

**FOOD INSECURITY AND FORAGING FOOD FROM  
GARDENING, HUNTING, AND FISHING AMONG  
SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM  
AND ELIGIBLE SUPPLEMENTAL NUTRITION  
ASSISTANCE PROGRAM FAMILIES**

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**By**

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GARDENING, HUNTING, AND FISHING AMONG SUPPLEMENTAL  
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SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM FAMILIES**

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## **DEDICATION**

This work is dedicated to my Ma, Rekha Ghosh

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## **LIST OF ABBREVIATIONS**

Supplemental Nutrition Assistance Program (SNAP)

Food Acquisition Purchase Survey (FoodAPS)

Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA)

Expansion of the Earned Income Tax Credit (EITC)

## **ABSTRACT**

Households participating in, or eligible for, USDA's Supplemental Nutrition Assistance Program (SNAP) deploy many food acquisition strategies to enhance their food security because the SNAP program is intended to supplement rather than provide all a household's food needs. My research is aimed at 1) better understanding how SNAP participation, income levels and other household characteristics affect the likelihood that a household will use food acquisition strategies such as gardening, hunting or fishing, and shopping at dollar and club stores, and 2) if strategies such as gardening, fishing, and hunting are associated with greater household food security.

The sustainable livelihood approach provides a framework to study everyday activities of individuals and households while examining the broader forces that affect their choices, especially how livelihoods are maintained in everyday life in a defined setting and environment. Using the USDA Food Acquisition and Purchase Survey data (FoodAPS), I examined the association between the choices of survey households and the broader structural context within which the actors are embedded.

There is no statistically significant difference between SNAP and other low-income non-SNAP households in terms of the food acquisition strategies examined. Higher income households are more likely to get food from gardening, fishing and hunting and are more likely to shop at club stores than are SNAP households. SNAP households and other low-income households are more likely to shop at dollar stores than are higher-income households. However, gardening, hunting and fishing are more common among households in rural areas, in the Midwest and with primary respondents who are white and married. Non-SNAP households with income levels above the poverty level are more

likely to receive fruits and vegetables from others' gardens than are SNAP households. Households that receive fruits and vegetables from others' gardens may maintain good social lives, which in turn may increase the chance of reciprocity. An area for further research might be understanding why gardening, hunting, and fishing do not appear to be widely used by low-income households. That understanding may be critical for the success of efforts to enhance food security of low-income households.

## **CHAPTER 1: INTRODUCTION**

Meeting family needs and reducing food insecurity and hunger are a challenge for households participating in the Supplemental Nutrition Assistance Program (SNAP) as well as other low income, SNAP-eligible households. Such underserved sections of society often adopt coping strategies or look for available resources that can help address their food needs and enhance their food security. This dissertation documents how less-studied coping/adaptive strategies like producing or foraging food (e.g. hunting, fishing and gardening) contribute to ameliorating food insecurity among SNAP and non-SNAP low-income households.

One of the root causes of food insecurity is poverty. As Rank (2004:39) describes, “having enough food on the table is a constant battle for families in poverty.” Poverty and income inequality are pressing problems in the U.S. For many people living in poverty, certain resources needed access to food and other essentials that are out of reach. Food assistance programs at the federal level play a significant role in reducing food insecurity among low-income households and individuals (Calloway et al. 2015, Ratcliffe et al. 2011, Davis et al. 2006). SNAP is the largest federal nutrition program in the U.S. However, more and more vulnerable people (including SNAP and other SNAP-eligible households) are either battling constantly with hunger, missing their meals at the end of the month before their paychecks come in, or even depending on risky and unreliable food sources. Such factors compel a wide range of adaptive and coping strategies, which sometimes include gardening, hunting and fishing to supplement food resources available to the household.

I am particularly interested in these latter adaptive and coping strategies. It is true that according to the U.S. Department of Agriculture (USDA) FoodAPS<sup>1</sup> data used in this study, the number of households engaged in getting food from gardening, hunting or fishing is small. My question revolves around the deployment of these strategies and how it is associated with enhanced household food security, potentially by increasing the number of choices available to the household. The livelihood perspective is included in this study as a framework that suggests that “food sources and strategies fit along a continuum of resources from more valuable and very stable or reliable to very risky and unreliable” (Whiting 2006:256). Incorporating the livelihood framework allows examination of the self-provisioning strategies used by the SNAP and eligible SNAP households and their relationship with food security level.

The overall goal of this study is to examine how SNAP participation, income levels and other household characteristics affect the likelihood that a household will use food acquisition strategies such as gardening, hunting or fishing, and shopping at dollar and club stores. In addition, I’m interested in seeing if such strategies are associated with household food security. I expect to find the following relationships: 1) households living in rural areas will be more likely to have their own garden; 2) households living in rural areas will be more likely to

<sup>1</sup> “USDA’s National Household Food Acquisition and Purchase Survey (FoodAPS) is the first nationally representative survey of American households to collect unique and comprehensive data about household food purchases and acquisitions. Detailed information was collected about foods purchased or otherwise acquired for consumption at home and away from home, including foods acquired through food and nutrition assistance programs. The survey includes nationally representative data from 4,826 households, including Supplemental Nutrition Assistance Program (SNAP), low-income households not participating in SNAP, higher income households.” <http://www.ers.usda.gov/foodaps>.



receive fruits and vegetables from other households' gardens; 3) households in the Midwest will be more likely to have their own garden 4) households in the Midwest will be more likely to engage in hunting and fishing, 5) households in the Midwest will be more likely receiving fruits and vegetables from others' garden, 6) large household size will be more likely to have their own garden, 7) SNAP households will be more likely to spend their money in dollar stores than non-SNAP households with low income, 8) non-SNAP households with high and marginal income will be more likely to spend their money in club stores than SNAP households, and 9) gardening, fishing, and hunting will increase food security among the households using these strategies. My findings highlight how minimal the statistical differences between SNAP and non-SNAP low income households are when it comes to deployment of gardening, fishing and hunting strategies. Some of my findings suggest that social, cultural, natural and human capital play important roles in reducing food insecurity. Most of all, this research is valuable for what it tells us about the hardships SNAP and eligible SNAP households face in enhancing their food security level in times of uncertainty, and the available opportunities that might help them address these challenges.

### *Poverty, Hunger and Food Acquisition*

Poverty is defined either in absolute or in relative terms. Absolute poverty is measured in relation to the amount of money that is required to meet basic needs like food, clothing, and shelter. It is defined in terms of external conditions that influence a person's economic transaction behavior like buying consumption goods and selling services. Relative poverty is defined in relation to the economic

standards of other members of society in a given societal context. These two definitions of poverty – absolute and relative – are largely concerned with income and consumption that prohibit individuals from fully participating in society (Rank 2004).

This inability to fully participate in society relates to the idea of social exclusion “The idea of social exclusion has conceptual connections with well-established notions in the literature of poverty and deprivation” (Sen 2000:3). Some scholars have focused on the causes of poverty such as culture, social structure and other related factors rather than simply measuring poverty. Thus a definition of poverty can be difficult to pin down since it is multidimensional and covers its association with social and physical hardships like hunger and food security (Whiting 2006).

Discussions about the causes of an individual's poverty are common in American social science, and policy. Rank (2004), tends to connect various social aspects and relate poverty with physical capital, human capital (i.e. skills and education), and cultural context in which the individuals live. This perspective is well understood, and effective programs and policies have been created to change the attitude, behavior and other related factors to alleviate poverty without making many changes in the overarching economic model, along with calls for augmenting the reserve of human capital through education, training, and skills among the poor (Olsen et al 2004, Kramer-Leblanc et al 1997, Wachtel 2001).

In contrast, the coexistence of poverty and affluence has also been argued to be a persistent problem (Rank 2004). In other words, the rich get richer and the

poor get poorer. In the United States, the capitalist system revolves around competition, a system which rewards the powerful actors in society at the expense of those that have limited or no access to resources, power or important institutions (Whiting 2006). For instance, Wachtel (2001), argues that the dominant class of society works more efficiently when there is poverty and inequality. Similarly, Rank (2004) comments that due to structural inadequacies in a society which includes low wages and an ineffective safety net, the majority of the Americans would experience poverty at some point in their adulthood. The late 20<sup>th</sup> century saw a retrenchment and reduction in the social safety net in the United States. "These reductions have included both scaling back of the number of benefits being transferred and a tightening of program eligibility" (Rank 2004:62). A lot has happened since 2004—the Great Recession, which caused a spike in poverty, followed by a gradual reduction in official poverty measures from 2011 or so until 2019. The current crisis (COVID-19), of course, has caused a new spike in poverty measures. To sum up, Rank's (2004) view is that prevailing poverty in America is because of structural inefficiency and vulnerability caused by low paid jobs and an ineffective social safety net.

From this point of view, it can be argued that in addressing poverty, American society fails to look at the broader picture like our economic, political and social structures, and instead of sharing responsibilities, turns economically vulnerable populations, welfare recipients and minority groups into scapegoats (Rank 2004). In other words, by focusing on the personal characteristics and tagging them as 'good' or 'bad', American society ignores the structure and lack of

opportunities that give rise to the social and economic conditions of these individuals (Whiting 2006, Rank 2004, Wilson 1996, Albrecht et al 2000). From this perspective, it would be meaningless to simply modify an existing program or add a new program. From this scholarly perspective, the whole structure needs an overhaul so that it can address and alleviate the root causes of poverty.

Rank (2004) argues that the concept of economic vulnerability is closely linked with the ignorance of the importance of human capital such as education, skills, and qualifications that help an individual overcome crises, do well in the labor market, and do not put them in a difficult situation in terms of their earning ability. Duncan (1999) also supported this perspective while studying poverty in three rural communities. She concluded that the importance of human capital is vital, especially in promoting educational opportunities, which take place in the context of economic and political constraints (Cotter 2002).

Similarly, Fitchen (1995) affirms that poverty is a combination of both system-level and individual characteristics. "Poverty has increased in certain rural places as a result of system-level factors, such as economic change, but socio-behavioral characteristics of individuals and households determine why, given these system-level changes, certain people have become poor or are poorer than other people" (1995:266). It is important, therefore, to examine the individual choices and household characteristics keeping in mind the social and economic factors in which people are living (Whiting 2006).

Rank also affirmed this perspective that structural failure at both political and economic levels has produced a shortage of opportunities and sufficient

support, resulting in high rates of poverty in America. As Rank (2004:81)

illustrates in his book “One Nation, Underprivileged” below:

“The structure of the American economy, along with its weak social safety net and the inadequacy of public policies directed toward the economically vulnerable, ensures that millions of Americans will experience impoverishment at any point in time and that a much larger number will experience poverty throughout a lifetime. The fact that three-quarters of Americans will experience poverty or near poverty (at the 1.50 level) during their adulthood is emblematic of these structural level failings.”

The above research shows that individual characteristics are important—human and social capital help explain who faces a higher risk of experiencing poverty at some point in their lifetime. But alongside individual deficiencies, the structural dynamics of American society result in substantial poverty. What these scholars argue is that to strengthen the work of the poor, the focus should be on collective responsibility and not just on social welfare reform initiatives. The approach of targeting just the social reform has accomplished little in terms of reducing poverty. This study focuses not only on households who are under the safety net of a federal food program, but also those whose individual income is low enough to force them to access available resources and capitals to enhance their food security level.

Since poverty is both a structural and an individual issue, larger reforms are needed along with individual level household characteristics to address food security. Thus, poverty, hunger and food insecurity are important parameters of economic hardship. Low and marginal income households use different strategies to manage their food security within a rigid institutional structure that limits their food choices and options. This study aims to examine the role of gardening,

hunting, and fishing when low and marginal income households and individuals face food insecurity because of poverty and uncertainty. This analysis seeks to understand the difference in the deployment of particular coping strategies like gardening, fishing, and hunting between SNAP and non-SNAP low and marginal households; another goal of this project is to determine which households (SNAP or non-SNAP) shop at alternative stores like dollar store and club store as a coping/adaptive strategy. Lastly, the project will examine the association of gardening, fishing and hunting with household food security, to see if such strategies are associated with enhanced food security levels of individuals and households under difficult circumstances.

### *Hunger and Food Security in the United States*

Food insecurity and hunger are closely associated but are distinct concepts. Hunger refers to a personal physical discomfort caused due to lack of food, while food insecurity is the inability to have access to food because of a lack of financial resources at the household level. The U.S. Department of Agriculture (USDA) defines food insecurity as a lack of nutritious food necessary to lead a healthy life both physically and mentally (Coleman-Jenson, Nord, and Singh, 2014). Other scholars have defined food security as access to sufficient food by all people to lead an active, healthy life (Jensen 2000, Andrews 1998, Hamilton 1997, Bickel 2000). Another definition is that food insecurity is the inability to obtain adequate, nutritional and socially appropriate food for oneself and their family (Van Esterik 1999, Riches 1999). All these definitions emphasize the necessity of enough food

(quantity), but also give consideration to quality concerns (nutritionally adequate). Clearly, food insecurity is a complex problem that is present in both developed and developing countries. Because it may differ from household to household depending on political, social and economic experiences, there is no single face of food insecurity. Even though definitions of food security include many aspects of the food system and food security is closely related to poverty, it is usually measured at the household level (as it is in my study) where food provisioning usually occurs.

Food insecurity affects millions of people every year. There are various federal programs and services that aim to alleviate problems related to poverty and hunger, as well as individual and household adaptation to certain needs and situations. While there are different measures of poverty as discussed above, the official poverty rate declined sharply after 2010, from 15.1 percent in 2010 to 11.8 percent in 2018, the lowest level since 2001 (statista 2020), but after the COVID-19 crisis there is a high probability that poverty rate will rise as compared to pre-crisis period. Likewise, SNAP participation peaked in 2013, but declined by almost 12 million between 2013 and 2019,<sup>2</sup> although the current situation with the COVID-19 pandemic has certainly changed household food security and SNAP participation. Change in the participation rate can be due to changes in policy, but most of it is tied to rising incomes among low-income Americans since the end of the recession (Oliveira et al. 2018). Among the marginal sections of society, studies specific to

<sup>2</sup> <https://fns-prod.azureedge.net/sites/default/files/resource-files/SNAPsummary-7.pdf>

food acquisition point to opportunities and strategies that may play an important role in enhancing food security for households and individuals. They also suggest that vulnerable groups can be rather innovative as they seek food security.

This project is specifically interested in understanding food provisioning choices like producing or foraging food (e.g. fishing, hunting, and gardening) used by SNAP households and by households that are not participating in SNAP even though they are likely eligible, especially to see if these strategies are associated with enhanced household food security. Those households are potentially eligible but not participating in SNAP include two categories, those households with low income (<100% of the Federal Poverty Guideline) who would automatically qualify for SNAP and those with marginal income ( $\geq$ 100% and <185% of the Federal Poverty Guideline) which may or may not qualify for SNAP benefits. These categories were used in order to examine if there is any difference in deploying strategies like gardening, fishing, and hunting between low income households who are enrolled in the SNAP program and eligible low- and marginal-income households who are not in SNAP. This study focuses on the adaptive and coping mechanisms used by households that may enhance their food security. This study has used USDA's National Household Food Acquisition and Purchase Survey (FoodAPS), a survey that collected detailed, nationally-representative data on household food purchases and acquisitions.

In this chapter, poverty, hunger and food security is discussed and examined in the context of the broader food system in the United States. Coping and adaptation strategies used by low and marginal income households and individuals



in the form of food assistance programs and strategies are examined as they are studied in the existing literature.

### *Project Contributions*

This project aims to understand the association between food acquisition strategies like gardening, hunting, fishing, and food security for SNAP and non-SNAP participants. This study also documents how members of low-income and marginal income household's cope and make choices in uncertain times to provide food for themselves and their families in the U.S.

Seeking from several scholarly literatures, this project contributes various key theoretical, and methodological insights. Poverty research, and especially food security studies, exploring household coping strategies such as gardening, fishing and hunting are limited. This is in part due to the difficulty of conducting research studies in this arena, and inaccessibility of data, but also because these strategies are often considered sport or culture rather than coping strategies. This work also contributes to the literature by examining differences between SNAP and non-SNAP households. The existing literature that has focused on food acquisition methods and included strategies like gardening, fishing, and hunting as part of coping strategies have not considered whether SNAP and non-SNAP households may differ in their use of these strategies to enhance their food security.

The sustainable livelihoods scholarship states that households construct their livelihoods i.e., "livelihoods are shaped by the ability of individual households, groups, and communities to negotiate among themselves, others, and the markets. Outcomes are determined by a person's resources and activities

especially the ability to access, acquire, and control the values created by labor and capital” (Valdivia and Gilles 2001:6). Households must use available and accessible capitals and assets to maintain these livelihoods. Simply put, households need to act according to available capitals and capabilities. This project contributes to understanding how households may deploy different capitals in accessing food. When applied to self-provisioning, this literature points to the importance of considering types of food acquisition methods like gardening, hunting and fishing that SNAP and non-SNAP households may use. It may also indicate the potential benefits of taking initiatives to grow and support efforts related to self-provisioning, which in turn could assist socially disadvantaged and vulnerable groups of society, and by extension, the community as a whole.

The next chapter provides a description and history of SNAP and a discussion of some of the challenges faced in studying the program. Understanding SNAP is important because of the role played by the program and the strategies used by low-income households to enhance food security. Chapter 3 provides further details about the livelihood perspective as well as related and relevant literature to food provisioning. Chapter 4 presents the methodological framework and the data analysis conducted in this project. Chapter 5 presents statistical analysis that examines the characteristics of households that use gardening, hunting, and fishing or that use alternative stores like dollar and club stores as coping/adaptive strategies. Chapter 7 also uses statistical analysis to examine whether these strategies enhance food security for surveyed households. Finally, this study is summarized in the form of final discussions, concluding thoughts and

future research directions in chapter 7.

## **CHAPTER 2. THE SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM**

Households and individuals in the United States that experience hunger and food insecurity face difficult and uncertain choices. There are several programs and services focused on reducing food insecurity, typically used in conjunction with individual adaptations to address particular needs and situations. Research directed at food acquisition methods used by poor and vulnerable groups explore opportunities and strategies that can help these households achieve food security. While examining food strategies, “it is important to acknowledge the role of structural context and individual agency, because the poor make choices within a given context of an assortment of “opportunity structures” (Whiting 2010:503). This project is specifically designed to examine how gardening, fishing, and hunting is deployed by SNAP and non-SNAP households for acquiring food security.

In this chapter, food security is examined both in the structural context and broader safety net in the United States. Coping strategies and adaptations are examined for low income households that participate in a food safety program like SNAP. Multiple factors associated with SNAP must be considered by researchers examining the differences in approaches between SNAP participants and non-SNAP low-income participants in using food acquisition strategies to cope with food insecurity or to moderate their food security level. These factors include eligibility criteria to participate in the program, reasons behind under-reporting (failing to report correctly, for example, in government surveys) of participation by

SNAP participants and decisions by eligible households not to participate in SNAP. Also to be discussed is past research on the effectiveness of SNAP as an anti-hunger program, and methods that were used by previous researchers to measure the impact of SNAP on food security. It would be interesting to examine whether SNAP participants, after being under the federal safety net umbrella which requires them to go through a lengthy process of application and meet the required criteria to be in the program, continue to deploy same strategies of gardening, hunting and fishing to enhance their food security as may be used by eligible SNAP and marginal income participants who do not participate in SNAP.

### *History of SNAP*

The US government's best known and most common means to reduce hunger and food insecurity is the Supplemental Nutrition Assistance Program. SNAP is the largest nutrition federal program in the country, and by definition, is designed to help low-income people and households buy the food they need to lead a healthy life. When hunger was recognized as a large problem in the nation in the 1960s, a food assistance program was designed to help needy Americans. In 1963, President Kennedy started a pilot project called the Food Stamp Program (FSP) which was renamed in 2008 as SNAP (Bartfeld et al. 2015). Bartfeld (2015) refers to President Kennedy who in his own words describes the early success of food assistance programs by stating,

"during the past year, the Department of Agriculture has been conducting a food stamp program in eight pilot areas. There have been encouraging results from this program. Low-income families are receiving better diets- they have been able to obtain meat, poultry, fish, milk, eggs, fruits

and vegetables. Retail food store sales in these areas increased 8 percent in dollar volume. There have been savings in distribution costs and benefits to the economy of the food stamp communities." (Bartfeld et al. 2015:1)

In 1971, "Congress amended the Food Stamp Act to establish national level eligibility and benefit standards" (Bartfeld et al. 2015:3). This resulted in a rapid increase in the number of participants. However, many anti-hunger advocates still believed that the program was not reaching the neediest because of something called the purchase requirement (Rank 2004). The purchase requirement was set up to work this way: "recipients paid for the stamps (limited to no more than 30 percent of their income with the 1971 amendments) and then received a "bonus" payment to cover the difference between the amount paid and the amount needed to attain a low cost, nutritionally adequate diet." (Bartfeld et al. 2015:4). However, this left the destitute to purchase the stamps and made others reluctant to participate in the program especially when the bonus amount was very small (Bartfeld et al. 2015). In 1977, the Food Stamp Act eliminated the purchase requirement and replaced it with the 'net income rule.' The participation rate jumped by 1.5 million recipients. Subsequent changes happened to reduce barriers to program access. By the early 2000s, electronic benefits transfer (EBT) replaced the traditional vouchers that were used to make purchases. As of 2015, benefits could be redeemed at nearly 250,000 outlets nationwide (Bartfeld et al. 2015). After fifty years of the program, one in seven Americans benefited from this program in 2013 at a federal fiscal cost of \$80 billion (Bartfeld et al. 2015:1). In 2019, 12% of the total population (1 in 9) benefited from this program (CBPP, 2019). However, it is generally accepted that

the cost of the program would be much higher if every eligible participant actually received benefits through SNAP. SNAP enrollment expands during economic recession and shrinks when there is reduced need. While there was a decline in participation in the late '90s, it rose sharply during the recession that began in 2007 (Bartfeld et al. 2015).

