Childhood Food Insecurity In The United States: Exploratory Annotated Bibliography

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References

Barrett, C. B. (2010). Measuring food insecurity. *Science*, *327*(5967), 825–828.

https://doi.org/10.1126/science.1182768

According to the authors of the paper "Measuring Food Insecurity", peer-reviewed

research that appeared in the *Science* magazine in 2010, food insecurity is an increasing

concern globally, however, measuring food insecurity is difficult and oftentimes doesn't

depict the full scope of the problem. Based on this assertion, the researchers attempt to

answer the following:

1. Why is food insecurity so difficult to measure?

2. How can we more effectively measure food insecurity?

3. How can we effectively intervene to decrease food insecurity?

The researchers used data from the Food and Agriculture Organization of the

United Nations (FAO) as well as from the United States Department of Agriculture

(USDA) to determine trends in food insecurity, specifically looking at data on

"undernourishment". However, the problem with the data that shows patterns and facts

on the number of people who are undernourished globally and by region is that aggregate

data "masks" differing trends and makes it difficult to create meaningful and effective

policies. The researchers theorized that to eliminate the problem of data aggregation, it is

necessary to split the problem of food insecurity into three areas, or "pillars". In order to

determine the three pillars of food security, the researchers used USDA and FAO data to

determine what is and isn't measured. Food availability is the most commonly measured

pillar of food security, followed by access and utilization. Though it is easy to measure

food availability, it doesn't take into account food waste and is an oversimplified estimate

of food insecurity. It is far more difficult, but important, to measure the access that people have to food security, such as disenfranchisement, and utilization, such as micronutrition. The researchers determined that future research should measure the latter two pillars and focus on analyzing data at local and individual levels to provide the most accurate and effective data to policymakers. The paper illustrates that future researchers should move away from the traditional data collection methods of pulling data from databases regarding income and food production, as was done in the paper, and instead shift towards more personal surveys that cover a wide range of topics, from household nutrition information to disease risk exposure, as also was done in the research process of this topic. The authors end the paper by identifying how this shift in food insecurity measurement could potentially be beneficial to creating relief and support programs targeted to specific communities that need it most, and in areas that would have the largest positive impacts on communities. The researchers emphasized the need for long-term solutions to breaking poverty cycles over short-term relief from food insecurity problems.

Overall, this paper relates to the human development topic of ensuring basic rights, such as food security, to ensure that people have the opportunity to exercise other rights while having a higher quality of life. In addition, this paper address the first and second goals of sustainable development, which are "no poverty" and "zero hunger", because it addresses ways to measure food insecurity in the future so that accurate actions can be taken to aid in the progress of those goals.

Fleischer, N. L., Liese, A. D., Hammond, R., Coleman-Jensen, A., Gundersen, C., Hirschman, J., Frongillo, E. A., Ma, X., Mehta, N., & Jones, S. J. (2017). Using systems science to gain

insight into childhood food security in the United States: Report of an Expert MAPPING

WORKSHOP. *Journal of Hunger & Environmental Nutrition*, *13*(3), 362–384.

https://doi.org/10.1080/19320248.2017.1364194

This research paper, published in the *Journal of Hunger and Environmental Nutrition* is a

combination of the ideas and research of a team of ten researchers across the areas of

food security and childhood nutrition. Food insecurity, especially in children, has not

subsided since the 2009 recession. Thus, the researchers determined that they must take

an innovative look at the possible factors of childhood food insecurity. The question that

the researchers wanted to answer was: what are the factors that may contribute to

childhood food insecurity, and in what ways are they connected? In order to accomplish

this, the researchers and other professionals in related fields convened at a conference to

assemble a map displaying the interconnections between the parts of the complex system

that is childhood food insecurity.

The biggest finding of the conference, as demonstrated in the paper, is that the struggle of

food insecurity comes back to a central conflict between competing demands and limited

resources of children and their caregivers. The main sectors of influence that determine

how much money families can put towards quality and quantity of food are: social,

school/education, health, economic, and government. Each of these sectors was identified

as having areas that place demands upon families. For example, a job that doesn't provide

adequate health insurance might lead to caregivers having to find more expensive

outsourced health insurance, which diverts money away from quality food. Each of these

sectors also has the potential to provide resources, such as government programs, like

school meal programs, to alleviate food stress placed on families. The main problem

identified in regards to the complexity of childhood food insecurity is that other demands or needs, such as healthcare, might be the trade-off with food purchases when families must make these difficult decisions.

In order to alleviate potential problems caused by sectors placing demands on caregivers and children, the researchers suggest solving systematic problems that may prevent families from finding adequate support, such as the lack of accessibility identified in federal food and nutrition assistance programs. In addition, the researchers propose that childrens' social systems, made up of caregivers, families, and teachers, encourage children to learn habits such as managing scarce resources and developing a support network. Most importantly, the researchers determined that there are gaps in their research that can be further explored to more accurately find solutions to food insecurity problems. These areas are identified as studying childhood hunger, not merely food insecurity, researching policy stakeholders to determine in what area would changing policies make the biggest impact, and creating a systems dynamics model to make predictions in patterns of food insecurity and identify directional relationships between the casual connections developed in the researchers' qualitative map.

Concerning our current study of human development and data science, this paper relates to Amartya Sen's argument that people must have the ability to live a life in which they are free to enjoy their lives without having to worry about necessities, such as food. The article additionally relates to the sustainable development goals of "zero hunger" and "no poverty" because, to achieve zero hunger, food insecurity must be eliminated. Additionally, poverty is both a cause and effect of food insecurity due to the demands of having to choose other necessities leading to poverty cycles. By addressing food

insecurity and its factors, the authors choose to look at the complex system that is childhood hunger. Though this article doesn't specifically use geospatial data sets, it does open avenues for future research in a variety of areas that would make use of geospatial data sets. Instead, this article uses a qualitative mapping process to identify links between different factors impacting food insecurity in order to provide a visual and written synopsis of determinants of food insecurity. This article is beneficial to establishing future research, as it provides evidence of research gaps in areas such as the healthcare system's impact on food insecurity, educational impact, etc. (correlating to the sectors identified).

Gebbers, R., & Adamchuk, V. I. (2010). Precision agriculture and food security. *Science*, *327*(5967), 828–831. https://doi.org/10.1126/science.1183899

The paper "Precision Agriculture and Food Security", published in the Food Security Special Section of the renowned journal *Science*, discusses how precisions agriculture can positively contribute to addressing the problem of food insecurity. Precision agriculture is a technology-based approach to agriculture that uses a combination of sensors, information systems, informed management, and enhanced machinery to optimize the production of agriculture output by predicting and accounting for variations in agricultural production. The main benefit of this approach is increased sustainability of the food supply as well as reduced waste.

The researchers used examples of precision agriculture to illustrate how it can measure variation in soils and crops (such as through remote and proximal sensing), create yield maps to indicate crop performance, and show milk composition using livestock RFID tags and milk robots. Additionally, the authors stress the importance of standardizing

information pathways in order to lead to improved food traceability. The researchers suggested using XML, which is a markup language, for food chain communication and ISOBUS, which is a communication protocol for technology, for equipment electronic communication.

This paper deals with the human development topic of ensuring basic rights to food in order to live a life free from unnecessary hardship, which is what Amartya Sen believes is a hallmark of a developed society. In addition, this article relates to technological improvements that can aid in development and demonstrates how food security doesn't just have to be approached in terms of increasing food availability but also can go all the way back to the start of the process of food production; increasing sustainability in food production and decreasing waste in the early stages of food production can increase the amount of food available once food reaches stores, which can possibly decrease food insecurity. In addition, this article presents possible ways to work towards accomplishing the sustainable development goals of "zero hunger" and "no poverty", which can be achieved through decreasing food insecurity. The data sets that the researchers used were derived from remote sensing to create yield maps of crops in order to determine which environmental factors led to increased crop production. Though this was just a small example included in the article, the researchers proposed many ways to use technology and data science to further study possible root causes of food insecurity.

Gundersen, C., Strayer, M., Dewey, A., Hake, M., & Engelhard, E. (2021). *Map the Meal Gap 2021: An Analysis of County and Congressional District Food Insecurity and County Food Cost in the United States in 2019*. Feeding America.

The Map the Meal Gap dataset was put together by Feeding America, which conducts the

Map the Meal Gap study on a yearly basis in order to understand how the costs of food,

as well as measures of food insecurity, vary at local levels. The data set uses the

determinants of non-undergraduate student poverty, median income, unemployment,

homeownership, and disability status in order to generate estimates of food insecurity

rates for individuals as well as for children on a congressional district and county level,

across the entire United States. The dataset also includes estimates of national and county

meal costs as well as shortfalls in food budgets. The model used to calculate the estimates

also controls for the percentage of Hispanic and African American households, as

previous demographic data and studies identified those two minority populations at

greatest risk for food insecurity. The data set includes congressional district estimates,

which are determined from American Community Survey (ACS) data on a yearly basis,

as well as county estimates also determined from ACS data but on a five-year estimate

basis.