Under this program, working age adults without any children are required to work or participate in a work program for at least 20 hours per week in order to receive SNAP benefits for more than 3 months in a 36-month period.<sup>(3)</sup> Once the time limit is met, they are supposed to work for 80 hours per month or should enroll themselves in an educational institute or training program that gives them a job for the same amount of time. However, the state has the right to waive these three months if there is a sufficient increase in the unemployment rate and drop the waivers when the economy improves.<sup>(3)</sup>

In 2017, 84 percent of eligible Americans participated in the SNAP program.<sup>(4)</sup> The U.S. Department of Agriculture, who administers the program, claims that in 2010, 51 million people were poor and were eligible to get federal nutrition assistance, but only 38 million people actually received them. However, “nationally, the SNAP participation rate among all eligible persons was 85 percent in FY 2016” (USDA-FNS 2019).

<sup>3</sup> <https://www.fns.usda.gov/snap/work-requirements>

<sup>4</sup> <https://www.fns.usda.gov/snap/trends-supplemental-nutrition-assistance-program-participation-rates-fiscal-year-2010#:~:text=Overall%2C%20the%20program%20served%2084,rate%20has%20been%20fairly%20stable.>

### *Eligibility Criteria for SNAP Participation*

SNAP, by definition, is set up to help low-income people and households buy the food they need to lead a healthy life. The goal of SNAP program, is to reduce hunger and malnutrition, and was formerly known as the food stamp program. SNAP, like the food stamp program that came before it, allows its recipients to use their benefits at approved SNAP retailers.

The monthly SNAP amounts that are allotted are calculated based on income- gross monthly income, net income, and assets (households without a member who is elderly or has a disability must have assets of \$2,250 or less to participate, and households with at least one-member age 60 or older, or is disabled must have assets of \$3,500 or less).<sup>5</sup> These amounts are updated annually. The income that is used to determine the allotment is calculated on "net monthly income". Some of the deductions that are taken into consideration are medical expenses for adults or disabled individuals, child support payments, shelter expenses, and dependent child care costs. In the present scenario, the calculations of allotment amounts do not consider other factors, like household structures (e.g., single parent vs two-parents' household), food access, regional price variations and other factors that may affect the families' food purchasing budgets (Moore et al. 2009 and Calloway et al. 2015). In such cases, it becomes a challenge for SNAP households to meet family needs and reduce food insecurity and hunger. The program was deliberately renamed the "Supplemental Nutrition Assistance Program" to clarify that it is not designed to satisfy all the food needs of low-

<sup>5</sup> <https://www.fns.usda.gov/snap/recipient/eligibility>



income families. SNAP participants are expected to adopt some coping strategies that help to enhance their food security and meet food needs.

### *Challenges and Participation*

Ward et al. (2000) suggested that although food needs were still high at the turn of the 21<sup>st</sup> century, there was a decline in Food Stamp participation.

Observations suggest that some of the most common factors that prevent eligible individuals from participating in the program are sociological, psychological and economic.

The economic literature points out the utility framework that includes cost and benefit analysis as the cause for participating and not participating in the federal assistance nutrition program (Brizmohun and Duffy 2016). Based on the economic models, the participation cost associated with claiming the benefits “including both transaction costs (time and money spent on transportation to the welfare office, time spent filling out forms and so on) and the psychological cost of shame and stigma” are seen as major deterrent factors (Brizmohun and Duffy 2016:4).

SNAP functions most effectively as a fiscal stabilizer, which means the enrollment rises when the economy and the market income fall to smooth consumption and vice versa (Bartfeld et al. 2015). Congressional Budget Office projected that by 2022,<sup>6</sup> there will be a 23 percent fall in participation due to improved labor market conditions (Bartfeld et al. 2015). Some of the policy related

<sup>6</sup> This was modeled prior to economic disruptions due to the COVID-19 pandemic.

impacts on SNAP participation are due to major social welfare reforms in the 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), which “directly it eliminated eligibility for most legal permanent aliens unless they had ten years of work experience or were veterans.” (Bartfeld et al. 2015:21). It also took away convicted drug felons eligibility to participate in the program (Bartfeld et al. 2015). Participation was also affected when paper coupons were replaced with debit cards, making it compulsory for the states to adopt electronic benefit transfer (EBT) (Gabor and Botsko 1998; Gleason et al. 2001). Other significant policy change that affected the participation rate indirectly prior to PRWORA was the 1993 “Expansion of the Earned Income Tax Credit (EITC) that pulled scores of the single mothers into the labor force and off welfare and SNAP” (Bartfeld et al. 2015:22)

Beyond policy changes and macroeconomics, demographic shifts in the US can also be a possible factor affecting the size of SNAP participation. One of the misconceptions among the elderly is that by choosing to opt out of the program they are not taking away benefits that could be made available to the younger population. Also, because a decline in marriage rates and comparative increase in percentage of single mothers from 1980 to the mid-2000s (from 15 to 40 percent) have made it more likely for these individuals and families to be poor, it is possible that the participants are younger and larger in number (Cancian and Reed 2009, Carlson and England 2011).

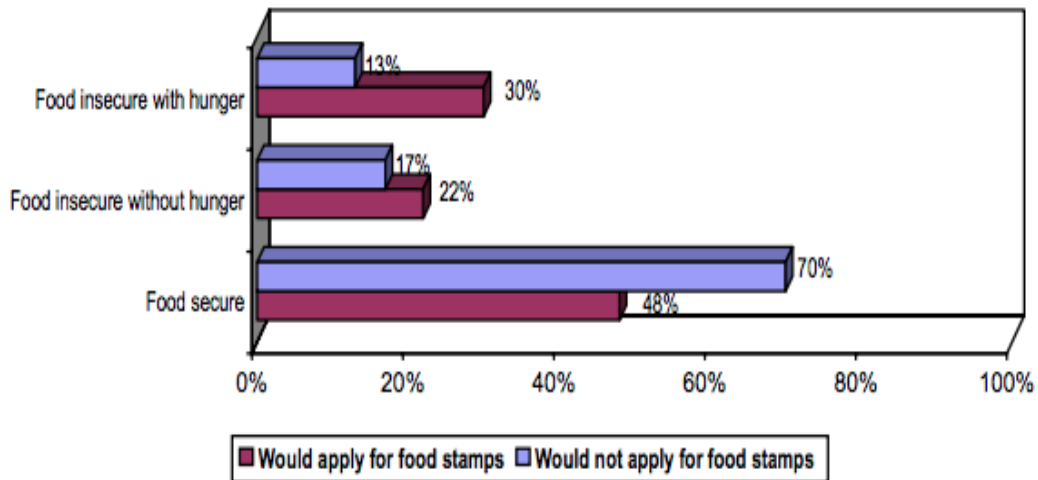
From a social perspective, eligible participants often consider SNAP participation a stigma. For example, limited income families who had to use

physical food stamp coupons to pay at grocery stores might have felt that their fellow shoppers were stigmatizing them. Rogers-Dillon (1995), for example, argued that users who use food stamps are tagged as a welfare recipient and constitute what Goffman (1986) terms as stigma symbols (Brizmo and Duffy 2016). Although anticipated increase of participation among eligible households and reduced stigma were key arguments supporting the adaptation of EBT as a mechanism of program delivery, Ziliak (2009) did not find any evidence to support the argument in his study.

Another reason for low participation in SNAP could be the laborious process an applicant has to go through to apply, including filling out an 18-page questionnaire. Not only is there a sense of indignity associated with filling out the form, but also minimal assistance is provided to people who struggle to complete the process. Some are even reluctant to share personal information that is required to determine SNAP participation eligibility. Overall, for some, the process is difficult to navigate, while for others, lack of awareness and eligibility criterion prevent them from receiving benefits through the SNAP program. While reviewing the economics of food insecurity, Gunderson et al. (2011) argued that there are mainly three reasons eligible participants do not partake in the SNAP program: 1) possible stigma associated with participation which may range from personal distaste for receiving food assistance to the possible negative reaction from others, 2) transaction costs of the whole process including costs such as claiming benefits to transportation costs and 3) low benefits which can be as low as \$17 per month for some families (see also Brizmo and Duffy 2016). The food security status of

a family could very possibly be one of the important reasons for not participating in the SNAP program even when they are eligible. The below figure illustrates the same. As reported by USDA ERS (2004:40), “Households that reported they would not apply for food stamp benefits even if they knew for certain they were eligible were overall more food secure than households that reportedly would apply to the FSP, possibly indicating a lower need for benefits.”

**Figure 1. Food Security Status of Eligible Nonparticipants by whether Would Apply for Food Stamps (Percent of Group with Characteristic)**



Source: USDA, ERS 2004

Underreporting by SNAP participants (meaning failing to report participation in the program by when surveyed) or denial of SNAP participation to eligible participants can affect the analysis of program impacts. Underreporting is the most serious challenge to measuring the antipoverty effect of SNAP and may lead to its underestimation. “Underreporting of benefits has the greatest effect on the severity index” (Bartfeld et al. 2015:67). Measurement error is thus a serious concern

confronting an accurate assessment of the program. This leads to an understatement of the impact of SNAP insofar as it does not measure those whose level of poverty is diminished, even if a family do not move above the poverty line (Bartfeld 2015). It is possible that a household may fail to report their participation in SNAP for a variety of reasons, including a feeling of stigma or failing to recall participation in the past twelve months, especially if participation is sporadic (Tiehen et al. 2012). One of the methods used by previous work to correct this underreporting was to use aggregate USDA administrative data on recipients and benefits (Tiehen et al. 2012). Then a weighting procedure was applied by the researchers to match the SNAP participant's data to the number in the administrative data.

When underreporting was corrected, there was a substantial increase of SNAP's anti-poverty effect (Wheaton and Tran 2018). Wheaton (2007) found that correcting for underreporting increased the estimate of the number of people removed from poverty by 86 percent in 2004. Tiehen and Jolliffe (2012), and Smeeding (2015) also found a similar result: adjusting underreporting led to the doubling of the effect of SNAP on the poverty rate in 2011, with an even larger effect on estimates of the severity of poverty. Sherman and Trisi (2015) found that after correcting for underreporting, SNAP removed 10.3 million people from poverty in 2012.

Underreporting or denial of participation in the SNAP program makes it difficult to obtain a correct estimate of its anti-hunger effect. In addition, some eligible households do not participate in SNAP for a variety of reasons. Therefore, this project will broadly focus on two groups: households participating in SNAP

and those who are likely eligible for the program but do not participate in SNAP. It is important to both understand how effective government food assistance programs are in providing a safety net and how dependent poor and vulnerable groups in society are on individual agency and capitals. Although answering these questions is beyond the scope of this project, in this study, these questions help explain the role of in gardening, fishing, and hunting in enhancing food security level when SNAP and non-SNAP households fall short of food occasionally.

### *Measuring the Effectiveness of SNAP*

As the name suggests, SNAP is not meant to address all nutritional needs of low-income households. The poverty rate solely considers cash income to determine whether a family is poor or not. It excludes in-kind transfers such as SNAP, Medicaid, Medicare and taxes paid (Bartfeld 2015). Another problem in determining its effectiveness is associated with under-reporting of the participation rate and the gross amount of benefits received by the participants.

Food insecurity is an important factor in the decision to apply for SNAP (Nord and Golla, 2009) which makes sense, given that SNAP is an anti-hunger program “designed to reduce food insecurity. However, the relationship between food insecurity and SNAP participation is complicated by selection bias. As such, studies that have attempted to derive the impact of SNAP on reducing food insecurity have faced the difficulty of accounting for self-selection” (Brizmohun and Duffy 2016:9). Self-selection means those who are food insecure are more likely select themselves to participate in SNAP. Taking the example of health and

nutrition, the goal of SNAP is to alleviate hunger and provide resources to buy healthy food or a nutritious diet. Assessing the impact of SNAP on food insecurity and on health and nutrition is a challenging task in survey data because of the possibility of reverse causation and self-selection. Many of the health issues may be long term and not actually influenced by SNAP participation, and one way to handle this is to control the self-selection bias. Most research does not deal with reverse causation issues, and if it does, it relies on low-power instruments. Another possible solution could be to use more structural identification assumptions that can separate ties on the effects of SNAP (Bartfeld 2015). In other words, causality goes in both directions, but we can control for a lot of factors before we can measure the "true" beneficial effects of such programs. One common approach to deal with this is as follows: if there is "no geographic variation in federal rules," then we can "limit the analysis to more comparable treatment or control groups" (Bartfeld 2015:153).

Another challenge that a researcher faces in measuring the effectiveness of SNAP on food security or health, in general, is that participants are not selected at random from the population. Also, comparing SNAP participants and non-SNAP participants is "conditional on observable characteristics-may not be apple to apple comparisons" (Bartfeld et al. 2015: 134). Comparing SNAP and non-SNAP participants could be biased. The challenge here is that any of the comparisons of participants and non-participants in standard data set suffer misclassification because SNAP participants are under-reported and some of the reported non-SNAP participants are enrolled in SNAP in reality (Bollinger and David 1997). To get an unbiased estimate of the effectiveness of the program, one can randomly assign an

offer to participate in the program to otherwise identical eligible individuals, then compare the eligible participants to the denied eligible individuals to participate (Bartfeld 2015).

Although theory may predict the effect of SNAP on food security as positive, another concern is that empirical analysis may be different. SNAP participants are endogenous, i.e., participation is a behavioral outcome. Both food security and SNAP participation are influenced by other factors, and failure to measure those factors lead to spurious associations. For example, Josh and Colleagues (2012) reported a host of hardships that are usually associated with food hardships, like ill-health, housing insecurity and losses of utilities. If these factors prompted participants to enroll in the SNAP program, it is obvious that they will be in a much more disadvantageous position than non-SNAP participants (Bartfeld et al. 2015), thus leading to a negative association between SNAP and food security.

#### *Impact of the Food Stamp Program on Low Income Households in the United States*

One of the most important dimensions of ill-being, food insecurity, and poor health is poverty. SNAP is considered as an anti-poverty weapon; SNAP benefits increase income among a marginalized section of society and improve their well-being even if they do not lift the low-income population out of poverty.

SNAP benefits reach a broad range of disadvantaged households and are not limited to specific demographic groups based on household structure, disabilities status or age (Ziliak 2009). Recently, there has been a concern that changes in SNAP administration have made the program less targeted to poor people (Armor

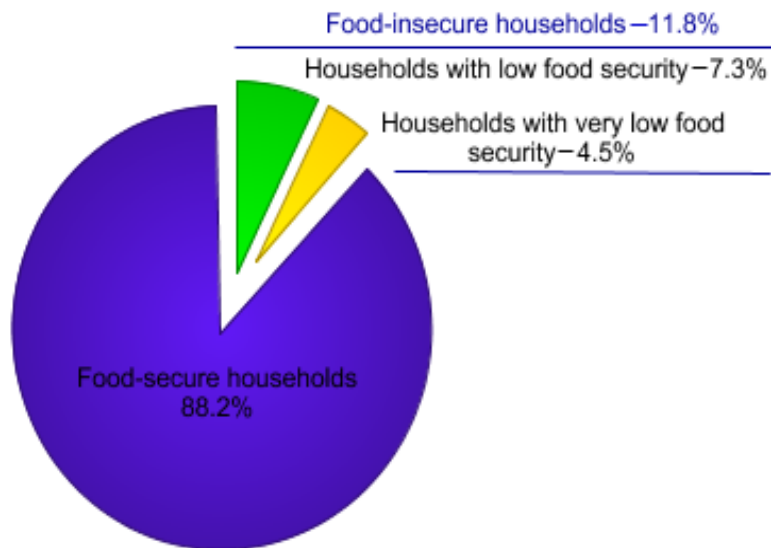


and Sousa 2012; Rector and Bradley 2012). The extent to which SNAP reduces poverty is an important factor in determining its effectiveness as an anti-hunger program. There is a constant scholarly effort to understand the impact of food insecurity and the reason households are food insecure. One policy solution in the U.S. has been in the form of food assistance programs. SNAP "serves as the first line of defense against hunger and is designed to reduce food-related hardship, such as food insecurity" (Ratcliffe et al. 2011:1).

Previous studies show that the anti-poverty effect of SNAP increases when the "poverty rate increases during difficult economic conditions" (Bartfeld et al. 2009:55). In 2011, "the official poverty rate was 15 percent," whereas, "SNAP benefits reduced the poverty rate to 13.8 percent. This reduction clearly shows that SNAP lifted approximately 3.9 million out of poverty in 2011" (Bartfeld et al. 2009:55). "SNAP benefits have a stronger effect" on poorer families whose "income is below 50 percent of the poverty line. In 2011, SNAP reduced the deep poverty rate by 16.6 percent." (Bartfeld et al. 2009:55).

Some studies have found that SNAP participation has no statistically significant effect on food insecurity or SNAP do not contribute to food insecurity (Gunderson and Oliveria 2001, Davis and Foster 2015, Huffman and Jensen 2008), while other studies that used different data and methodologies state that SNAP reduces food insecurity or insufficiency (Bartfeld and Dunifon 2008, Borjas 2004, DePolt et al. 2009; Nord and Golla, 2009, Yen et al. 2008, and Ratcliffe et al. 2011). Figure 2 below shows the pre-Covid 19 food security status of U.S. households.

*Figure 2. U.S. Households by Food Security Status, 2017*



Source: USDA, Economic Research Service, using data from the December 2017 Current Population Survey Food Security Supplement.

Clearly, there are contested views about the role of SNAP in reducing food insecurity which I do not intend to explore. Instead, I desire to focus on gardening, fishing, and hunting as a coping/adaptive strategy and its relationship to food security. Using USDA Food APS survey data, this study seeks to bring out the differences in the coping/adaptive strategies between SNAP and non-SNAP low-income participants during their time of difficulties. For example, the availability of capitals, resources, and finance plays a big role in determining food choice among needy and vulnerable households. The shortcomings of the previous studies mentioned above are that they address food security but not the role that coping strategies like (hunting fishing and gardening) can play in the lives of SNAP and non-SNAP low-income households, and, in particular, to what extent these

strategies are effective in reducing food insecurity. Also, this study will determine which households (SNAP or non-SNAP) shop from alternative stores like dollar store and club store.

### Conclusions

Some households with low income struggle to feed themselves and their family sufficiently even if there are opportunities for food acquisition. These households seek other resources like social support, as well as other programs and strategies to fill the gap. Although food programs are designed to reduce food insecurity and help household access to food, research indicates that these programs serve different needs as they are organized in varied ways. There is also a gap in the published literature in understanding what distinguishes households that could participate in SNAP and don't, from those who do participate. There has been little research on the likelihood of these low-income households using coping strategies like hunting, fishing and gardening. In this section I have made an attempt to lay out the background and some of the important stances related to SNAP so that readers understand the significance of self-provisioning strategies like gardening, fishing, and hunting and analyzing their relationships to food security levels.

### **CHAPTER 3. RELEVANT THEORETICAL FRAMEWORKS: LIVELIHOODS AND COPING STRATEGIES FOR POVERTY AND HUNGER**

An analysis of literature on poverty reveals that the Sustainable Livelihood Approach (SLA) aims to reduce poverty and vulnerability by helping people develop strategies utilizing a wide range of assets. This approach is widely used in the rural context, but can also be applied in an urban context (Research Project for the Department for International Development (UK), 2001). This framework offers a way to explain and study everyday activities of individuals and households while examining the broader forces that affect their choices, especially, how livelihoods are maintained through continuous interactions (reciprocity) and negotiations (redistribution) in everyday life in a defined setting and environment.

“As assets and resources (spanning all different types of capitals) inhabit both the individual and structural realms, the focus in SLA is on the negotiations required each day to access and use different capitals to enrich a household’s well-being. According to the Livelihood framework, it is crucial to navigate and document a range of resources—both tangible and non-tangible—available to households in a given context. This framework may help scholars comprehend household food acquisition strategies because it takes into consideration agency as a bridge between actors and structures.” (Whiting 2006:80).

Applying the sustainable livelihood theory, I examine the association between the choices of the actors (SNAP and non-SNAP participants) and the broader structural context within which the actors are embedded.

This study analyzed coping strategies or adaptive strategies that are pursued by SNAP and non-SNAP participants to enhance their food security. I build on existing literature by focusing on only three strategies- gardening, fishing and

hunting. These three strategies are hypothesized to enhance the food supply of SNAP participants, unlike other coping /adaptive behaviors that SNAP participants use to stretch their food supply, such as skipping meals. Other strategies such as avoiding buying expensive food, buying from dollar stores and big box stores, or relying on emergency food supply, etc. likely result from the condition of food insecurity, rather than a reflection of attempts to lift themselves into food security.

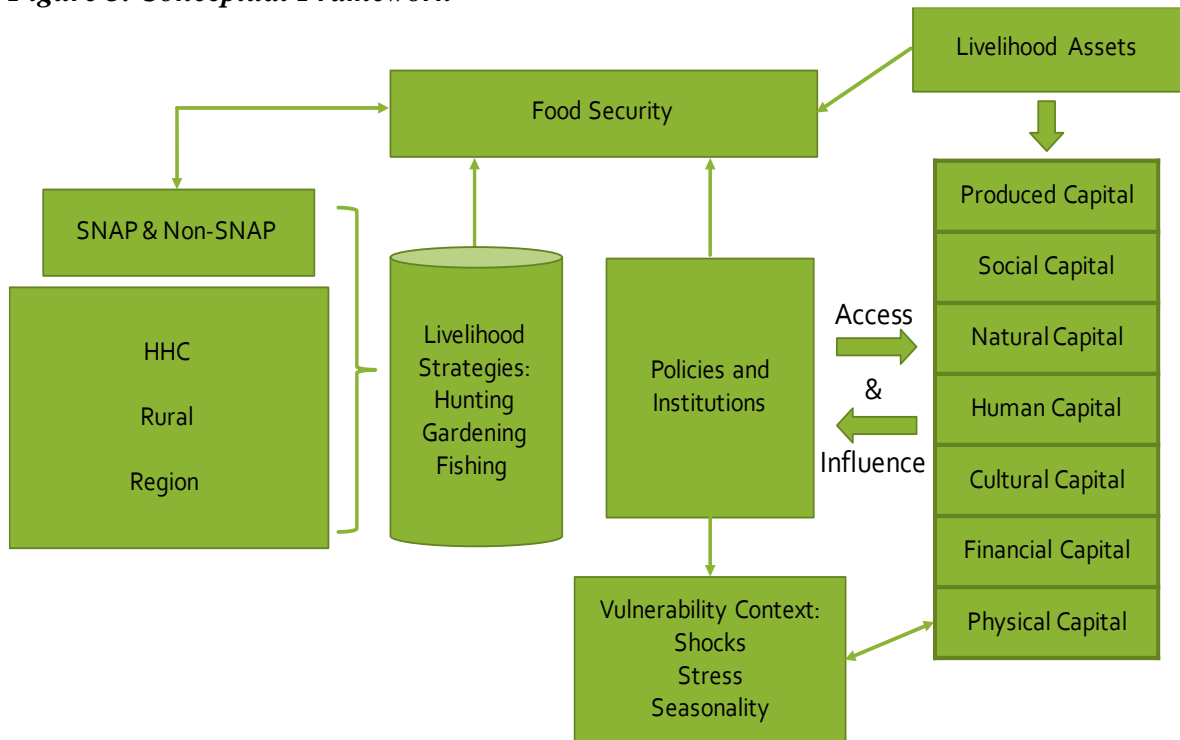
### *Conceptual Framework*

“Household and individual livelihood strategies are associated with the environment and socioeconomic contexts in which people live.” (Peng et al. 2017:1). Strategies are determined by tangible resources like financial, physical, or natural capital, and intangible ones like human and social capital known as diversity of household assets, in addition to social institutions that determine how or whether one has access to assets. Peng et al. 2017). Therefore, “livelihoods are multidimensional, but are not merely a summary measure of cash-equivalent resources” (Peng et al. 2017:3).

A conceptual framework as defined by Miles and Huberman (1994) is a visual or written product that "explains, either graphically or in narrative form, the main things to be studied- the key factors, concepts or variables- and presumes relationships among them" (1994:18). A conceptual framework based on the sustainable rural livelihood framework (Department for International Development, 2000; Peng et al. 2017) is presented below to provide the conceptual and theoretical foundations of this study on household livelihood sustainability analysis (see

Figure 3). Natural (like geographical location, soil, water) and socioeconomic (like education level, household size) contexts influence household decisions to adopt different livelihood strategies (like gardening, fishing, and hunting) (Peng et al. 2017). Here, I first classify household livelihood strategies like fishing, hunting and gardening and how they are deployed by SNAP participants and nonparticipants, and then, based on my data, examine the impact these strategies have on the food security level of SNAP and non-SNAP households and individuals.

**Figure 3. Conceptual Framework**



The conceptual map above is an approach to develop a model to study the different livelihood strategies used by SNAP and low-income, non-SNAP households (the latter includes those with income <100% of the Federal Poverty Guideline and those with income between 100-185% of the Federal Poverty

Guideline) to cope with hunger and food insecurity. Livelihood strategies are defined in this study as coping/adaptive strategies including fishing, hunting, and gardening. Policies and institutions which may include government and private sectors, laws etc. influence livelihood assets (human capital, social capital, physical capital, financial capital, produced capital, cultural capital, and natural capital) and in turn, access to these assets influences policies. Vulnerability context including stress, shocks, and seasonality is directly related to livelihood assets. Policies and governments can take care of these long or short-term stresses and shocks to help the low-income households maintain their livelihood. Livelihood strategies (hunting, fishing and gardening) may enhance the food security level, which is the outcome variable.

The livelihoods perspective highlights actual behavioral choices that low-income members of society make to cope with hunger, poverty, and insecurity. The hypotheses for this study are framed within the sustainable livelihood theory. In the following section, the livelihoods perspective will be discussed as a way to examine choices and adaptations of low and marginal income individuals and households within the given context.

#### *Theoretical Background: Livelihood Sustainability*

Sustainability is considered a significant part of the research on household livelihoods. Sustainable livelihoods can also be defined as the ability of households to maintain a certain standard of living and sustain themselves when they face stresses and shocks (De Haan 2000, Chambers and Conway 1992). Stresses can be

long and short term, which include coping with hunger for certain periods in a year. On the other hand, shocks are more short term and are triggered by natural calamities like earthquakes or tornados or sudden changes in the economy (economic recession) and political conditions (SNAP benefits and eligibility criteria). The advocates of sustainable livelihoods claim that it is both a participatory approach and a long-term vision. It aims to reduce poverty and increase the sustainability of livelihoods by (Research Project for the Department for International Development (UK), 2001:24):

- “Increasing access to social services, natural resources, and infrastructure
- “Developing a cohesive social environment
- “Securing access to financial resources and
- “Developing institutions and policies that support multiple livelihoods strategies and equitable access to markets”

This work focuses on ways in which SNAP and likely eligible, non-SNAP households adapt when their household is facing food insecurity. The livelihood framework allows examination of the association between choices of the actors and the broader structural context within which the actors are embedded. This framework offers an explanation and a way to study the everyday activities of individuals and their households while examining the broader forces that affect their choices. The sustainable livelihood approach focuses on the ability of the household to maintain a certain standard of living. It is defined as those households that are capable of maintaining an adequate livelihood, and sustaining themselves from shocks and stresses (de Haan 2000, Chambers and Conway 1992). De Haan



(2000) states that livelihood sustainability depends not only on social but also economic inclusion, thus, members of the society that are excluded are less likely to have a sustainable livelihood. Similarly, Chambers and Conway (1992) state that to achieve a sustainable livelihood one needs capability ("what a person is capable of doing or being" (1992:4), equity (refers to the distribution of resources such as "assets, capabilities and opportunities and especially enhancement of those of the more deprived" (1992:4) and sustainability (defined as a capability to maintain livelihood "while maintaining the local and global assets and capabilities on which livelihoods depend" (1992:5) which includes both micro and macro conditions. These three components are the means and ends of sustainable livelihood (Chambers and Conway 1992).

The sustainable livelihood approach goes beyond traditional approaches, and includes vulnerability and social exclusion in its framework. The sustainable livelihood approach offers a coherent approach to poverty (Krantz 2001). The rural livelihood framework, in general, is mostly applied for developing countries, however, de Haan (2000) argues that the distinct concept of developing countries is no longer applicable as it all comes down to the understanding of poverty and vulnerability. The framework of livelihood could very well be applied to the context of individual activities and practices within a structure and a larger environmental context (Whiting 2010). The concept of livelihood pertains to individual households and their ability to maintain a certain standard of life.

Livelihoods are maintained through continuous interactions and negotiation in everyday life in a defined setting and environment (Valdivia and Gilles 2001, Ellis

1998). Valdivia and Gilles (2001) emphasize that through their daily negotiation and access to the resources, individuals satisfy their wants and needs. The livelihood perspectives follow the idea of assets in different forms, like the capital or assets and resources households use to carry on with their everyday lives (Whiting 2010). Assets and capabilities are both the end and the means (Chambers and Conway 1992) that can be substituted for needs, to maintain a livelihood strategy. This is both suggested by literature and very relevant to this study. Vulnerable households with low income adopt different hunger coping strategies to mediate risk.

In this study, coping strategies or adaptive strategies are defined as actions that food insecure individuals and households might pursue to try to increase their food security, with particular attention paid to the practices of hunting, fishing, and gardening. Coping strategies (like fishing, hunting, and gardening) can be short-term (as all the three social variables are subject to change as the food security levels improve), and can also be a form of livelihood strategy like prolonged 'adaptive strategies' (de Haan 2000). In this context, it may also be reasonable to consider the three coping strategies chosen for this study -hunting, fishing, and gardening – could also be recreation, habit or culture for many households/ individuals, as opposed to coping mechanisms to overcome economic hardships. For instance, it is difficult to tease out how gardening may be used as a coping strategy when it may also be a cultural habit or an enjoyable pastime. Perhaps households – especially the low-income non-SNAP households used in this study --

just like to garden in which case can they really be considered as strategies triggered by food insecurity or adopted to address food insecurity?

Now, considering the money or assets these households possess that reflect their capabilities and available capitals, activities like hunting, fishing, and gardening can be treated as a strategy to cope with economic hardships or a way to supplement food resources. In other words, vulnerable families act according to their available capital and resources. This thought is also supported by Kempson et al (2002, 2003) and Hoisington et al (2002) in their work.

Available capital, including natural, human, social, physical, and financial capital (Morse et. al 2009) also addresses sustainability but is beyond the scope of this research. Seven key components of portfolios (natural, human, social, physical, cultural, produced, and financial) are suggested (de Haan 2000, Bebbington 1999, Chambers and Conway 1992). For example, natural and cultural capital can be represented in hunting/fishing: 1) these skills are often passed down as a cultural asset, and 2) households or individuals with availability and access to environmental resources or geographical location can use these as part of their household livelihood strategy, signifying them as natural capital.

Livelihood strategies are like moving targets and change with changes in situations (de Haan and Zoomers, 2005). This means the same SNAP and low-income, non-SNAP families may pursue different coping/adaptive strategies depending on their needs and opportunities. The decisions are influenced by their available capitals, including economic, cultural, social and human capital. Supporting the theoretical assertion that households must use available and

accessible capitals to cope with/ adapt to uncertain situations, for example, my hypothesis that a “household with more members will pursue more of gardening than households with fewer members” is guided by both economic, human and cultural capital. Gardening can be practiced both for economic hardships, and also as a part of culture/norm. Cultural capital that is directed by forms of values, knowledge, and beliefs can motivate the households to learn the skills and maintain the heritage of their family and culture. Similarly, because of available natural capital and availability of space, households living in the rural areas are more likely to have their own garden than households living in other areas. Regional settings affecting the likelihood of a household having their own garden is also guided by the livelihood theory which states availability of natural capital and cultural capital influences the choices and decisions of the households, and helps to cope or adapt with food hunger.

Using the livelihood perspective to understand different strategies, it can be suggested that households pursue coping/adaptive strategies to enhance their food security depending on their socio-economic characteristic that also reflects their capabilities and capitals. The sustainable livelihood approach seeks to improve the lives of vulnerable households by trying to build on what they have- assets (UNDP, 1999). In this project, the two groups - SNAP and low-income non-SNAP households – are theorized to depend heavily on their available cultural, economic, social and human capitals to deploy strategies like gardening, fishing, and hunting. These activities are largely driven by culture, economic capability, and social relations and connections. The theory not only addresses the causes of poverty

induced by stresses or shocks, but also goes beyond to study the reasons of poverty due to a basic lack of assets. The main two challenges of the sustainable livelihood approach are access to capital and relationship between access and decision making. These are governed by social relations and power (de Haan and Zoomers, 2005). Thus, the livelihood framework provides the theoretical foundation to understanding a household's adaptation and coping strategies when they are vulnerable.

### *Principal Assets or Capitals*

Chambers and Conway (1992) provided one definition of Sustainable

Livelihoods Approach:

"A livelihood comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living; a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long-term" (1992:6).

Sustainable Livelihoods Analysis is an example of the 'multiple capital' approach, and sustainability is defined in terms of available capital (natural, human, social, physical, and financial) (Morse et. al 2009).

*Figure 4. The Seven Principal Assets or Capitals of Household Livelihood Portfolios*

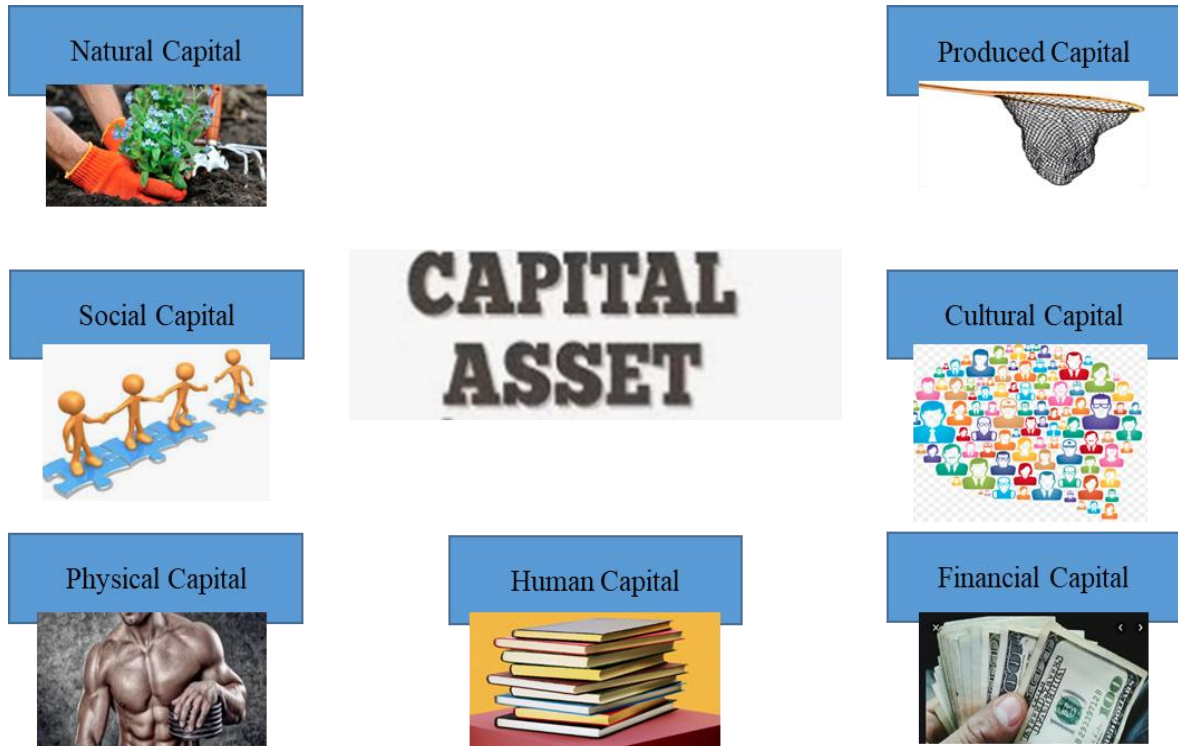


Figure 4 describes each of the seven capitals suggested by these authors above. The symbols represent kinds of assets corresponding to specific categories of capital. For example, natural capital is represented with gardening, signifying that households or individuals with availability and access to environmental resources like water and fertile soil in a suitable geographical location can use this as part of their household livelihood strategy (Whiting 2006). Human capital is represented as education, signifying that households or individuals who have higher education may get a good job and earn more money to have a secure livelihood. Produced capital is represented by a fishing net, signifying that actors who have a

skill for fishing and are equipped with required tools, and a license for fishing in private/public property may use this as a livelihood strategy.

Several of these 'capitals' are conceptual and require a more detailed understanding. They are described below.

### *Human Capital*

Human capital, apart from providing labor for various enterprises such as income generation, subsistence farming, gardening, and hunting (Morse et.al. 2009), also refers to a set of skills like education and training that can be negotiated for other forms of capital, especially financial. While human capital is partly related to household composition, it also depends upon the level of education, age, gender and so on. Land, labor, and production have been historically associated with economic analysis. Eventually, human capital was also related to this equation, making clear the differences in human contributions as well as the fact that and not all people should be treated as mere labor. Investment in human capital such as education and training etc. can generate income in the future.

Education adds to human capital (Becker 1964). Knowledge grows as it is shared and never diminishes like other capitals (physical). Here, in my study the knowledge needed for gardening or hunting/fishing is likely learned and/or culturally transmitted.

### *Social Capital*

Social capital represents a set of resources like social relations, social

affiliations, network associations or other relationships upon which people can make claims when adopting livelihood strategies (Scoones 1998). Bourdieu (1986:249) defines social capital as:

“the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group which provides each of its members with the backing of the collectively owned capital, a ‘credential’ which entitles them to credit, in the various senses of the word. These relationships may exist only in the practical state, in material and/or symbolic exchanges which help to maintain them.”

To adopt different kinds of livelihood strategies there must be a combination of "capital" support as well as access and control over that capital. In other words, social capital is dependent on social relationships and people. Social capital, just like education (human capital), increases on utilization, and depletes if not used. Also, unlike other capitals like human capital, social capital is not depleted if used extensively; in fact, it unties the knot if not used. Social capital plays a significant role in building social relationships and trust.

Following Bourdieu’s (1986) definition of social capital as resulting from durable networks and institutionalized relationships, Putnam (1993) and Granovetter (1973) also focused on how social networks contribute to social capital. Putnam (2000), for instance, says that social capital is the sum of social exchanges and networks. Fukuyama (1995) argues that social capital is a set of norms and values that helps people to coordinate with each other. Social capital is associated with human capital (Coleman 1988), and cultural capital (Bourdieu 1986). Additionally, "the social capital embodied in norms and networks of civic



engagement seems to be a precondition for economic development" (Putnam 1993:37). It cannot be denied that the social capital or the social relations and associations we maintain help us to cope with life and livelihood strategies (Whiting 2006). At any scale, livelihoods are made up of a dynamic portfolio of various activities (Richards 1989).

### *Economic/Financial Capital and Produced Capital*

Financial capital, like credit and debt, savings and liquid money, and economic assets are necessary to lead a healthy life and to also pursue any livelihood strategy. Production equipment and technologies are also included in the financial capital. Produced capital also encompasses other forms of goods like food and other materials that can be exchanged for other forms of capital. Financial capital is most easily exchanged and also used. Produced and financial capital are very significant for securing food. Food is treated as a commodity and hence, for an individual or household to have a high food security level, availability of money and produced capital to acquire financial capital are required.

### *Cultural Capital*

In 'The Forms of Capital' (1986), Pierre Bourdieu distinguished between economic, social and cultural capital. He also differentiated between three forms of cultural capital- the embodied state, the objectified state, and the institutionalized state. He defined the three states as

"in the form of long-lasting dispositions of the mind and body, in the objectified state it is in the form of cultural

goods (pictures, books, dictionaries, instruments, machines, etc.), which the trace or realization of theories or critiques of these theories, problematics, etc.; and in the institutionalized state, a form of objectification which must be set apart because, as will be seen in the case of educational qualifications, it confers entirely original properties on the cultural capital which it is presumed to guarantee." (Bourdieu 1986:243).

According to Bourdieu (1986), cultural capital has a state which he called cultural habitus. It includes ways of thinking or socialization, and cultural objects such as artwork or specific tools. Bourdieu gave importance to this aspect as it leads to the reproduction of social status and class, an existing inequality that is passed from one generation to another (Whitting 2010).

Cultural capital can be acquired unconsciously, depending on the period, society, and social class, and it dies with its bearers. Limited attention is given to cultural capital especially as it relates to health, which in turn is influenced by food security (Abel 2008). On the contrary, much importance is given to cultural capital by (Khawaja and Mowafi 2006: 445) who state that accumulation of this capital can lead to a healthy life. This thought is also supported by Mackenbach (2012). Rank (2004), states that individuals that lack human and social capital face more challenges in their life than others. Those without access to these capitals experience crisis, lower wages, and job loss as social mobility are small, especially to financial capital.

### *Physical Capital*

This category includes basic infrastructure that people need like the tools and equipment to support their livelihoods and make a living, as well as the tools

and equipment that they use to increase productivity. Without easy access to basic services, a long time can be spent on unproductive activities like gathering wood or collecting water. Some of the physical capitals are housing, safe building, transport and communication systems, shelter, access to information, water and sanitation systems, and energy.

### *Natural Capital*

Natural capital combines the resource stocks, and environmental services (hydrological cycle, soil, water, genetic resources, etc.) to which a household has access. Access to natural capital can prove useful for households to develop sustainable livelihoods. However, often livelihood decisions involve over-consuming a type of capital asset at some point; for example, intensive agriculture can lead to soil degradation, damaging an important natural capital. Thus, livelihood strategies are continuous endeavors to adjust these asset combinations in order to produce better outcomes.