Some interesting statistics that are derived from the data set that I found interesting are

that the most expensive average meal cost estimate by county is in Klickitat County,

Washington, which has an estimated food insecure population percentage of 13.9 and an

estimated child food insecure population percentage of 17. The average cost of a meal in

Klickitat County is $5.26. On the contrary, the least expensive average meal cost can be

found in Llano County, Texas, with an estimated cost of $2.13. Llano County has a food

insecure population percentage estimate of 16.6 and a child food insecure population

percentage estimated at 6.5. In relation to our location, it is estimated that 12.3 percent of

the population of Williamsburg is food insecure, and 13.4 percent of the child population

of Williamsburg is food insecure. The estimated average cost of a meal in Williamsburg is $3.42.

The authors of the background of the data set, as well as the creators of the data set, aim to discover the areas of the United States that are most food insecure so that they can best direct resources towards those areas. Thus, the researchers investigated the human development problem of food insecurity and how it is distributed throughout states, counties, and congressional districts. This data can be used for a variety of purposes, for example, someone running for office for a congressional district can determine if food insecurity in their district is abnormally high or low, and can determine whether or not to use combatting food insecurity as a possible platform goal. This article and subsequent data set relate to Amartya Sen's definition of human development because he thinks of human development as freedoms, and in order to truly carry out one's freedoms, one must not have to worry about basic necessities such as food. Food insecurity relates to securing something that is a building block to individuals being able to experience freedom and therefore development. Additionally, this data relates to the sustainable development goals of "no poverty" and "zero hunger", as combatting food insecurity can lead towards the completion of both of these goals.

Wauchope, B., & Ward, S. (2012). Mapping food insecurity and food sources in New HAMPSHIRE cities and towns. https://doi.org/10.34051/p/2020.163

This paper was done by the Carsey Institute of Public Policy at the University of New Hampshire and is a deep-dive into the food sources available to residents of New Hampshire as well as food insecurity measurements. The researchers were attempting to answer two questions:

1. Which areas of New Hampshire are most vulnerable to food insecurity?

2. Which areas of New Hampshire have the most access to food sources?

The researchers used poverty and population density information to develop a map of the counties most at risk for food insecurity. The researchers created a map with different layers representing the percentage of families living below the poverty line and the population density in people per square mile in order to determine which areas of the state are most at risk for food insecurity. It was determined that the western and northern more (rural) areas of the state were more at risk for food insecurity due to the greater populations living below the poverty line.

In addition, the researchers used data on various food sources, such as fresh food markets, grocery stores, convenience stores, and school lunch programs, among other sources, in order to create a map showing the density and type of food sources in New Hampshire. What they found was that the sources of more nutrient-dense and variable food options are concentrated in the southeastern portion of the state, which is also where the population density is higher. The researchers came to the conclusion that in rural areas of the state, the problem might not just lie in the availability of food sources, as in many rural areas of the state there are sufficient public food program options, instead, the problem lies in the accessibility of these sources. The researchers propose that future research focus on the transportation available in the areas of the state most at risk for food insecurity in order to determine if major factors are transportation and access to food sources.

Additionally, this article relates to the source regarding how the three pillars of food security can be analyzed through access, availability, and utilization. This paper covers the availability portion of food security measurement.

The article relates to Amartya Sen's view of human development as being complex, as the researchers determined that you can't just use one measure of the population, such as the percent of families below the poverty line, to determine if there is a risk of food insecurity. Instead, there are a variety of factors, such as access to transportation and density of fresh food sources that contribute as well. This illustrates how human development is complex, so solutions must also take into account this complexity. Additionally, this article addresses the United Nations sustainable development goals of "zero hunger" and "no poverty", as it directly discusses poverty in relation to its impact on hunger and food security.

Based upon the sources thus far explored, my further literature review and research will focus on the question: To what extent do residents of the Chesapeake Region of Virginia have access to a variety of food sources? Food insecurity estimates throughout Virginia vary greatly, and there are a variety of factors that could contribute to these variations, making it a complex topic. I aim to investigate access to proper food sources, rather than availability, as previous research has discovered that availability of food sources does not entirely predict food insecurity. I will continue to expand upon my chosen method of study in my literature review, as well as discuss measures of food insecurity in Virginia currently. For my further research proposal at the end of the semester, I will investigate the type of food sources that are available in the Chesapeake region and categorize them in a way similar to *Mapping Food Insecurity and Food Sources in New Hampshire Cities and Towns*, and I will additionally investigate the transportation

infrastructure and how it relates to the food sources as well as food insecurity in this region. Finally, based upon possible results, I will propose areas of the region that need improvements in transportation as well as food accessibility.