These capitals mentioned above are ideal types, but all of them are significant in their own way and help an individual and household sustain their livelihoods. Evaluations of these capitals should be based on their availability when needed by a household. In some cases, non-tangible assets can be more important than tangible ones. For instance, Bebbington (1999) argues that social capital is of utmost importance as it allows access to other resources. Access to social capital is crucial as it provides opportunities to mingle with other actors which is vital to living a sustainable livelihood. He asserts that assets are “capabilities for three

actions- instrumental action (making a living), hermeneutic action (making living meaningful), and emancipatory action (making a change in the fundamental structures of life)” (Bebbington (1999:2022). Capitals and capabilities are thus vital, helping the vulnerable group to maintain a sustainable livelihood.

Increase in assets and access to resources and capitals by households and individuals will make them the less vulnerable to uncertainties or seasonality, and they will have a more secure livelihood. Often increasing one type of capital will lead to an increase in other type of capital; for example, as people hone their skills and training (increase in human capital) they may earn more money (increase in financial capital) which in turn might help them upgrade their facilities and infrastructure (increase in physical capital).

### *Coping and Adapting*

"Coping strategies" are households' temporary safety mechanisms that are adapted by vulnerable members of society when experiencing shocks or stress. These are short term mechanisms but may turn into a long-term adaptive strategy (de Haan 2000). In this study, the word coping and adaptive are used interchangeably for self-provisioning strategies like gardening, hunting and fishing. In this research work, gardening, fishing, and hunting are considered more as long-term strategies (adaptive strategies) than short term mechanisms (coping strategies). While it is certainly possible that people might begin to garden or hunt as a coping strategy, most people who garden or hunt have done so for some time, for some combination of recreational purposes and/or a long-term adaptive

strategy. Because this empirical work is not longitudinal, it would be difficult to tell whether these activities are coping or adaptive strategies.

Livelihood diversification is significant for coping and survival of vulnerable groups (Ellis 1998), and determines different kinds of daily activities that are adopted for survival (Whiting 2010). People adopt different coping strategies depending on their socio-economic factors, such as family size, income, education, etc. The construction of livelihoods is not simple. For example, policies and institutional impacts can enhance the opportunities of some households while suppressing others (Ellis 1988 and Whiting 2010).

The term "coping strategies" has been used in different ways by various scholars in their work on food access and food security. According to Kempson et al. (2003), coping strategies are defined as those practices that individuals adopt to obtain food and continue to maintain the supply of food after it has been acquired. Wood et al. (2006:46) say that coping strategies are a way "to stretch the food supply and /or stretch the money for food, including producing their own food and denying food to family members." Pinard et al. (2016) defines coping strategies as behaviors that include rationing the supply of food, skipping bills and noting changes in food purchasing habits. Anater et al. (2011) define coping strategies as strategies that are used by individuals and their household when there is an inadequate supply of food.

Food coping strategies could be considered integral in reducing food insecurity and hunger. From the above definitions, it is clear that different scholars have used the word 'coping' in different ways and that sociological conclusions and

insights vary accordingly. In this study, the word coping and adaptive are used interchangeably for strategies like gardening, hunting and fishing, depending if these are a short term or some long-term activities. This is because while it is certainly possible that people might garden or hunt as a coping strategy, people may also garden or hunt 1) for a limited period of time, 2) for some combination of recreational purposes and/or 3) as a long-term adaptive strategy.

Other coping strategies that can be located within the livelihood framework draw on different capitals such as social, cultural, human, or natural, and include such strategies as eating meals at other places including at friends' houses, community gatherings, churches or schools; borrowing money from others; perceiving family and friends as important sources of food acquisition; cooking with others; asking help from others; and trusting in God (Maxwell 1995, Kempson et al. 2003, Wood et al. 2006, Anater et al. 2011, Usfar et al, 2007; Pinard et al. 2016). Food acquisition strategies like acquiring food by hunting, fishing and gardening may possibly decrease expenses associated with acquiring food, but conversely, households may also incur one-time or on-going extra expenses such as buying seeds and fertilizers, licenses, fishing gear etc. As mentioned by Greder et al. (2002), participants in their study indicated that they could save a lot of money if the households had access to social capital, like gardening, sharing information, and transportation, purchasing in bulk and sharing costs (Kempson et al. 2003). These households seek help from their family and friends to secure food, utilizing social networks. Also, children are sent to participate in programs like 'Summer Food for Kids' (Wood et al. 2006). Strategies pursued by limited resource

households that have been documented include pooling food to cook with others, participating in research studies, getting food from workplaces and churches, and consuming free samples from stores (Kempson et al.2003). Usfar et al (2007) posit that the employment of social coping strategies requires less commitment on the part of the household as compared to high-cost coping strategies like pawning assets, some of which may not be recovered later. These strategies can be positive in that they encourage social interaction, reduce food insecurity and nudge participants towards achieving social sustainability, while also influencing policymakers and the government to promote more community-based activities, centers and social gatherings.

### *Connecting Self-Provisioning and Livelihood Theory*

In a capitalist country like the United States, the economic system relies upon money and not everyone can participate in the economy equally. The deprived population that does not have the resources or access to different capitals depend on others to survive. Limited resource households and individuals confront many barriers to obtain adequate healthy food. Families and individuals with limited resources may have to devise strategies to cope with hunger in addition to relying on other kinds of food assistance programs and emergency food to feed themselves (Kempson et al. 2003; Kempson et al. 2002, Anater et al. 2011). In this section I will discuss the literature on self-provisioning in relation to gardening, fishing and hunting. I am particularly interested in looking at scholarship that considers these activities a result of economic hardship, how these activities may

differ geographically, or examines them as part of culture, leisure or recreation rather than coping mechanisms.

Self-provision has received relatively little attention in economic hardship literature. Self-provisioning has been defined as a collection of activities (like gardening and fishing etc.) in which goods are produced and consumed by one or traded rather than sold in a market (Teitelbaum and Beckley 2006). Scholarship on the relationship between economic hardship and food acquisition strategies, especially gardening, has been mixed. Campbell (1993) found that people in the Missouri Ozarks participated in the informal trading of goods and services as a way to maintain their economic standing. Mingione (1991) found that vulnerable low-income households practiced self-provisioning activities to address economic hardships. Bentley (1998) argued that economic necessity made people maintain home gardens. Specifically, Bentley (1998) cited a survey during World War I which found more than half of the respondents (54 percent) maintained a garden for economic reasons compared to 29 percent for patriotism. Nevertheless, few scholars have considered household gardening as a way to address economic hardship. Mirowsky and Ross (1999:548) states that economic hardship occurs when individuals or households have difficulty, “paying bills or buying things the household needs such as food, clothing, medicine, and medical care.” Saunders et al. (2008) state that income alone cannot be a predictor of economic hardship as it fails to take into account other material resources such as land, and nonmaterial resources such as gardening knowledge that households may have at their disposal which can be used as potential instruments to circumvent economic hardship.



In contrast, abundant scholarly work in North America has been published on gardening as a culture and hobby rather than a means to address economic hardships. Results from a study by Jenson et al. (1995) show no significant relationship between income levels and self-provisioning activities when examining households living in rural Pennsylvania. Brown et al. (1998) found that households in economic hardship engaged less in self-provisioning activities compared to higher incomes households. Teitelbaum and Beckley (2006) state that low capital investments, like hunting, and gardening were still practiced widely in rural Canada solely because of cultural reasons, rather than out of economic necessity. They state “economic factors are not the overriding factor in determining whether or not households participate in self-provisioning activities” (Teitelbaum and Beckley, 2006: 127). In fact, if the cultural motivation is removed, then low-income households would not participate in such activities. Quandt et al. (1994) describes that residents with higher income in rural Kentucky were more likely to participate in home gardening compared to those with lower level of income. Quandt et al. (1994) found that socio demographic factors like, age, marital status, and living arrangements were found to be more associated with own gardening than was economic hardship.

Taken together, the above literature suggests that gardening can be, and at times has been, used to address economic hardship. However, the studies have mixed findings about the role economic hardship plays in leading an individual or household to participate in gardening. Several studies have shown that within the United States, economic hardship is not the sole driver behind adoption of this

strategy. Additional social factors like cultural values should also be taken into consideration.

Other literature has shown that households that receive and share fruits and vegetables from others' garden and have responsibility to give can minimize the problem of food insufficiency (Lee et al. 1994, Hofferth and Iceland 1998, and Meert 2000). Having their own garden or receiving fruits and vegetables from others' garden may be linked to strong social, cultural, and natural capital or financial capital. For this project, I will consider self-provisioning like gardening, hunting and fishing from all three perspectives- economic hardships, leisure and culture – because it may be that gardening, fishing, and hunting may be associated with increased food security irrespective of the reasons for which they are done.

Although existing literature provides important information about food strategies, several questions need to be added to it to focus on the role of food acquisition strategies like hunting, fishing and gardening among marginalized and vulnerable households in the United States. This study attempted to answers these important questions that were not addressed previously. Taking into consideration the literature on self-provisioning with respect to gardening, hunting and fishing, the following research questions will be asked in this study:

First, how do SNAP and non-SNAP households, keeping in mind the socio-economic aspects of their household and other factors, deploy strategies like gardening, fishing, and hunting to secure their food. Second, which households (SNAP or non-SNAP) shop from alternative stores like dollar store and club store? Third, does gardening, fishing, and hunting correlate with greater food security

level of these households? These questions are further explored in the research section.

For my third research question, I look to the gardening literature that suggests that economically disadvantaged populations may consider gardening, fishing, and hunting as a tactic to procure food and make their livelihood sustainable. Though gardening, fishing, and hunting may not be the ultimate solution for the marginalized section of society yet, it can potentially moderate and enhance the food security level for a certain period of time in a year.

Bourdieu (1986:24) explains, “different types of capital can be derived from economic capital.... there are some goods and services to which economic capital gives immediate access.” Households with insufficient financial capital and also lacking in produced capital may face economic hardship (Whiting 2006). Economic hardship may lead to food insecurity.

Referring to three livelihood assets - physical capital, social capital and human capital, Coleman (2012:382), states that “the concept of physical capital as embodied in tools, machines and other productive equipment can be extended to include human capital which is created by changes in person that brings about skills and capabilities that make them able to act in new ways.” Human capital such as education and training etc. can generate income in the future and is thus directly related to food security. Overall, food insecurity is linked with poorer physical quality of life, which may prevent children in a household from fully engaging in daily activities (Casey et al. 2005). “At school, food-insecure children are at increased risk of falling behind their food-secure peers both academically and

socially; food insecurity is linked to lower reading and mathematics test scores, and they may be more likely to exhibit behavioral problems, including hyperactivity, aggression and anxiety.” (Feeding America 2018:39). So, it can be said, that individuals with lower levels of education due to food insecurity face many physical and behavioral problems which prevent them from leading a healthy life and developing and maintaining strong social connections.

### *Gaps in Research Using FoodAPS Data*

A quantitative approach, described in the next chapter on methodology, was applied to answer the research questions in this study using data from the USDA Food Acquisition and Purchase Survey (Food APS), a dataset described in the next chapter. However, it is useful here to review research work that has been done using the same dataset in order to identify gaps that have not been addressed by these studies.

Earlier work done using USDA's FoodAPS survey data include ERS reports summarizing information about SNAP participant purchases compared to the healthy eating index, in addition to suggestions on nutritional policies that could improve diet quality (Mancino et al. 2018, Mancino et al. 2018, Todd and Scharadin, 2016). Some studies summarize the relation between nutritional quality of food and acquiring food from school and social gatherings by SNAP households, which also provides insights about food assistance programs and food demand in the U.S. (Todd 2017 and Todd et al. 2017, Mancini and Guthrie 2018). As stated previously, low-income households (both those that participate in SNAP and those

that don't) often rely on obtaining free food to meet their daily needs, from social gatherings, school lunch, food pantries, and so forth. While SNAP acts as a safety net for these low-income households, it does not provide everything needed to meet the daily food requirement of these families throughout the month. Thus, these low-income families need to look for some alternative ways like coping strategies-tradeoffs, skipping food, stretching the food supply, etc. to meet their food needs.

Some work connects food security and health. For instance, Jo (2017) relies on FoodAPS data to examine child obesity in a household and how households with one obese child differ in several ways and have a disadvantageous environment than one without an obese child (Jo 2017). Another study describes how food choice and diet quality are impacted by access to food stores, while others address shopping habits in supermarkets and supercenters irrespective of the participant's income (Ploeg et al. 2016 and Morrison 2015). The poor quality of food and dietary habits of low-income families caused by poor access to healthy food can also lead to diet-related health problems. Some of the literature using Food APS data describes connections between SNAP and healthy eating. It also explores how SNAP participants spend their dollars, and how farmers' markets influence households to purchase fruits and vegetables as well as their food spending patterns (Stewart et al. 2018, Ploeg et al. 2017, Tiehen et al. 2017). So, it is clear that some of the research that has been done using FoodAPS data already relates to food security and health issues.

Other scholarship using the dataset is more wide-ranging. A set of studies using this data describe two behavioral responses of SNAP participants towards

consumption pattern – “short-run impatience and fungibility of income” (Berning et al. 2016:2) – also supported by Whiteman et al. 2018:2, Dorfman et al. 2018, Smith et al. 2016. Another part of the literature also reveals the shopping patterns of SNAP participants in choosing their food stores and their willingness to pay more and travel further distances to access supermarkets over local farmers’ markets. Other studies mention lower food insecurity when SNAP participants have nutrition literacy and finance management (Hiller et al. 2017, Wilde et al. 2014, Taylor et al. 2016, Chang et al. 2017). The University of Utah developed a tool that assesses purchased grocery food quality. This tool helps to study the correlation between the grocery purchased quality index and the healthy eating index (Brewster et al. 2017). Another study developed a food diversity index that allows tracking of the diversity in household expenditure (Leschewski et al. 2017). SNAP participants living in high-cost counties were also seen to be associated with nutritional improvements (Basu et al. 2016).

Although the above studies are important in that they give us an idea of shopping behavior of the consumers and their dietary habits, choice of food stores and their expenditure pattern, as well as explore relationships between health and the consumers' dietary habits, choice of food stores and expenditures, many of these studies do not examine how SNAP participation impacts these relationships. They also consider how food insecurity can impact health and growth in some cases, but fail to address the various measures low-income households need to take to sustain themselves in days of food crisis as well as the compromises they have to make to provide food to their family members.

Although these studies are important in providing information about consumers in general, they are limited and do not shed light on the role that governance and policy need to play in improving the lives of low-income consumers. It should be noted that in meeting their daily needs, social, human and natural capitals play a significant role in the lives of low-income SNAP and non-SNAP participants. As mentioned by Greder et al. (2002), participants in their study discussed the helpfulness of social capital like sharing information and transportation, purchasing in bulk and sharing the cost, gardening and producing, and how these practices saved them a lot of money. These above-mentioned steps could add positive meaning to lives, reducing food insecurity and nudging participants towards achieving social sustainability, while influencing policymakers and the government to promote more community-based activities, centers and social gatherings.

## **CHAPTER 4. METHODOLOGY**

### *Introduction*

Much of the existing SNAP literature, particularly that relying on analysis of FoodAPS data, has not looked at coping strategies such as gardening, fishing and hunting, and has not defined differences in deploying these strategies between SNAP households and those low-income households that are likely eligible for SNAP but do not participate (referred to here as non-SNAP households). The Sustainable Livelihoods Approach reviewed above suggests that we should look at a number of available capitals to see how households create their livelihoods and reduce their vulnerability, thus my study will examine the relationship between food security and adaptive strategies pursued by low-income households and the correlation of these strategies to food security by exploring the following questions:

RQ1: How do hunger coping strategies differ between SNAP and non-SNAP households?

The literature reviewed above, suggests that in low-income households, economic necessity played a significant part in deploying strategies like gardening. (Mingione 1991, Campbell 1993, Bentley 1998, and Teitelbaum and Beckley 2006). Also from the work of Chambers and Conway (1992), households in geographical locations with space and climate for self-provisioning would be more likely to get foods from their own gardens, other people's gardens or from hunting and fishing. In addition, areas that have good access to natural capital would be more likely to do this as well. Households with more human capital might also be



more likely to use these strategies. Cultural capital that is directed by forms of values, knowledge, and beliefs can motivate the households to learn the skills and maintain the heritage of their family and culture.

Following this literature, I propose these hypotheses for RQ1:

H1: Households living in the rural areas will be more likely to have their own garden

H2: Households living in the rural areas will be more likely to receive fruits and vegetables from someone else's garden

H3: Households living in the Midwest will be more likely to have their own garden

H4: Households living in the Midwest will be more likely to hunt and fish

H5: Households living in the Midwest will be more likely to receive fruits and vegetables from someone else's garden

H6: Large households size will be more likely have their own garden

RQ2: Which households (SNAP or non-SNAP) shop from alternative stores like dollar stores and club stores as a coping/adaptive strategy?

As mentioned by Chambers and Conway (1992:4) within the sustainable livelihood approach- there are several sets of skills people require “that include being able to cope with stress and shocks, and being able to make use of livelihood opportunities.”

SNAP and non-SNAP low income households can make use of the opportunities like shopping from dollar stores to cope with stress (in this case it can be hunger). Also, the above literature suggests that in low-income household's economic necessity played a significant part in deploying strategies like shopping

from dollar stores. As reported by USDA ERS (2004:40), “Households that reported they would not apply for food stamp benefits even if they knew for certain they were eligible were overall more food secure than households that reportedly would apply to the FSP, possibly indicating a lower need for benefits.” So, the below hypotheses are well supported based on these above argument and studies. Though, results indicate that we did not find any support for the first hypothesis, the difference between SNAP households and other low-income households with regards to dollar store use was not significant.

RH1-A: SNAP households will be more likely to spend their money in dollar stores than non-SNAP households with low income

RH2-B: Non-SNAP households with high and marginal income will be more likely to spend their money in club stores than SNAP households

RQ3: Do households that use strategies such as gardening, fishing and hunting have higher levels of food security?

Within the livelihood approach the three concepts- capability, equity and sustainability are linked. Based on the work of Chambers and Conway “A household may be enabled to gain sustainable livelihood security in many ways through-....livestock or trees, fishing, hunting or gathering..” (Chambers and Conway, 1992:5). The below hypothesis is well supported by this livelihood approach.

H1: Households having their own garden or obtaining food from others’ gardens have higher levels of food security.

*The USDA FoodAPS Survey Data*

For this study, I used the USDA's Food Acquisition Purchase Survey (FoodAPS) publicly available dataset. In a survey of over 4,800 households, USDA collected information on all household food acquisitions during a one-week time period including 1) foods from retailers (e.g., grocery stores, farmer's markets, and supermarkets) categorized under food-at-home, 2) food-away-from-home which includes food from restaurants, schools, and fast-food vendors, and 3) foods obtained without any purchase or for free like food from food pantries, community centers, family, others and friends. As is defined by the USDA, "Food APS is a nationally representative survey of noninstitutionalized households in the contiguous United States, as well as four subpopulations: (1) SNAP participants; (2) nonparticipants with incomes less than the federal poverty threshold (FPL), which varies by household size and family size; (3) nonparticipants with incomes between 100 and 185 percent of FPL, and (4) nonparticipants with incomes greater than or equal to 185 percent of FPL. household codebook: (USDA-ERS 2016b:56). A total of 4,826 (including missing values) SNAP/non-SNAP households were included in the survey. The Food APS data contains one record for each of the 4,826 households that participated and completed both the initial and the final interviews. These 4,826 households can be broken down as 851 non-SNAP households with incomes that could qualify them for SNAP participation, 346 non-SNAP households with incomes meeting SNAP eligibility requirements, 2,048 non-SNAP households with incomes over the eligibility threshold for SNAP participation, and 1,581 SNAP households. Households with low income and

households participating in SNAP were “oversampled to allow for research on food behaviors for populations that are often underrepresented in other surveys.” (Page et al. 2019:217).

FoodAPS contains one record for each of the 4,826 households who were surveyed between April 2012 to January 2013 and completed both initial and final interviews. “The Initial Interview was conducted after the household was identified as eligible for the survey through a screening process and before acquisition information was collected. The Final Interview was conducted upon the conclusion of the acquisition data collection week” (USDA-ERS 2016a:2). The household member who did most of the meal planning and grocery shopping was considered as the primary respondent (PR) and was asked to complete the initial and the final interview before the start of the survey week and at the end, respectively. During these interviews, questions were asked about socioeconomic and household characteristics such as income, gender, age, household size, child care, rent, expenses, food security, health status, diet and nutrition knowledge, and food assistance program participation. “Individual-level information was collected through two computer-assisted in-person interviews (CAPI). The initial interview was conducted after the household was deemed eligible for the survey and before acquisition information was collected. The final interview was conducted upon the conclusion of the acquisition data collection week. The primary respondent was asked to respond to both the initial and final interviews, providing both household- and individual-level information for all household members” individual codebook (USDA-ERS 2016c:3).

Households reported the location of the event for each acquisition along with what they “purchased, the total cost for all items and mode of payment (e.g., credit or debit card, cash and SNAP benefits).” (Page et al. 2019:218).

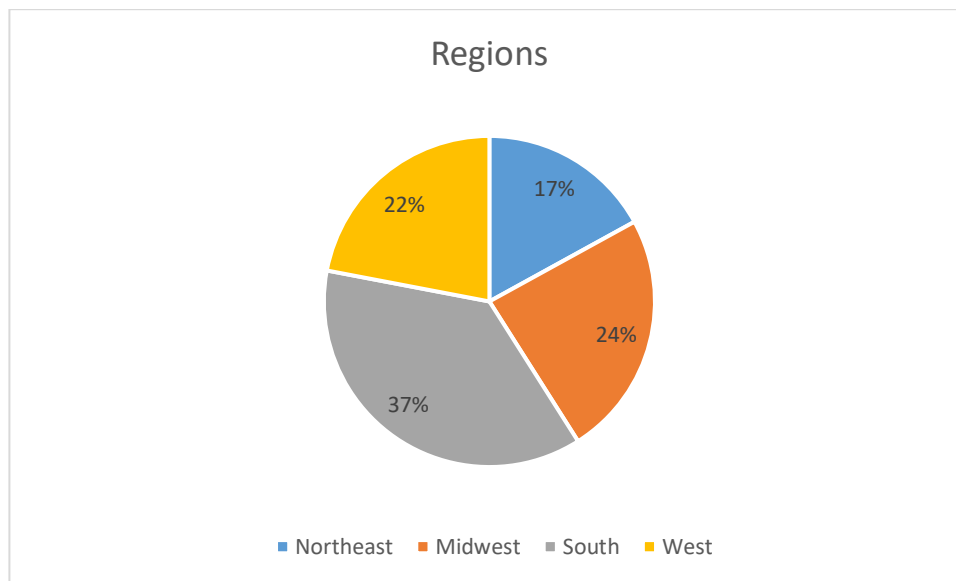
Prior to the collection of data through Food APS, research on food policy impacts, food assistance programs, and food choices was constrained due to limitations of the availability of data. The National Research Council (NRC) highlighted the necessity for good “data to analyze behaviors and choices related” (Page et al. 2019:216) to U.S. household food acquisitions and food assistance program participation in 2005 (NRC 2005). And as mentioned above, SNAP participants and low-income households were oversampled to help research on food behaviors for populations that are often underrepresented in most other surveys. Various innovations have helped improve the overall quality of FoodAPS data:

First, FoodAPS includes a geographic component that provides detailed information about food access and the local food environment. In this study, there are four regions (Figure 5 shows the region boundaries, and Figure 6 shows the share of survey households in each region) considered (Northeast, Midwest, South, and West), and are identified as residing in rural or urban locations. Per ERS Food Access Research Atlas<sup>7</sup>, “rural is defined in the Census Bureau's urbanized area definitions, where rural areas are sparsely populated areas with fewer than 2,500 people” (USDA-ERS 2016a:56). According to the APS survey, 1,311 live in rural areas and 3,515 do not.

<sup>7</sup> <https://www.ers.usda.gov/webdocs/Datafiles/80591/documentation/pdf>



**Figure 6: Representation of the Four Regions**



FoodAPS data are available in two forms—the first on restricted use basis and the second on a public use basis. The restricted file contains confidential information and also the identity of the Primary Respondents. Only approved researchers can access this restricted file which is stored at the National Opinion Research Center (NORC) at the University of Chicago. The public use file, on the other hand, which is available to all has less information but still contains over 1,000 variables.

The studies that have been conducted using Food APS data as discussed in the previous chapter reveal the shopping behavior of low-income households and their food acquisition ways. They also describe health-related issues that may occur due to food insecurity and lack of nutritious food.

Gardening, fishing, and hunting have not been a focus of literature using FoodAPS data, even though those activities may affect the food security level of both SNAP participants and nonparticipants. Various research studies do exist on related topics, but they do not specifically use Food APS data or explore the important question that might inform research on this topic as to who uses gardening, fishing, and hunting and why. Table 1 provides a list of variables as described in the USDA FoodAPS dataset and also used in this study.

***Table 1. Variables as Described in USDA FoodAPS Dataset***

<b>Variables</b>	<b>Description in FoodAPS</b>
Hunt and fish	Household gets food by hunting or fishing (Y/N)
Garden own	Household has a vegetable garden in season (Y/N)
Garden else	Household receives fruits or vegetables from anyone else's garden (Y/N)
Race	Racial category of individual
Marital	Individual's marital status
Region	Census region
Rural	Household is in a rural Census tract
Education	Individual's highest level of completed education
Age	Approximate midpoint of individuals age group
Employment	Individual's employment status last week
Gender	Individual's sex (1=male, 2=female)
Household size	Number of people at residence, excluding guests



### *Population and Sample Data*

Two sets from the FoodAPS data were merged for this research: the “Household” dataset (4,826 records) and the “Individual” dataset (14,317 records). This study has 4,826 observations, because when the household and individual data were merged, individuals who had PNUM as '1' in the FoodAPS Individual data set were only taken into consideration as they refer to the Primary Respondents (PR) for the survey (as shown in Figure 7 below). By PR here, I mean the individual who was the main food shopper or meal planner of the household and agreed to participate in the survey. “The PR was asked to respond to both the initial and final interviews, providing both household- and individual-level information for all household members.” (USDA-ERS 2016c:4).

“The data file FoodAPS Individual data contains one record for each of the 14,317 individuals in the 4,826 households that participated in the data collection. FoodAPS households are uniquely identified by the variable HHNUM. Within each household, individuals are identified by PNUM. Together, HHNUM and PNUM uniquely identify an individual.” (USDA-ERS 2016c:4). So, the sample size is 4,826 because we are only taking the PR from the individual survey who has PNUM as ‘1.’ As shown below (Figure 7), two data sets “household dataset” and “individual dataset” were merged. There are 4,826 households as identified below by ‘hhnum’ and individual record of 14,317 as identified by ‘pnum’, where the Primary Respondent in the household takes the value of ‘1’ in the ‘pnum’.

**Figure 7. Merging Two Datasets**

hhnum[1]		1118
	hhnum	pnum
1	111823	1
2	104953	1
3	116861	1
4	115198	1
5	109129	1
6	102166	1
7	105266	1
8	115177	1
9	104470	1
10	101906	1
11	101210	1
12	115164	1
13	114161	1

As two data sets were merged for this research, there are some variables that are households specific and individual specific. Below is the list of these specific variables (Table 2).

**Table 2. Variables that are Household Specific Versus Individual Specific**

Variables Household Specific	Variables Individual Specific
Hunt fish	Education
Garden own	Gender
Garden else	Marital Status
Region	Race
Rural	Individual's marital status
Household size	Employment
	Age

**i) Operationalization of Dependent Variable for Research Questions 1 and 2**

In this study, I took 'hunt fish' (Household gets food by hunting or fishing (Y/N), 'garden own' (Household has a vegetable garden in season (Y/N), and 'garden else' (Household receives fruits or vegetables from anyone else's garden

(Y/N) as my dependent variables. In each case, the variable takes the value 1 when the household obtain engages in the activity and 0 otherwise.”

**ii)** Operationalization of Independent Variables Research Questions 1 and 2

In this study, I have considered 1) primary respondent’s marital status (marital), 2) primary respondent’s gender, and 3) and four target groups (SNAP households, and non-SNAP households with low, marginal, or high income).

SNAP households are considered as the reference group in this study for the first and second research question.

**iii)** Operationalization of Dependent Variable for Research Question 3

In this study, I took ‘raw food security score’ as my dependent variable. The variable ‘raw food security score’ is operationalized based on 10 food security questions the households answered which were included in the FoodAPS survey.

Non-SNAP households with high income is considered as a reference group for the Research Question 3.

As mentioned above, SNAP (for Research Question 1 and 2), and non-SNAP households with high income (for the Research Question 3) is considered as a reference group so that the other categories (Non-SNAP low and marginal income households) can be compared to the reference group.

Sociodemographic Determinants

The other sociodemographic variables that will be included in the model are age, gender (male/ female), race (Black, white, and other race), education level,

household size, and marital status (married, widowed, divorced, separated).

**iv) *Operationalization of Sociodemographic Variables for all the Research Questions***

Marital status is operationalized into two categories: respondents that are currently married, and those who were never married.

Race is operationalized into three categories: respondents that are “white,” respondents that are “Black” and “others” that belong to other races; everyone who does not self-report as exclusively “white” or “Black” is in “other” category (only for RQ 1 and 2). The survey does not treat “Hispanic” as a separate race, but as an ethnic group. As noted in the Individual codebook (USDA-ERS 2016c:4), “respondents were allowed to report being of one or more racial groups (White; Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian or Other Pacific Islander; and/or Other). When the respondent reported an individual as being in an “Other” racial group, the respondent was then asked to specify and the response was recorded.”

Education is operationalized into four categories: respondents that have high school or less, those who have some college degree, those who have a Bachelor’s degree and those who have a Master’s degree or other advanced degree. Here, Master’s degree is considered as the reference group.

Rural refers to the primary respondent living in rural areas. It is operationalized into two categories, viz., yes and no.

Region is operationalized into four categories – Midwest, South, West and Northeast.

Household size is operationalized by number of household members: it ranges from 1 to 14, but grouped into 6 categories: household members with 1,2,3,4,5 or more

Gender is operationalized into two categories: respondents who are female, and those who are male.

Marital Status were recoded from the categorical variable marital status. Marital status was categorized as currently married, and not currently married. I recoded the marital as currently married = 1, and previously married and never married=0.

First, I used a chi-square test to determine whether or not there is a statistically significant relationship between independent variables that are categorical and our binary dependent variable. Just as in linear regression we are comparing groups to each other. In order to compare, one group will be a baseline group which is called a reference group and it has to be omitted from the comparison.

The socio-demographic variables and the other independent variables were chosen based on published works in a similar field of research. Selection of the variables were done based on (1) the initial recognition of the variables from literature, as there was little in the literature on them, particularly using FoodAPS dataset, and (2) on the availability of variables in the FoodAPS Household and Individual datasets. After that, those found having significant relationship with the

dependent variables were included in the model. Variables description and demographic and household characteristics of the variables as used in the study is represented below in table 3 and 4.

**Table 3: Variables and their Description**

<b>Variables</b>	<b>Form</b>	<b>Description</b>
Hunt and fish	Binary	Yes=1. No=0
Garden own	Binary	Yes=1. No=0
Garden else	Binary	Yes=1. No=0
SNAP	Binary	SNAP=1, others= 0 SNAP household
Non-SNAP with low income	Binary	Non-SNAP=1, others =0 Low income Non-SNAP household, with income <100% of the Federal Poverty Guideline
Non-SNAP with marginal income	Binary	Non-SNAP=1, others =0 Marginal income Non-SNAP household, with income >=100% and <185% of the Federal Poverty Guideline
Non-SNAP with high income	Binary	Non-SNAP=1, others =0 income >=185% of the Federal Poverty Guideline
Currently married	Binary	Currently married= 1 Others =0
Rural	Binary	Yes=1 (1,311), No=0 (3,515)
House hold size	Continuous	Ranges from 1 to 14
Race	Categorical	White = 1 Black =2 Others =3
Gender	Binary	Male=0 (1,278), Female= 1 (3585) (same as gender in table 2, but coded as 0 and 1)
Education	Categorical	High School or less=1 Some college=2 Bachelor=3 Masters=4
Age	Midpoint of the individual age group	

**Table 4. Demographic and Household Characteristics of SNAP and Non-SNAP Participants**

<b>Gender</b> Female Male	3,548 1,278	Female =1 Male = 0
<b>Marital Status</b> Married Widowed Divorced Separated Never married	2,030 360 893 250 1290	currently married=1 never married=0  4,823 3 missing
<b>Race</b> White Black American Indian or Al Asian or Native Hawaii Other race Multiple race	3,371 701 43 215 389 101	White = 1 Black=2 Others= 3  4,820 6 missing
<b>Education</b> 10th grade or less 11th or 12th grade, H.S. diploma, GED Some college or association Bachelor's degree Master's degree	554 284 1,388 1,575 697 325	H.S or less= 1 College=2 Bachelor=3 Master degree=4  4,823 3 missing
<b>Region</b>	Midwest South West Northeast	Northeast=1 Midwest =2 South=3 West=4
<b>Household size</b>	Ranges from 1 member to 14 members	Family with members 1,2,3,4,5 and more
<b>Age</b>	Midpoint of the individual age group	Age variable is categorized in 17 groups, for example: for age between 20 -35 years inputted as 27.5 years.

### *Methods Used by Previous Researchers*

Most of the research conducted to study the potential effects of SNAP on food insecurity were based on the outcomes of program participation and nonparticipation (Gregory et al. 2015). These studies restricted their analyses to households with incomes that were below or close to the gross income eligibility limit for SNAP. The restrictions were done intentionally to make the sample more comparable between the participants and nonparticipants. The restrictions ensured that everyone in the samples was asked the same questions in the food security model, thereby avoiding an artificial sample selection issue.

Methods that are used in the earlier research range from simple comparisons between SNAP and non-SNAP participants (do not deal with causal effect); to “methods that adjust for selection on observable (either matching via or similar methods or by regression)” (Bartfeld et al. 2015:135); to those based on policy changes and the difference in differences estimation or even event studies; to instrumental variables (IV) and other approaches that deal with 'selection on unobservable' (Bartfeld et al. 2015).

Another way of doing the analysis is using two sets of data and comparing them. One data set should be collected when SNAP participants enter the program and another would be a contemporaneous sample of households that continue in the program for 6 months or more. A cross-sectional and longitudinal data set could be compared with the baseline data from these two sets of data (Nutrition Assistance Program Report, 2013). Cross-sectional data compares outcome measures at a single point across SNAP participants who enter the program, while the



longitudinal data compares outcome measures over time for the next set of SNAP participants that continue with the program (Nutrition Assistance Program Report, 2013). This minimizes self-selection.

Another alternative approach could be “model assumptions *a priori* to bound possible impacts. This could be done by firstly using logical probability restrictions and then introducing weak assumptions” (Bartfeld et al. 2015:83).

The next could be relaxing the bivariate normal assumptions, probably by using maximum likelihood methods and factor structures both continuous and discrete (Bartfeld et al. 2015). Finally, dose-response models that proved to be consistent with the literature and economic intuition about the effects of SNAP (Bartfeld et al.2015, Nord and Prell 2011, Mabli et al.2013 and Nord 2013).

So, we can conclude that each method has its own weakness and strength. Using a set of econometric models could address the weakness that is inherent in each method (Nutrition Assistance Program Report, 2013).

The method that can be adopted in the future is a Randomized Control Trial (RCT). To examine new changes in SNAP, USDA has been using RCT, by introducing incentives to purchase more vegetables and fruits or other healthy food. The report of such an experiment in Massachusetts and Hampden county in 2011-12 was reported by Bartlett et al. (2013). Two groups were selected—one treatment group who got the incentives, and the control group who followed the usual SNAP rules without incentives. The treatment group was given “\$0.30 for each dollar of SNAP benefits spent on fruits and vegetables.” (Bartfeld et al. 2015:154). The result showed that the treatment group who received incentives consumed more

fruits and vegetables compared to the control group. This type of experiment is very useful to learn how to increase purchases and consumption of healthy food (Bartfeld 2015).

The dataset I will be using is not longitudinal data, but rather one-time data, so cross-sectional measures could be evaluated at a single point of time. By using this method, we can avoid confounding effects (that influences both the dependent and the independent variables, and causes spurious association).

Descriptive results (comparisons of means) were used as reported from each year's Current Population Survey— by the Economic Research Service in its Household Food Security in the United States series (Coleman-Jensen et al. 2012). Coleman and coauthors (1999) also used descriptive methods in their early works to demonstrate that food insecurity is higher among SNAP participants than other households. Their study controls for some observed characteristics, but there are also many unobserved characteristics not considered (and not controlled for) that could lead to spurious associations (Gregory et al. 2015).

My study will also use descriptive results (comparisons of means), and standard regression similar to what has been used in some other studies (Kabbani and Kmeid 2005). These studies that used regression found out that the risk of food insufficiency and insecurity are higher among households that had lost benefits compared to other households (Gunderson and Gruber 2001, Mykerezzi and Mills 2010). Another study compared food security outcomes for SNAP households before and after 6 months of their participation and found food security increases with households' SNAP tenures (Mabli et al. 2013).

Following the literature and previous work done by scholars in measuring the effectiveness of SNAP as an antipoverty program which showed a distinct result pattern, I am using USDA's Food Acquisition Purchase Survey (FoodAPS) dataset, and the method of descriptive statistics and standard regression in my study. The outcome variable in most of my analyses is a binary indicator, e.g., if the households get food from gardening or not, or they get food from hunting or fishing or not. I incorporated numerous additional controls for my analysis – most of these are standard and have been used previously by other researchers. For my analyses, I considered a sample that combines households with high income, marginal income, low income and very low income which also includes SNAP participants. These households differ in the susceptibility of their food hardships. Disaggregating in this manner increases the comparability of the households as per the income level and also between the groups. As such, it also ascertains the robustness of the findings, thereby demonstrating the impact of the statistical analyses of this study.

### *Research Questions and Statistical Analyses*

To address the first research question on how hunger coping strategies differ between SNAP and non-SNAP participants, the following hypotheses are analyzed

H1: households living in rural areas will be more likely to have their own garden

H2: households living in rural areas will be more likely to receive fruits and vegetables from other households' gardens

H3: households in the Midwest will be more likely to have their own garden

H4: households in the Midwest will be more likely to engage in hunting and fishing

H5: households in the Midwest will be more likely to receive fruits and vegetables from other households' gardens

H6: large household size will be more likely to have their own gardens

Logistic regression is used to determine the difference in the adaptive and coping strategies between SNAP households and non-SNAP households with different income levels, controlling for certain factors. The equation below will be estimated to trace the difference in strategies between SNAP and non-SNAP participants:

$$C_i = \beta_1 NS_i + \lambda_1 NSS_i + \mu_1 NSSS_i + \epsilon_{1i} \quad (1)$$

where  $C_i$  represents the  $i$ th strategy;  $NS_i$  represents non-SNAP participants with low income (<100% of the Federal Poverty Guideline),  $NSS$  represents non-SNAP participants with marginal income (>=100% and <185% of the Federal Poverty Guideline) and  $NSSS_i$  represents non-SNAP participants with high income (>=185% of the Federal Poverty Guideline),  $\epsilon_{1i}$  is an error term with mean zero and  $\sigma^2$  variance.  $i$  represents the household coping strategies: fishing, hunting and gardening.

Further, the analysis is expanded to consider the household's place of residence:

$$C_i = \beta_2 NS_i + \gamma_2 R_i + \delta_2 P_i + \lambda_2 NSS_2 + \mu_2 NSSS_2 + \epsilon_{2i} \quad (2)$$

where  $R_i$  represents a binary variable, which takes the value of 1 when households reside in rural areas and 0 otherwise and  $P_i$  represents the region. Finally, including sociodemographic characteristics, the equation would be.

$$C_i = \beta_3 NS_i + \gamma_3 R_i + \delta_3 P_i + \lambda_2 NSS_3 + \mu_2 NSSS_3 + \theta_3 Z_i + \epsilon_{3i} \quad (3)$$

where,  $Z_i$  is the vector of sociodemographic characteristics including age, gender (male/ female), race (Black, white, and other race), education level, household size, and marital status (married, and not married).

To address the second research question, determining the characteristics of households who shop at dollar stores and club stores as a coping/adaptive strategy the following hypotheses were framed:

H1: SNAP households will be more likely to spend their money in dollar stores than non-SNAP households with low income

H2: Non-SNAP households with high and marginal income will be more likely to spend their money in club stores than SNAP households

Another logistic regression would be estimated (as shown below). In this case, the dependent variable would be the use of dollar stores and club stores.

$$DC_i = \Omega_i NSH_i + \lambda_1 NSSH_i + \mu_1 NSSSH_i + \epsilon_{1i} \quad (4)$$

where  $DC_i$  represents the  $i$ th type of stores;  $NSH_i$  represents non-SNAP participants with low income (<100% of the Federal Poverty Guideline),  $NSSH$  represents non-SNAP participants with marginal income ( $\geq 100\%$  and  $< 185\%$  of the Federal Poverty Guideline) and  $NSSSH_i$  represents non-SNAP participants with high income ( $\geq 185\%$  of the Federal Poverty Guideline),  $\epsilon_{1i}$  is an error term with mean zero and  $\sigma^2$  variance.  $i$  represents the household buying from dollar and club stores.

Further, considering the location: rural or region of the country, and households with more members, I expanded the model, using the following equations:

$$DC_i = \alpha_0 + \alpha_1 NSH_i + \gamma_3 F_i + \delta_3 K_i + \lambda_2 NSSH_3 + \mu_2 NSSSH_3 + \epsilon_{3i} \quad (5)$$

where  $F_i$  represents a binary variable, which takes the value of 1 when households reside in rural areas and 0 otherwise.  $K_i$  represents the region, and finally, including sociodemographic characteristics, the equation would be.

$$DC_i = \alpha_0 + \alpha_1 NSH_i + \gamma_3 F_i + \delta_3 K_i + \lambda_2 NSSH_3 + \mu_2 NSSSH_3 + \theta_3 E_i + \epsilon_{3i} \quad (6)$$

where,  $E_i$  is the vector of sociodemographic characteristics including age, gender (male/ female), race (Black, white, and other race), education level, and marital status (married, and not married).

To address the third research question “Do households that use strategies such as gardening, fishing and hunting have higher levels of food security?”

H1: Households having their own garden or obtaining food from others’ gardens have higher levels of food security

Another multiple regression would be estimated (as shown below) to examine the relationship between food security and gardening, fishing, and hunting mentioned previously. In this case, the dependent variable would be 'Raw Food Security'. This variable reflects the sum of the household’s score on the questions highlighted in Table 5. As defined by the USDA ERS codebook, (USDA-ERS 2016c:15), “the final interview included 10 questions used to assess household food security status based on USDA’s 30-day Adult Food Security Scale. Responses of “yes,” “often,” “sometimes,” and responses of 3 or more days are coded as affirmative. The sum of affirmative responses to the 10 questions in the Adult Food Security Scale is the household’s raw score on the scale.” USDA considers household with raw scores of zero as experiencing "high food security", scores of 1-2 as experiencing "marginal food security", scores of 3-5 as experiencing "low food security" and scores of 6-10 as experiencing "very low food security." In the Food Aps survey data, 960 (19.89%) households reported in the second category (marginal food security), 785 (16.27%) households reported in the third category (low food security) and 559 (11.58%) households reported in the fourth category (very low food security). The remaining 2,522 (52.26%) are in the first category

that is highly food secure (high food security). The below table shows the 10 food security questions that were asked of the participants to assess household food security status based on USDA's 30-day Adult Food Security Scale. These 10 questions (see table 5) give us an idea on how the raw score was constructed and grouped into four categories of 'food security- high, marginal, low, and very low food security level.

**Table 5. Food Security Questions that made the Raw Score for Variable ‘Food Security’**

In last 30 days, worried food would run out before we got more money Often true Sometimes true Never true
Food ran out and had no money to buy more, in last 30 days Often true Sometimes true Never true
Couldn't afford to eat balanced meals, in last 30 days Often true Sometimes true Never true
Adults skipped or cut size of meals b/c not enough money, in last 30 days (Y/N)
Number of day's adults skipped/cut meal size b/c not enough money, last 30 days
Eat less than felt you should b/c not enough money, in last 30 days (Y/N)
Ever hungry but didn't eat b/c not enough money, in last 30 days (Y/N)
Lose weight b/c not enough money for food, in last 30 days (Y/N)
Skip food all day b/c not enough money for food, in last 30 days (Y/N)
How often adults skipped food all day b/c not enough money, in last 30 days

**Independent Variables**

Food acquisition strategies like gardening, fishing or hunting for both SNAP and non-SNAP participants are considered as independent variables. The equation below gives the basic relationship on how food security is associated with these coping strategies.



$$FS = bS + cNS + dNNS + eHF + fG + gGO + \epsilon \quad (7)$$

where FS represents food security, the continuous variable, S represents SNAP participant and NS represents non-SNAP participants with income <100% of the Federal Poverty Guideline, NNS represents non-SNAP participants with income >=100% and <185% of the Federal Poverty Guideline, G represents gardening which takes the value of 1 when the households have their own garden and 0 otherwise, HF similarly represents hunting or fishing, and GO represents households receiving fruits and vegetables from others' garden, and  $\epsilon$  is a mean zero error and constant variance.

### *Analyses*

The analysis consisted of descriptive statistics as well as logistic regressions and multinomial regression using STATA. I ran the logistic regressions of having own garden, getting food from others garden and getting food from hunting or fishing on all independent variables. Sample size = 4815 observations (excluding missing data).

Descriptive statistics, and chi-squared tests were conducted to describe the sample and the association between the characteristics and the coping strategies used by SNAP and non-SNAP participants using STATA.

Multiple regression analysis was used to determine the relationship between food security and adaptive strategies. The food security score is estimated as a function of variables representing the adaptive strategies (gardening, hunting and

fishing) and the target groups (SNAP participants and SNAP nonparticipants with three different levels of household income).

The following socio-demographic characteristics were included in this analysis for specific purposes as defined above: age, gender (male/ female), race (Black, white, and other race), location, education level, household size, marital status (married, and not married).

**Table 6. Overview of the Research Agenda**

<b>Dependent Variables</b>	<b>Hypotheses</b>	<b>Method (s)</b>
Adaptive Strategies (Gardening, Hunting/fishing)	RH1-A: Households living in the rural areas will more likely to have their own garden	Frequencies Cross-tabs Logistic Regressions
	RH1-B: Households living in the rural areas will more likely to receive fruits and vegetables from others garden	Frequencies Logistic Regressions
	RH1-C: Households living in the Midwest will more likely to have their own garden	Frequencies Logistic Regressions
	RH1-D: Households living in the Midwest will more likely to engage in hunting and fishing.	Frequencies Logistic Regressions
	RH1-E: Households living in the Midwest will more likely to receive fruits and vegetables from others gardens	Frequencies Logistic Regressions
	RH1-F: Large household size will more likely to have their own garden	Frequencies Logistic Regressions
Dollar and Club store	RH2-A: SNAP households will be more likely to spend their money in dollar stores than non-SNAP households with low income	Frequencies Logistic Regressions
	RH2-B Non-SNAP households with high and marginal income will be more likely to spend their money in club stores than SNAP households	Frequencies Logistic Regressions
Food Security (raw score)	RH3: Households having their own garden or obtaining food from others' gardens have higher levels of food security	Cross-tabs Multiple Regressions

### *Frequencies*

A frequency is the number of times an event or something occurs per unit of time. In our sample, it indicates the range and distribution across the variable. It is important as it makes possible a detailed analysis of the study and also gives a sense of the structure of the population with respect to a particular characteristic. In my analysis, frequencies are used to provide a starting point and determine the groups of the population, the context, and a framework for analysis and interpretation of the results.

### *Cross-Tabulations with Chi-square*

Cross tabulation analyzes the relationship between various variables. It also shows the correlation and its changes from one variable grouping to another variable grouping. In this analysis, I compare percentages of frequency counts in a cross-tabulation of the target groups with three different dependent variables: garden own, garden else, and hunting/fishing.

Pearson's Chi-square is also called a "goodness of fit" statistic. It is the most common test to analyze categorical data. I have used Chi-square test of significance, with a p-value 0.05, and 0.10 level for determining whether there are significant differences between groups across variables. This has helped determine the significance level of the variables and allowed me to compare adaptive strategies like gardening, hunting and fishing adopted by households having similar food security conditions in the rural, and the region among the SNAP and non-SNAP participants.

### *Binomial Logistic Regression*

Binomial logistic regression is used in this analysis to look at the food sources used by the target groups- SNAP and non-SNAP participants.

Demographic variables are regressed on food acquisition strategies like hunting, fishing and gardening to find important predictors for food acquisition behavior. In this study, dependent variables are dichotomous measures (have their own garden, receives fruits and vegetables from others' garden, and gets food from hunting and fishing/ doesn't use the strategy).

Logistic regression is the primary statistical tool used by researchers when the dependent variables are dichotomous. In this analysis the dependent variables are the probability that an event will occur in one of the two categories, therefore it is constrained between 0 and 1. As Pampel states in his logistic regression, "they show the increase or decrease in the predicted probability of having a characteristic or experiencing an event due to a one-unit change in the independent variables" (2000:1-2).

Logistic regression is significant in two ways. This tool is used to predict the group membership. Also, because logistic regression's results are in the form of odds ratios, it calculates the probability of success of the probability of failure. These analysis and prediction are important as they give us the probability of belonging to one group after controlling various other variables. They also help us determine the strength of variables and the relationship among the variables. To sum up, the researcher can get a clear picture about the variables that will lead to the results (Menard 1995, Tabachnick and Fidell 1996).

Like any other statistical analysis tools, there are several assumptions in a logistic regression. It assumes that there is a

- “First, binary logistic regression requires the dependent variable to be binary.
- Second, logistic regression requires the observations to be independent of each other.
- Third, logistic regression requires there to be little or no multicollinearity among the independent variables.” (statistics solution:1).

Logistic regression does require a decent sample size even if the assumptions are very minimal. In linear regression, the rule of thumb for the sample size “requires at least 20 cases per independent variable in the analysis.” (statistics solution:1). In order to estimate accurate hypothesis testing it might be required to have at least 50 cases per independent variable, especially if there are many groups in dependent variable for the study (Tabachnick and Fidell 1996). Lastly, in linear regression, “it is important to check for outliers since it is sensitive to outlier effects.” (statistics solution:1)

### *Multiple Regression*

Multiple regression is used in this analysis to look at the effect of food acquisition strategies like gardening, fishing, and hunting on food security used by the target groups—SNAP and non-SNAP participants. Multiple regression explains the relationship between multiple independent variables and one dependent variable.

Like any other regression, there are assumptions associated with multiple regression: first, it assumes that the model is linear in nature. Second, it assumes that variables have normal distribution. Thirdly, the variance is constant across all levels of the predicted variable, so homoscedasticity is assumed. Multicollinearity tests are also performed to ensure that there is no high co-relation between the independent variables.

## **CHAPTER 5. FOOD ACQUISITION STRATEGIES**

Low-income households often have to make choices to fulfill their food needs. The research questions for this chapter focus on how these strategies differ between SNAP and non-SNAP households and across other household characteristics. The first step is to identify the frequency of these coping strategies in SNAP households and three groups of non-SNAP households: those with income below the federal poverty guideline, those with income between 100% and 185% of the poverty guideline, and those with income of 185% or more of the poverty guideline (see table 7). Almost all households with income below 100% of the poverty level would qualify for SNAP, and some with incomes up to 185% of the poverty level would also qualify if they have sufficient deductions or meet other criteria.

**Table 7. Numbers of Surveyed Households in Each Category**

	<b>SNAP</b>	<b>Non- SNAP low</b>	<b>Non-SNAP marginal</b>	<b>Non-SNAP high</b>
<b>Variables</b>	<b>Frequency (total 1581)</b>	<b>Frequency (total 346)</b>	<b>Frequency (total 851)</b>	<b>Frequency (total 2048)</b>
Hunt/Fish	213	48	142	390
Garden own	284	64	197	604
Garden else	386	91	284	756
Rural	405	73	248	585
Midwest	305	84	230	551
South	669	133	343	639
West	356	87	169	444
Northeast	251	42	109	414

Source: Author calculations based on FoodAPS data, using Stata software.

Note: “SNAP” households participated in the program during the survey period. “Non-SNAP low” households have incomes below 100% of the poverty guideline. “Non-SNAP marginal” households have incomes greater than or equal to the poverty guideline but less than 185% of the poverty guideline. “Non-SNAP-high” households have income equal to or greater than 185% of the poverty guideline.



Table 7 indicates the number of survey households reporting hunting, fishing and gardening activities, and the number in each geographic region and in rural areas, categorized in the four SNAP and income related groups. In the estimated equations which follow, the Northeast region is considered as the reference group. Note that the ratio of SNAP to non-SNAP respondents with low income is very different in the Northeast than in some other regions. More than a quarter of the households (26%) reside in rural areas. Creed and Ching (1997) address the importance of recognizing the populations in rural and urban areas from a theoretical stance. They discuss the crucial need to maintain the visibility of the rural not only from a food production standpoint, but also to examine the overall life course of people living in rural areas.

Table 7 shows that almost 14 percent of SNAP participants acquire food by hunting or fishing, 18 percent have their own garden, and 24 percent receive food from other peoples' gardens. Just over a quarter of SNAP participants live in rural areas, with more of them residing in the South than in other regions.

The pattern of food acquisition strategies for non-SNAP households with low incomes is very similar to that for the SNAP households. Around 14 percent of non-SNAP households with low income acquire food by hunting or fishing, 18 percent have their own garden and 26 percent receive food from others' gardens. Just over a fifth of non-SNAP households with low income live in rural areas, while about a quarter live in the Midwest, another quarter in the West, and nearly two-fifths live in the South. The Northeast has the smallest share at just 12 percent.

Non-SNAP households with low income are more likely to receive food from others' gardens compared to acquiring food from hunting or fishing and having their own garden. We do notice here that non-SNAP low income households get more food from others' gardens compared to the SNAP households, though the difference is minimal. There is not much difference between SNAP and non-SNAP low income households in acquiring food from hunting and fishing. Also, SNAP households are more likely to reside in the rural areas than non-SNAP low income households.

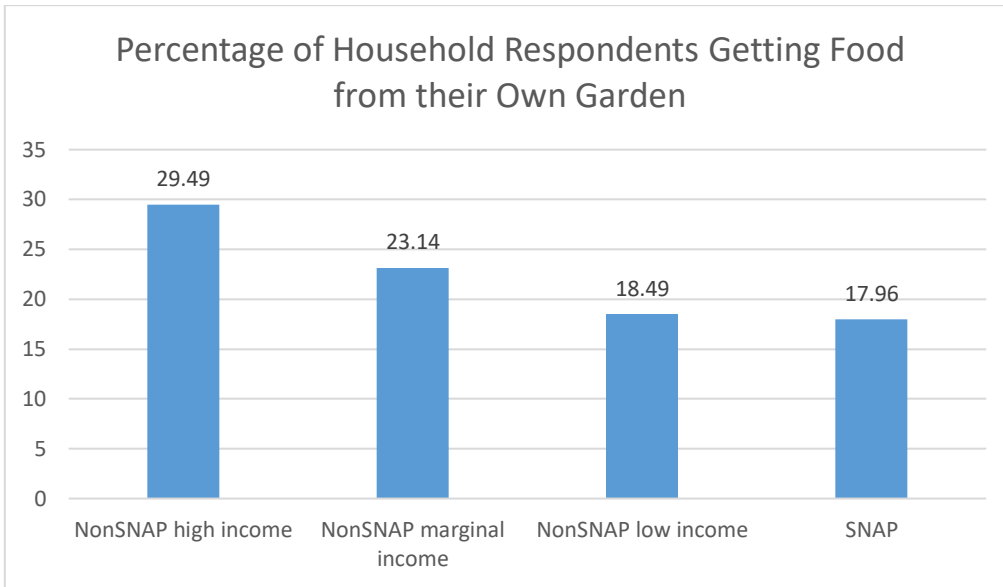
Almost 17 percent non-SNAP participants with marginal income acquire food by hunting or fishing, 23 percent have their own garden and 33 percent receive food from other gardens. Around 29 percent of non-SNAP participants with marginal income live in the rural areas, and are more likely to reside in the Southern region compared to other regions, with lowest share in the Northeast (Table 7).

Almost 19 percent of non-SNAP participants with high income acquire food by hunting or fishing, almost 30 percent have their own garden and 37 percent receive food from others' gardens. Almost 29 percent of non-SNAP households with high incomes live in rural areas, and more live in the South (31 percent), than in other regions. The graphical presentation of the data (target group and deploying strategies) is provided in Figures 8, 9 and 10 below.

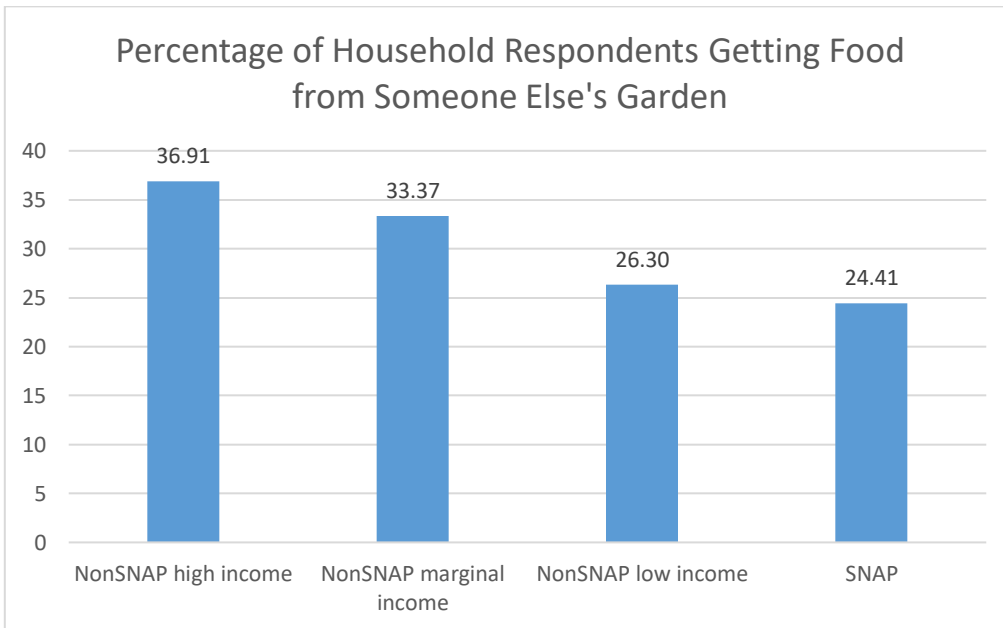
Non-SNAP households with high food security and high income are more likely to have their own garden and engage in hunting and fishing compared to other target groups in this study. In general, these self-provisioning activities

appear to be more related to income levels than to SNAP participation. Low income non-SNAP households generally report behavior more similar to SNAP households than to higher income households.

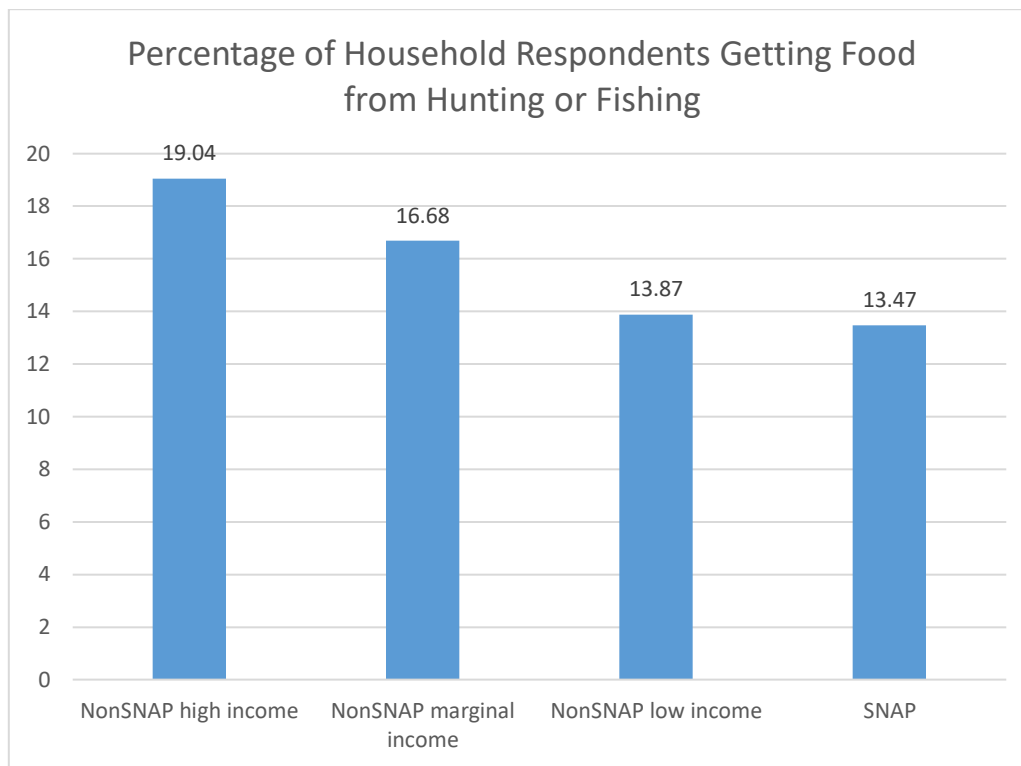
**Figure 8. Target Groups Getting Food from Their Own Garden**



**Figure 9. Target Groups Getting Food from Someone Else's Garden**



**Figure 10. Target Groups Getting Food from Hunting or Fishing**



Recognizing the behavioral and attitudinal differences between populations based on rural areas and regions, location is important when considering food acquisition strategies. People may have more opportunities to garden, hunt, or fish in some regions than in others, and may find more cultural acceptance and support for such activities. Schupp and Sharp’s (2012: 96) analysis of the importance of geographical location with respect to growing one’s own food – that “food production has historically been a rural activity” – was also supported by Lobao and Meyer (2001). As a result, a difference could exist in terms of prevalence of own gardening in the rural areas and other regions. Schupp and Sharp (2012:96) argue that “rural residents may have easier access to space necessary to garden.”

They observe that “there may be a reservoir of cultural and human and cultural capital that results in rural residents both knowing how to effectively garden and having access to social networks to support such activities. While the cultural knowledge and gardening or farming skills may historically have been greater among rural residents” (Schupp and Sharp 2012:96). Put another way, cultural capital shifted with the shift in agricultural practice. For example, a household's knowledge of how to grow food could vary significantly based on where the household resides (Schupp and Sharp, 2012).

### *Cross-Tabulations*

Pearson’s Chi-square tests of significance are performed using Stata. Cross tabs are usually conducted on categorical data to help understand the correlations between different variables. Using this statistical test, I cross-tabulated target group (SNAP households, non-SNAP households with low income, non-SNAP households with marginal income, and non-SNAP households with higher income) and food acquisition strategies and arrived at some preliminary findings which are interesting. Table 8 shows the cross tabulation for households receiving food from their own garden has statistically significant Chi-square values, suggesting that there is a relationship of the target groups with the food strategy. In general, a greater percentage of higher income households garden, hunt and fish than households that either participate in SNAP or are eligible to do so, while a greater percentage of these latter households use dollar stores to acquire food than do

higher income, non-eligible households. These differences are also statistically significant.

**Table 8. Cross Tab with Pearson Chi Square Test: Target Group and Garden Own**

<b>Target Group</b>	<b>Do not have own garden</b>	<b>Have own garden</b>	<b>Total</b>
Non-SNAP high income	1,444	604	2,048
Non-SNAP marginal income	654	197	851
Non-SNAP low income	282	64	346
SNAP	1,297	284	1,581
<b>Total</b>	<b>3,677</b>	<b>1,149</b>	<b>4,826</b>

**$\chi^2$  Significance= 0.000**

Table 9 provides a cross-tabulation between target groups and receiving food from someone else’s garden. The Chi-square value is statistically significant, indicating that there is an association of target group with the food acquisition strategy. As shown in Table 9, almost 37 percent of non-SNAP households with high income get food from others’ gardens, compared to 33 percent of non-SNAP households with marginal income, 26 percent of non-SNAP households with low income, and almost 24 percent of SNAP households.

**Table 9. Cross Tab with Pearson Chi Square Test: Target Group and Garden Else**

<b>Target Groups</b>	<b>Do not receive food from someone else’s garden</b>	<b>Receive food from someone else’s garden</b>	<b>Total</b>
Non-SNAP high income	1,292	756	2,048
Non-SNAP marginal income	567	284	851
Non-SNAP low income	255	91	346
SNAP	1,195	386	1,581
<b>Total</b>	<b>3,309</b>	<b>1,517</b>	<b>4,826</b>

*X<sup>2</sup> Significance= 0.000*

Similarly, another cross-tabulation was conducted between the target groups and those getting food from hunting and fishing (Table 10). The statistically significant Chi-square value, indicates that there is an association between target groups and the food acquisition strategy.

**Table 10. Cross Tab with Pearson Chi Square Test: Target Group and Hunting/ Fishing**

<b>Target Groups</b>	<b>Do not obtain food from hunting and fishing</b>	<b>Obtain food from hunting and fishing</b>	<b>Total</b>
Non-SNAP high income	1,658	390	2,048
Non-SNAP marginal income	709	142	851
Non-SNAP low income	298	48	346
SNAP	1,368	213	1,581
<b>Total</b>	<b>4,033</b>	<b>793</b>	<b>4,826</b>

*X<sup>2</sup> Significance = 0.000*

As with gardening, nearly one-fifth of households with higher income acquire food through hunting and fishing (almost 19 percent), while 17 percent of non-SNAP households with marginal income acquire food this way, and those with lower incomes use this food acquisition strategy less (15 percent of non-SNAP households with low income and nearly 14 percent of SNAP households), (see Table 10).

**Table 11. Cross Tab with Pearson Chi Square Test: Target Group and Dollar Store**

<b>Target Groups</b>	<b>Do not receive food from dollar store</b>	<b>Receive food from dollar store</b>	<b>Total</b>
Non-SNAP high income	1578	469	2047
Non-SNAP marginal income	565	286	851
Non-SNAP low income	230	115	345
SNAP	947	633	1580
<b>Total</b>	<b>3320</b>	<b>1503</b>	<b>4823</b>

***X<sup>2</sup> Significance = 0.000***

Table 11 reveals that almost 22 percent of non-SNAP households with high income acquire foods from dollar stores, compared to a third of non-SNAP households with marginal income (34 percent) and non-SNAP households with low income (33 percent), and almost 40 percent of SNAP households. The Chi-squared value indicates that the association between the target groups and the dollar store strategy is statistically significant.

**Table 12. Cross Tab with Pearson Chi Square Test: Target Group and Club Store**

<b>Target Groups</b>	<b>Do not buy food from club store</b>	<b>Buy food from club store</b>	<b>Total</b>
Non-SNAP high income	1490	557	2048
Non-SNAP marginal income	684	167	851
Non-SNAP low income	294	51	346
SNAP	1351	229	1581
<b>Total</b>	<b>3819</b>	<b>1004</b>	<b>4826</b>

***X<sup>2</sup> Significance = 0.000***

Table 12 reveals that almost 27 percent of non-SNAP households with high income get food from club stores, compared to 20 percent of non-SNAP



households with marginal income, 15 percent of non-SNAP households with low income, and almost 15 percent of SNAP households. The Chi-squared value indicates that the association between the target groups and this food acquisition strategy is statistically significant.

### *Binomial Logistic Regression*

A series of binomial logistic regression models were developed to further examine the relationships between food acquisition strategies, target groups and other demographic variables. By regressing each strategy on respondent age, gender, education, marital status, and household size as well as the SNAP participation and income-related target groups, we can evaluate how each factor affects the likelihood of deploying the strategy in question. In evaluating the impacts of SNAP participation, this approach controls for some of the other factors that might affect use of particular strategies, which may ameliorate some, but not all, of the challenges caused by self-selection bias in SNAP participation. In all of the models, the base household is a SNAP household from a non-rural location in the Northeast, with a primary respondent (PR) who is male, unmarried, reports a race other than white or Black, and has a master's degree or more.

**Table 13. Primary Respondent /Household Having their Own Garden**

Model 1.

Total Observation: 4815

<b>Household acquires food from own garden</b>	<b>Odds Ratio</b>	<b>Std. Err.</b>	<b>P&gt; z </b>
<b>Non-SNAP high income</b>	1.309	0.126	<b>0.005</b>
Non-SNAP marginal income	1.080	0.122	0.496
Non-SNAP low income	0.990	0.161	0.951
<b>Midwest</b>	1.123	0.062	<b>0.037</b>
<b>South</b>	0.926	0.033	<b>0.031</b>
West	0.994	0.029	0.833
<b>Married</b>	1.857	0.153	<b>0.000</b>
<b>Rural</b>	2.340	0.184	<b>0.000</b>
HS or Less	1.055	0.160	0.725
College	1.103	0.084	0.199
Bachelors	1.075	0.059	0.190
<b>White</b>	1.958	0.239	<b>0.000</b>
<b>Black</b>	0.841	0.074	<b>0.049</b>
<b>Age</b>	1.017	0.002	<b>0.000</b>
Gender	1.093	0.093	0.296
<b>Household size</b>	1.063	0.031	<b>0.035</b>
Cons	0.031	0.008	0.000

*Note: P values for variables significant at the 0.05 and 0.10 level are reported in bold.*

\*Dependent variable is the likelihood that a household will have its own garden.

Model 1 (Table 13) reveals that there is no significant difference between SNAP households and non-SNAP households with low or marginal income with respect to the odds of having their own garden. Non-SNAP households with high income are more likely to have their own garden than SNAP households. This result is consistent with previous research done by Brown et al. (1998) and Schupp and Sharp (2012), who “even found that households with higher incomes were more likely to participate in self-provisioning than those experiencing economic hardship.” (Schupp and Sharp 2012:96).

Households living in rural areas are more likely to have their own garden than households living in non-rural areas. People living in rural areas are more likely to have the land and skills needed to garden than are urban dwellers on the coasts. Households in the Midwest are more likely to have gardens than those in the Northeast, while households in the South are less likely to have gardens than those in the Northeast.

Households where the PR is white are more likely to have their own garden than households where the PR is of a race other than white or Black, while households with a Black PR are less likely to garden. Households where the PR is married are more likely to have a garden than those where the PR is not currently married. Single-parent households and non-white households have reasons they do not garden that are not explained by their income level. Similar findings were supported by Bickel et al. (2000), which found that households with single parents with children and income below poverty level, and Black households experience more food insecurity. These households may lack access to natural, cultural or economic capital, which could make it difficult for them to deploy strategies like having their own garden, but it also may be due to other factors. For example, single parents may simply lack the time needed to engage in gardening.

The results suggest that the older the primary respondent, the more likely the household is to have its own garden. Wang and Glicksman (2013) report that seniors participate in gardening because of their responsibilities towards others, for their own mental health, social connections and to help others. In another study, Leng et al. (2016) found older people above 65 years with depression or with

mobility limitations practice gardening and that gardening is positively associated with a high survival rate. Wellbeing and health of older people are positively associated with gardening as examined by Gagliardi and Piccinini (2019).

Larger households are more likely to have their own garden than smaller households. Perhaps households with more members are better able to supply the labor needed to maintain a garden, but other factors may also be at play. Large households may face food insecurity, as is examined by Bickel et al. (1999) and Olsen et al. (2004), and this could lead to self-provisioning efforts.

**Table 14. Primary Respondent/Household Getting Food from Someone Else’s Garden**

Model 2.

Total Observation: 4815

Getting food from else’s garden	Odds Ratio	Std. Err.	P> z
<b>Non-SNAP high income</b>	1.438	0.125	<b>0.000</b>
<b>Non-SNAP marginal income</b>	1.377	0.137	<b>0.001</b>
Non-SNAP low income	1.135	0.161	0.371
<b>Midwest</b>	1.154	0.057	<b>0.004</b>
<b>South</b>	0.925	0.029	<b>0.015</b>
<b>West</b>	0.903	0.025	<b>0.000</b>
Married	1.106	0.084	0.186
<b>Rural</b>	2.095	0.153	<b>0.000</b>
HS or Less	0.784	0.106	0.071
College	1.013	0.069	0.848
Bachelors	1.032	0.050	0.516
<b>White</b>	1.892	0.203	<b>0.000</b>
Black	1.055	0.073	0.488
Age	1.001	0.002	0.780
<b>Gender</b>	1.366	0.105	<b>0.000</b>
Household size	0.955	0.025	0.076
Cons	0.182	0.040	0.000

Note: p values for variables significant at the 0.05 and 0.10 level are reported in bold.

\*Dependent variable is the likelihood that a household will get food from someone else’s garden.

Model 2 (Table 14), above shows there is no significant difference between the non-SNAP households with low income and SNAP households with respect to receiving food from other households' gardens. Non-SNAP households with high income and non-SNAP households with marginal income are more likely to receive food from someone else's garden than SNAP households. Households living in the Midwest region are more likely to receive food from others' garden than households living in Northeast region, and rural households are more likely to do so than other households. Households in the South are less likely to receive food from others' garden than households living in the Northeast, also households in the West are less likely to receive food from others' garden than households living in the Northeast. Rural households are more likely to get food from someone else's gardens than non-rural households. A household of a PR who is white is more likely to receive food from others' gardens than when the PR is of "other" race. A household with a female PR is more likely to receive food from others' gardens than a household with a male PR.

Morton et al. (2008) found that rural areas with high poverty were more likely to utilize a reciprocity economy. A reciprocity economy occurs when individuals share the goods between themselves in a community. Such a reciprocity economy may be supported in part by the produce from home gardening. As Morton et al (2008) argues, "the rural low-income...was significantly more likely to give food to family, friends, and neighbors and obtain food such as fish, meat, and garden produce from friends and family compared to the urban low-income group" (2008:107). This suggests that people can only get food from others' gardens when

they know people who garden and maintain a good social relationship with them. If these social ties play a significant role when it comes to reciprocation, then it is likely that being part of a good network is also an essential factor when it comes acquiring food through gardening, fishing, and hunting.

The previous equation showed that white respondents were more likely to garden, and it reasons that they are also more likely to know people who garden. Even if communities of color are more likely to have stronger collective ties, they may not have people in their social networks who have garden produce to share. Further research might examine interaction effects between race and region.

**Table 15. Primary Respondent/Household Getting Food from Hunting or Fishing**

Model 3

Total Observation: 4815

Getting food from hunting/fishing	Odds Ratio	Std. Err.	P> z
<b>Non-SNAP high income</b>	1.326	0.145	<b>0.010</b>
Non-SNAP marginal income	1.138	0.144	0.308
Non-SNAP low income	1.045	0.189	0.808
<b>Midwest</b>	1.324	0.084	<b>0.000</b>
South	1.011	0.042	0.788
West	0.930	0.035	0.520
<b>Married</b>	1.437	0.136	<b>0.000</b>
<b>Rural</b>	2.903	0.254	<b>0.000</b>
HS or Less	1.335	0.237	0.102
College	1.137	0.102	0.151
Bachelors	0.987	0.065	0.841
<b>White</b>	1.864	0.273	<b>0.000</b>
Black	1.022	0.098	0.819
<b>Age</b>	0.990	0.003	<b>0.000</b>
<b>Gender</b>	0.668	0.061	<b>0.000</b>
Household size	1.029	0.034	0.384
cons	0.086	0.025	0.000

Note: p values for variables significant at the 0.05 and 0.10 level are reported in bold.

\* Dependent variable is the likelihood that a household will get food from hunting or fishing.

Model 3 (Table 15) reveals that there is no statistical difference between the non-SNAP households with low or marginal income and SNAP households with respect to hunting or fishing. Non-SNAP households with high income are more likely to hunt or fish than SNAP households. Households living in the Midwest are more likely to hunt or fish than households living in the Northeast and rural households are more likely to do so than households living in non-rural areas. PR who are white are more likely to live in households that get food from hunting or fishing than PR is of the “other” racial category. Households where the PR is currently married are more likely to get food from hunting or fishing than households where the PR is not currently married. A household with a female PR is less likely to receive food from hunting or fishing than a household with a male PR. The higher the age of the primary respondent, the less likely the household is to have obtained food from hunting or fishing. These findings are consistent with what Byrd et al. (2017) found that females are less likely to participate in hunting and fishing compare to males.

To determine which households choose shopping from alternative stores such as dollar and club stores to address my second research question, another logistic regression was conducted.

**Table 16. Primary Respondent/Household Getting Food from Dollar Store**

Model 4

Total Observation: 4815

Dollar store	Odds Ratio	Std. Err.	P> z
<b>Non-SNAP high Income</b>	0.629	0.052	<b>0.000</b>
Non-SNAP marginal income	0.867	0.081	0.131
Non-SNAP low income	0.887	0.114	0.356
Midwest	0.905	0.047	0.060
<b>South</b>	1.108	0.035	<b>0.001</b>
<b>West</b>	0.917	0.025	<b>0.002</b>
Married	0.870	0.065	0.067
<b>Rural</b>	1.277	0.096	<b>0.001</b>
<b>HS or Less</b>	2.973	0.523	<b>0.000</b>
<b>College</b>	1.525	0.135	<b>0.000</b>
<b>Bachelors</b>	1.160	0.074	<b>0.020</b>
White	0.954	0.923	0.634
<b>Black</b>	1.146	0.068	<b>0.021</b>
Age	1.001	0.002	0.456
Gender	1.082	0.082	0.298
<b>Household size</b>	1.074	0.026	<b>0.004</b>
cons	0.163	0.039	0.000

Note: p values for variables significant at the 0.05 and 0.10 level are reported in bold.

\* Dependent variable is the likelihood that a household will shop at dollar stores.

The results indicate that we did not find any support for the first hypothesis, the difference between SNAP households and other low-income households with regards to dollar store use was not significant.

Model 4 (Table 16) reveals that there is no statistically significant difference between the non-SNAP households with low or marginal income and SNAP households with respect to their use of dollar stores.<sup>8</sup> High-income households are found to be significantly less likely to shop at dollar stores than SNAP households. Households in the South are more likely to shop at dollar stores

<sup>8</sup> Dollar stores: “households shopped for food at a dollar store during the past 30 days.” (FoodAPS code book)



than households living in the Northeast, while households in the West are less likely. Rural households are more likely to shop at dollar stores than non-rural households. Households with Black PR are more likely to shop at dollar stores than households with a PR of the “other” race category. Households with PR with lower levels of education are more likely to shop at dollar stores than those where the PR has an advanced degree. The larger the household size, the more likely it is to shop at a dollar store.

It is interesting to see that some of the variables have significant effects even when controlling for other variables. For example, both education and race matter, even when controlling for income groupings. Sometimes the direction of causation is unclear. People in the South may be more likely to shop at dollar stores because a lot of stores were built there, or firms may have decided to build more stores in South because there were more prospective shoppers. Results suggest SNAP households are less likely than high-income households to engage in gardening, hunting or fishing, but more likely to shop at dollar stores.

From this data, one cannot determine whether people “use dollar stores during their difficult times” as a coping strategy or if there are other reasons these households shop in these stores, such as store proximity, marketing outreach, accessibility to transportation routes, or something else. Some people may even choose to shop in these stores for the pure pleasure of finding bargains (just as some high-income people may get pleasure from growing their own food), not because they lack alternatives. While results from Model 4 help us understand who uses dollar stores, further research is needed to address the question of why low

income households do not shop from dollar stores. The data in this study is insufficient to tease out different motivations.

**Table 17. Primary Resident/Household Getting Food from Club Store**

Model 5

Total Observation: 4815

<b>Club Store</b>	<b>Odds Ratio</b>	<b>Std. Err.</b>	<b>P&gt; z </b>
<b>Non-SNAP high Income</b>	1.926	0.193	<b>0.000</b>
<b>Non-SNAP marginal income</b>	1.469	0.173	<b>0.001</b>
Non-SNAP low income	1.030	0.178	0.864
<b>Midwest</b>	0.726	0.41	<b>0.000</b>
<b>South</b>	0.827	0.029	<b>0.000</b>
West	0.997	0.027	0.932
<b>Married</b>	1.549	0.129	<b>0.000</b>
<b>Rural</b>	0.791	0.072	<b>0.011</b>
<b>HS or Less</b>	0.569	0.08	<b>0.000</b>
<b>College</b>	0.837	0.059	<b>0.012</b>
Bachelors	0.944	0.047	0.260
<b>White</b>	0.702	0.070	<b>0.000</b>
Black	0.910	0.062	0.171
<b>Age</b>	1.005	0.002	<b>0.016</b>
Gender	1.083	0.094	0.356
<b>Household size</b>	1.168	0.033	<b>0.000</b>
Cons	0.189	0.045	0.000

Note: p values for variables significant at the 0.05 and 0.10 level are reported in bold.

\* Dependent variable is the likelihood that a household will shop at club store.

If we look at another store type, the club store,<sup>9</sup> Model 5 (see Table 17) demonstrates that there is no statistical difference between the non-SNAP households with low income and SNAP households with respect to their use of these stores. Non-SNAP households with marginal income, and non-SNAP

<sup>9</sup> Club store: “households shopped for food at a whole sale club during the past 30 days.” (FoodAPS code book USDA-ERS 2016a)

households with high income are more likely to shop from the club store than SNAP households. Households in the South are less likely to shop at dollar stores than households living in the Northeast, also households in the Midwest are less likely to shop at dollar stores than households living in the Northeast. Households in rural areas are less likely to shop from club stores than households living in other areas. This could be because there are few club stores in rural areas. Households with PRs with HS or less and college degree are less likely to shop from club stores compared to those with Masters or advanced degree. Households with older PRs are more likely to shop at club stores than households with younger PRs, and larger households are more likely to use club stores than smaller ones. Households with PR who are currently married are more likely to shop from the club store than PR who are not currently married, and households with a white PR are less likely to shop at club stores than households with a PR of “other” race. The higher the age of the primary respondent, the more likely the household is to shop food from at club stores.

Some of the reasons why SNAP households and other low income households do not shop from the club store could be because they generally require a yearly membership fee which many will not be able or willing to pay, the need to buy in bulk which may not be practical for these households, and the lack of transportation to these shops. Also, households with white PR are less likely to shop at the club stores than those in the base group, where the PR is of “other” race which may include some Latinx PR. This result might be because of the popularity of Sam’s Clubs and similar stores in many communities with large Latinx

populations (Valdez et. al. 2016). The data cannot give a clear picture of the whole story and further research is needed to tease out the reasons.

### *Discussion and Conclusion*

The models (1, 2, and 3) above show that three food acquisition strategies (gardening, fishing, and hunting) are used more frequently by household with some characteristics than with others. Non-SNAP households with higher income are more likely to have their own garden and get food from other's gardens compared to SNAP participants. The high-income households are also more likely to get food from hunting or fishing than are SNAP households. Region and rural areas also play an important part in the use of these strategies.

We also examined the relationship between the three food acquisition strategies and other demographic variables. For example, larger households are more likely to have their own garden. Gender also played an important role. Households with female PRs are more likely to report receiving food from someone else's gardens than those where the PR is male.

Applying the livelihoods perspective, as was expected, households deployed food acquisition strategies that reflected their capitals and capabilities. Households used the food acquisition strategies that are more available and accessible, and social ties or social capital help some households get food from other people's gardens. Access is a vital resource and access to other actors could be the most crucial link to tangible or material resources (Bebbington 1999). In addition to providing opportunities to access the material resources and needs, capitals can also enrich life in other possible ways. For example, cultural capital

illustrates that assets can empower households to gain access and opportunities besides being the sources of sustenance (Whiting 2010). Bebbington (1999) asserts that assets are capabilities for action and distinguishes three pathways for action – “instrumental action (which means making a living), hermeneutic means (making living meaningful) and emancipatory action (which means making changes in the fundamental structures of life),” according to Bebbington (1999:2022). Capitals therefore can be considered powerful in capabilities that bring opportunities to the households. In this study households with marginal and high income did use their capitals and capabilities to engage in gardening, fishing, and hunting. However, it is difficult to completely tease out what mechanism these households used to deploy these strategies. More refined research is needed in the future to examine these issues more closely.

Models 4 and 5 demonstrate that non-SNAP households with high incomes are less likely than SNAP households to shop at dollar stores, but the reverse is true in the case of club stores. Both dollar and club stores may provide food at a lower per-unit cost than conventional grocery stores and supermarkets, but fees, package sizes, location and other factors may make club stores inaccessible to many low-income households.

The survey data used in this analysis suggests that more low-income households shop at dollar stores than obtain food by either gardening or by hunting or fishing. It may be that many low-income households lack the social, human and financial capital needed to garden, hunt or fish. To start or maintain a garden or to engage in fishing and hunting, one needs produced capital, time, skills and other

resources which these households may lack. Dollar stores, in contrast, are easily accessible to many households.

The prevalence of the use of dollar stores may vary based on the availability of stores, race/ethnicity of shoppers, distance from home to the store, availability of transportation and car ownership (Hiller et al. 2017). Taylor and Boas 2016, examined the shopping habits of SNAP participants and non-participating SNAP-eligible households using Food APS data. They also found that a SNAP participant's willingness to shop at combo retail stores (which include dollar stores) depended on their distance from home and the household's access to a car. They recommended that "policy makers should incentivize building of certain outlet types over others, to fit the sociodemographic composition of each identified low-income, low-access area" (Taylor and Boas 2016: 1).

None of the estimated equation showed a statistically significant difference in the odds ratios between SNAP and low-income non-SNAP households. Income levels do affect the likelihood of households using several of the food acquisition strategies, but SNAP participation itself does not have a significant marginal impact. The question still remains whether food strategies such as gardening, hunting and fishing will enhance food security. This will be the focus of the next chapter.

## **CHAPTER 6: FOOD SECURITY AMONG SNAP AND NON-SNAP PARTICIPANTS**

This research has so far revealed the variation in deploying the food strategies used by SNAP and non-SNAP households. In this chapter, the focus is to understand if households having their own garden or obtaining food from others' gardens have higher levels of food security.

Based on the literature and theory presented in earlier chapters, we expect that gardening, fishing, and hunting would moderate the food insecurity level of households employing those strategies. The Food APS survey asks respondents 10 questions to assess their level of food insecurity. Their responses are used to develop a Food Insecurity Score, where the higher the score the more food insecure the respondent is.

- High food security among adults = raw score of zero
- Marginal food security among adults = raw score of 1-2
- Low food security among adults = raw score of 3-5
- Very low food security among adults = raw score of 6-10

Table 18 shows the food security level of the target groups (SNAP households, non-SNAP low income households, non-SNAP marginal income households, and non-SNAP higher income households) in this study.

**Table 18. Tabulation of SNAP and Non-SNAP Participants and their Food Security (Categories) Level.**

Food Security	Non-SNAP income <100% of the Federal Poverty Guideline	SNAP/Non-SNAP		SNAP households	Total
		Non-SNAP with income >=100% and <185% of the Federal Poverty Guideline	Non-SNAP with income >=185% of the Federal Poverty Guideline		
High food security (score = 0)	132	402	1,512	476	2,522
Marginal food security (score = 1 or 2)	64	184	318	394	960
Low food security (score = 3-5)	78	148	147	412	785
Very low food security (score 6-10)	72	117	71	299	559
Total	346	851	2,048	1,581	4,826

Among 1,581 SNAP participants, nearly one-fifth (19 percent) had very low food security, over a quarter (26 percent) had low food security, another quarter had marginal food security and 30 percent were classified as highly food secure (see Table 18). Non-SNAP households with low income had similar levels of very low (21 percent) and low (23 percent) food security, but had a lower level of marginal food security (18 percent) and a higher level of high food security (38 percent). Non-SNAP households with marginal income had higher levels of food security than low-income households--14 percent of participants had very low food security, 17 percent had low food security, 22 percent had marginal food security and 47 percent were highly food secure. By contrast, nearly three-quarters (73



percent) of households that do not qualify for the SNAP program because they have income greater than 185 percent of the poverty level have high food security.

On the surface, the results seem to imply that SNAP isn't doing much to enhance food security. From the literature (Bartfeld et al 2015), we know this may not be a valid conclusion, because of important differences in household characteristics—households are not randomly assigned to the SNAP and non-SNAP low income household categories, so one cannot conclude that differences we observe are necessarily because of SNAP participation. It is possible, for example, that certain household characteristics are associated both with SNAP participation and low levels of food security. Even if SNAP participation has a marginal positive impact on food security, it is possible that observed levels of food insecurity may be similar between SNAP households and other low-income households. My key interest is in finding out if the coping strategies I've identified are associated with higher food security in the households in this dataset.

#### *Primary Respondents and their Characteristics*

To look at the relationships between food security and the other independent variables, I used a cross-tabulation of the variables. “Pearson’s Chi-square tests of significance can be used to test the associative relationship between two categorical variables, in a cross-tabulation, by comparing the expected frequency in each cell with the observed frequency in each cell. Using this statistical test, I cross-tabulated demographic variables with food security levels. This question is then again examined through a multiple regression” (Whiting

2006:187). Using this statistical analysis, I cross-tabulated demographic variables with food security levels. I then reexamine the question through multiple regression by including independent variables to determine the marginal impact of each of these variables on food security levels.

### *Cross-Tabulations*

The “Pearson’s Chi-square tests the associative relationship among categorical variables.” (Whiting 2006:187) Table 18 shows “the percentages and significance values for the cross-tabulation of households and primary respondent characteristics and food security levels.” (Whiting 2006:187). Primary respondent’s gender, education level, and region of residence had significantly different associations with food security according to the Chi-square p-values (see table 19).

Food security is associated with respondent gender. Primary respondents in the survey do not reflect the mix of males and females in the general population, as 73.5 percent are female. The gender ratio of primary respondents suggests women are more likely than men to make food purchasing decisions in survey households. Note that a higher proportion of households where men were the primary respondent were classified as having high food security than was the case for households with women PRs.

Regionally, the proportions of households reporting high security are larger in the Northeast and Midwest than in other regions. The South and the West had the highest proportions of households reporting low or very low food security. Higher levels of education are associated with higher levels of food security. While

more than 42 percent of households where the PR did not obtain a high school diploma report low or very low levels of food security, less than 14 percent of households where the PR has a bachelor’s degree or greater reported the same. More than 72 percent of households where the PR has a bachelor’s degree or greater are classified as having high food security, compared to less than 36 percent of households where the PR did not complete high school or a GED.

**Table 19. Food Security Levels Across Demographic Characteristics and Region**

	<b>Total</b>	<b>High Food Security</b>	<b>Marginal Food</b>	<b>Low Food Security</b>	<b>Very Low Food Security</b>	<b>X<sub>2</sub>sig</b>
<b>Sex</b>						<b>0.003</b>
Male	26.49	56.25	17.44	14.55	11.73	
Female	73.51	50.81	20.78	16.89	11.52	
<b>Region</b>						<b>0.000</b>
Northeast	16.90	60.67	18.13	13.11	8.08	
Midwest	24.24	57.87	19.66	11.97	10.51	
South	36.98	47.14	20.34	18.83	13.67	
West	21.88	48.20	20.73	19.12	11.93	
<b>Education</b>						<b>0.000</b>
10th grade or less	11.49	31.95	22.74	29.25	16.06	
11th or 12th grade, no diploma	5.89	35.56	21.47	23.60	19.37	
H.S. diploma, GED or equivalent	28.78	48.05	21.55	17.87	12.53	
Some college or associate’s degree	32.66	51.42	21.59	14.67	12.32	
Bachelor’s degree	14.46	72.30	14.64	8.18	4.88	
Master's degree and above	6.72	80.61	9.54	5.85	4.00	

Consistent with past research, gender, education and region are significantly associated with household food security (Hillier et al 2017, Taylor and Boas 2016, and Sharp and Adua 2008). The next section examines whether gardening, fishing, and hunting have an impact on reported levels of food security, controlling for these demographic variables.

### *Multiple Regression*

The dependent variable in the regression equation is the raw score of food security. The raw score is “the sum of affirmative responses to the ten questions in the Adult Food Security Scale.” household codebook (USDA-ERS 2016a:15) as discussed in the Methodology chapter above. The higher the score, the greater the level of household food insecurity.

Model 1 (Table 20) considers only variables related to SNAP participation, income and self-provisioning activities without controlling for other demographic factors. The base household is a non-SNAP household with high income. Controlling for the household’s SNAP participation and income category, the results suggest that households that garden or that obtain food from someone else’s garden have significantly lower levels of food insecurity than households that do not. Hunting or fishing is not found to have a significant impact on household food security.

Food insecurity scores are significantly higher for SNAP and non-SNAP households with low or marginal income than they are for non-SNAP households with higher income levels. Note that the coefficients on the variables for SNAP

households and for non-SNAP low income households are similar, and much greater than the coefficient for non-SNAP households with marginal income. This suggests that income levels have an important impact on food security. Consistent with other studies (Bartfeld et al 2015), when there are no efforts made to correct for self-selection bias, the results do not demonstrate that SNAP participation reduces food insecurity, even among low-income households. The coefficient on the SNAP variable is actually greater than the coefficient on the variable for non-SNAP, low-income households. The significance of this result is not tested, but if it were significant, it would imply higher levels of food insecurity among SNAP households than among non-SNAP households with low income.

**Table 20. Base Model: Food Security, Target Groups and Gardening, Fishing, and Hunting**

Model 1

Number of Obs= 4826 Prob>P= 0.000 R-squared=0.1401			
<b>Raw Food Security Score</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>P&gt; t </b>
<b>Garden else</b>	-0.197	0.074	<b>0.008</b>
<b>Garden own</b>	-0.306	0.081	<b>0.000</b>
Hunt/fish	0.043	0.093	0.639
<b>SNAP</b>	1.970	0.078	<b>0.000</b>
<b>Non-SNAP low income</b>	1.830	0.134	<b>0.000</b>
<b>Non-SNAP marginal income</b>	1.212	0.094	<b>0.000</b>
_cons	0.859	0.061	0.000

*Note: p values for variables significant at the 0.05 level are reported in bold.*

Model 2 (Table 21) includes the same variables as Model 1, but adds a number of other demographic variables including region, sex, education level, age and household size. These additional variables control for a variety of factors that might be expected to affect food security levels, as indicated in the cross tabulations reported above. If the variables found to have significant impacts on food security using Model 1 are also found to have significant impacts using Model 2, it adds to confidence in the results.

**Table 21. Food Security Level and Gardening, Fishing, and Hunting**

Model 2

Number of Obs= 4823 Prob>P= 0.000 R-squared=0.160			
<b>Raw score</b>	<b>Coefficient</b>	<b>Std. Err.</b>	<b>P&gt; z </b>
Garden else	-0.132	0.074	0.075
<b>Garden own</b>	-0.201	0.082	<b>0.015</b>
Hunt and fish	0.001	0.094	0.986
<b>SNAP</b>	1.727	0.082	<b>0.000</b>
<b>Non-SNAP with low income</b>	1.652	0.134	<b>0.000</b>
<b>Non-SNAP with marginal income</b>	1.082	0.095	<b>0.000</b>
Midwest	0.042	0.052	0.421
<b>South</b>	0.105	0.032	<b>0.001</b>
<b>West</b>	0.066	0.026	<b>0.014</b>
Rural	-0.124	0.079	0.119
<b>HS or Less</b>	0.676	0.140	<b>0.000</b>
<b>College</b>	0.262	0.070	<b>0.000</b>
Bachelors	-0.010	0.051	0.834
<b>Age</b>	-0.014	0.002	<b>0.000</b>
Gender	0.041	0.076	0.589
Household size	-0.036	0.023	0.121
cons	1.023	0.200	0.000

*Note: p values for variables significant at the 0.05 and 0.10 level are reported in bold.*

The results for income categories, for getting food from one’s own garden and for hunting and fishing are qualitatively the same using Model 1 and Model 2. In both models, households with lower levels of income are likely to have higher levels of food insecurity, whether or not they participate in SNAP. Households that have their own garden have lower levels of food insecurity, while hunting and fishing has no significant marginal impact on household food security. The one difference in the two models is that getting food from someone else’s garden was found to significantly reduce food insecurity using Model 1, but using Model 2, the

effect is not significant at the 0.05 level (it is significant, however, at the 0.10 level).

In terms of the demographic control variables, Table 21 shows that residential location was found to be strongly associated with food security. Food insecurity is greater in the South and West regions than in the Northeast region, keeping other variables equal. Household size and gender are not important predictors of food security once controlling for other factors, but age is, as older people are less likely to be food insecure. Bickel et al. (1999) found that middle aged individuals are more likely to experience food insecurity than the older people. Lower levels of education increase food insecurity scores. The finding that gardening has a positive impact on food security is consistent with previous research (Becker 1984).



## **CHAPTER 7. FOOD ACQUISITION STRATEGIES** **CONCLUSION**

### *Summary and Discussion of the Overall Study Findings*

One purpose of this study is to examine the characteristics of households that utilize alternative food acquisition strategies such as gardening, hunting and fishing or shopping at dollar stores and club stores. A second purpose was to examine whether gardening, hunting, and fishing could enhance the food security level of these households. This information could help policymakers and non-profit organization better frame programs and policies concerned with hunger and food insufficiency.

Problems of poverty and hunger in the United States make it difficult for low-income households to participate in the economic system (Whiting 2006). It is important that marginal sections of society understand available options that could help them reduce food insecurity. For different communities and government programs and systems, it is essential to explore new directions to address food insecurity. This research study showcases the role gardening, fishing, and hunting plays in helping households moderate their food security level. Certain household characteristics play a vital role in determining the impact of these strategies in enhancing food security level. The results, in concert with literature review, suggest that reasons behind adoption of gardening, hunting, and fishing are multi-faceted. The results generally confirm suggested hypotheses.

The analysis also demonstrates that the likelihood of a participant having their own garden is significantly associated with where they live. One of the

hypotheses is that hunger coping strategies differ depending on the demographic characteristics of the household. Results reported in this study are in alignment with the theory that suggests that households make their choices of self-provisioning depending on their available assets, capitals, and capabilities. This finding is also consistent with previous literature that takes into account a variety of household types, the size of the household and the marital status, age, and gender of respondents (Hillier et al 2017, Taylor and Boas 2016, Bennett and McBeth 1998, Jones et al. 1999, Sharp and Adua 2008).

The results indicate that low-income households are more likely to shop at dollar stores than they are to obtain food by gardening, hunting, and fishing. Gardening, fishing, and hunting may be a part of the growing portfolio of activities embraced by households in periods of uncertainties, but they require scarce capital and time.

Across the surveyed households, gardening, fishing, and hunting were associated with income levels, but not with SNAP participation. Higher income households were more likely to have their own gardens, to get food from the gardens of other people, and to hunt or fish than were SNAP households. Gardening, fishing, and hunting can play a significant role in enhancing food security levels of households irrespective of the reasons why they are practiced. It is also true that many people engage in these activities for enjoyment and other purposes beyond meeting their food needs. Social, cultural, natural and financial capitals play a big role in determining which households practice these activities.

Household location is included as one of the variables associated with gardening, fishing, and hunting. Households living in the Midwest region and in rural areas are significantly more likely to have their own garden, to receive food from others' gardens and to hunt or fish than households living in the Northeast, and households in the South are less likely. As also demonstrated by Sharp and Clark (2008), the amount of space available to households in rural and specific regions can be notably different, which might also drive this association.

The demographic control variables, though not a focus of this study, have mixed relationships to gardening, hunting and fishing and receiving food from others' gardens. A statistically significant positive association can be seen between household size and a household having a garden. Bigger families may mean more food needs and more "free" labor, and it's also possible that large families are associated with traditional lifestyles that often include gardening as a common activity. Increasing levels of education are found to have a positive relationship with gardening, fishing, and hunting. As is demonstrated by Rank (2004) and Becker (1964), human capital plays an important role in enhancing food security. The households of white and female primary respondents are significantly more likely to receive food from others' gardens. Though the data does not provide any variables that measure social capital explicitly, it can be assumed that females who have strong social networks use them as a social safety net in times of food insecurity. Lastly, the result also shows that marital status has a statistically significant positive relationship with hunting, fishing and having one's own garden. A possible explanation could be that married women do a lot of gardening

themselves, but most hunters are men (Byrd E et al. 2017). Since most respondents are women, however, it might just be a statistical artifact in this study — marriage might not “really” be correlated with hunting, it might just be the presence of a male in the household, and married women are more likely to have men in the household than unmarried women.

Since gardening, hunting, and fishing have not been the topic of recent food provisioning research, the overarching goal of this study is to identify how SNAP and non-SNAP households deploy these strategies during periods of uncertainties and food insufficiency. It also determines which households shop at alternative stores like the dollar and club stores. The study also explores the impact of gardening, fishing, and hunting on food security. Synthesizing the information gathered from literature review, this study reveals that many of the variables examined have positive relationships with gardening, fishing, and hunting. The first area of interest relates to the geographic location and areas of the households. This could be considered as part of natural capital.

The second set of variables are associated with human capital like education level. The results of the analysis show that households in which the primary respondents have achieved more than a college degree have a statistically significant positive association with food security. However, human capital (education level) does not contribute to significant difference in deploying strategies like hunting, fishing or gardening.

### *Implications for Theory*

This study is an attempt at reexamining the relationship between gardening, fishing, and hunting and food security, and figuring out the differences among SNAP and non-SNAP participants when it comes to deploying strategies like gardening, fishing, and hunting. This information is valuable as it can assist policymakers deal with existing issues of food insufficiency and hunger.

First of all, results from this study can be of some utility in broader discussions of sustainability within the food system. With the recent push to encourage a more localized food system, this study can highlight some of the strengths and limitations of using gardening as a way towards achieving this goal (Schupp and Sharp, 2012). If supporters of the local food movement want to turn household gardening into an effective tool that helps realize sustainability, this study identified contributing factors as well as potential regions and areas conducive to these activities. Also, this study emphasizes the importance of social connections – it can be assumed that households receiving fruits and vegetables from others' gardens maintain good social lives, which in turn can increase the chance of reciprocity. As argued by Morton et al (2007:114), “low income households are nested in communities and regions that have distinct social norms of giving and getting foods as well as unique resource bases.” Morton also argues “the economy of the garden and the exchange of fruits and vegetables as a form of social relations and citizenship” (Morton et al. 2007:109).

Secondly, social capital, which includes a good social relationship with others, families, and friends, helps economically disadvantaged people. “Reciprocal

exchanges link individuals to the larger social structure and offer access to scarce resources” (Morton et al 2007:109). In rural upstate New York, low-income, food insecure families use coping strategies including obtaining food, and borrowing money for food from family and friends (Morton et al. 2007, Olson et al. 1997). Reciprocal survival strategies by “intergenerational and kin reciprocal survival strategies are also reported by other researchers” (Morton et al. 2007:109).

This also suggests that policymakers should be informed about the importance of local and community gardening. It would be beneficial to take initiatives to grow and support such efforts, which in turn will not only assist the socially disadvantaged and less fortunate groups of society but also the community as a whole. It should be noted that while access to land, garden shape, structures, and associated activities, zoning, and use, limitations and distribution of garden produce are impacted by local and state law policies, Federal initiatives also provide support through grants made to local and state governments.

Lastly, policymakers have generally assumed that increasing agricultural production would ensure supplies of food, and reducing food prices will help Americans be food secure (Allen 1999). But, this alone cannot address poverty and hunger. While gardening, fishing, and hunting is not the ultimate means of eradicating poverty and hunger, it could be an important tactic in addressing food insecurity.

### *Study Limitations and Future Research Conclusions*

The study attempts to examine the relationship between food security and gardening, fishing, and hunting, while also examining the differences in the deployment of these strategies among SNAP and non-SNAP households. However, as with any study, this study is limited by several factors.

The dearth of research about gardening, fishing, and hunting as a way of coping or an adaptive strategy, leaves room for improving future research directed at these questions. Another limitation has been the lack of good variables which could help to distinguish household characteristics. This project has relied a great deal on some variables specific to primary respondent information and some variables that are household-specific, making interpretations possible only on individual and household levels rather than a general interpretation of households deploying the strategies of gardening, fishing, and hunting.

Further, some meaningful variables like income, employment, and assets of these households could have contributed additional details to the research questions addressed in this study. But missing values of these variables made it difficult to include them in this study in a meaningful way. Thus, future research can definitely add more insights into these questions once these significant variables are made available.

Also, this study was not able to effectively address the three possible purposes (viz. economic hardships, cultural or recreational) for gardening, hunting, and fishing. As this is a gray area it is difficult to tease out the actual reasons why different households do or do not adopt gardening, fishing, and hunting. Further

research could help flesh out the primary reasons that drive or inhibit adoption of strategies like gardening, fishing, and hunting, and provide a better direction to the policymakers working on food security and poverty. With available limited data, this study is unable to answer the mechanism-related or 'how' questions regarding households indulging in gardening, fishing, and hunting. Future research is needed to throw light on this. Lastly, additional research is required to address methodological issues in self-provisioning strategies.

Furthermore, this dissertation research can hopefully prompt new ways of thinking, bringing considerable attention to gardening, fishing, and hunting as a way to address food insecurity in times of difficulty. This study talks about the reality of food poverty, food insecurity and hunger in the United States – for households that are under the umbrella of the federal safety net as well as those that have marginal or low income. It indicates that both groups need to understand how to moderate their food security level within a given context. These encouraging findings will hopefully provoke more research and discussions about ways to improve resources and food programs available to the needy and the poor of this country.



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