

Quantifying Strategic Goals for Emergency Food Pantry

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DATA 470: Applied Data Project

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December 18, 2024

Introduction and Purpose

The Emergency Food Pantry (EFP) serves as a critical resource for individuals and families facing food insecurity in the Fargo-Moorhead region. Established in 1970 to provide short-term food assistance for those in the community with chronic hunger issues, or in times of crisis. The pantry operates with the support of donations, volunteers, and local partnerships in the community. The pantry provides over 12,000 food baskets a year. They served 21,780 unique individuals in 2018, with 1.8 million pounds of food distributed.

This project aimed at helping EFP objectify measures of success for Strategic Priority 4 of the 2019 Strategic plan and help improve upon their current systems of client-centered food distribution. We focused on two main objectives:

- *Objective 1:* Develop a system to track and evaluate the amount of fresh fruit and vegetables offered to clients.
- *Objective 2:* Develop metrics and analyze data to evaluate whether the food provided is meeting the various needs of the clients.

In developing these systems and metrics, we designed a dataflow for each objective to collect and visualize collected data on a live, dynamic dashboard.

Description of the Problem

Food pantries are organizations that collect and distribute food to individuals and families facing food insecurity. They typically operate by sourcing food from food banks, charitable donations, local businesses, and other community resources. By serving as an intermediary between food sources and people in need, food pantries help alleviate the immediate challenge of hunger for vulnerable populations. Their role has become even more critical in regions with

limited access to affordable nutritious food, where they function as a primary safety net for many households.

The beginning of this report will explore related literature that has been conducted to specifically investigate the effects of hunger on communities, as well as the supply and demand of fresh fruits and vegetables in food pantries and how it affects their members. As food pantries continue to evolve, there is a growing emphasis on their role not just in emergency food provision but in addressing underlying causes of hunger and promoting long-term food security.

The Effect of Hunger on Communities

It is not difficult to determine an association between hunger and economic status within communities or nations. The role of food pantries is to provide for hungry populations and help those who are not receiving enough food and those who are not receiving the right food to survive healthfully. In summary, they aim to minimize malnutrition, or as the World Health Organization defines it, “deficiencies, excesses, or imbalances in a person’s intake of energy and/or nutrients” (WHO, 2024).

One may think of countries other than the United States initially when thinking of malnourished nations, however malnutrition still impacts this nation. A separate report by the WHO entitled “The Double Burden of Malnutrition” explores the nutritional transition of nations, such as the US, as they industrialize. The report also states that as economies grow, it becomes increasingly difficult for lower economic-class individuals to afford the food they need, as “low socioeconomic status decreases an individual's ability to afford nutrient-rich foods, predisposing to undernutrition, and also to overweight and obesity” (WHO, 2017). Particularly among urban populations, like in Fargo-Moorhead, these issues are quite relevant.

Hunger and food insecurity can take many forms, in this case namely malnutrition. Malnutrition can be studied as wasting, stunting, or being underweight, and increased urbanization is decreasing the availability of affordable nutrient-rich foods for lower-class income individuals. Studies have found direct economic and social consequences of malnutrition, correlated decreased economic output and decreased mental and physical development to stunting and other forms of malnutrition. This research directly supports the positive impacts that a food pantry can have for communities.

Food insecurity disproportionately affects vulnerable populations, and its impact extends beyond immediate hunger, influencing overall community health and stability. The Hunger on the Plains 2023 report highlights that 75% of surveyed neighbors in North Dakota and Clay County, Minnesota, experienced at least one chronic health condition, with conditions like high blood pressure (32%) and depression (31%) being the most prevalent (Great Plains Food Bank, 2023). These health challenges often exacerbate the economic and social vulnerabilities caused by food insecurity, perpetuating a cycle of poverty and poor health outcomes. This data underscores the necessity for food pantries to prioritize both the quantity and nutritional quality of their offerings, ensuring they address not only hunger but also the chronic health implications of inadequate diets.

Moreover, the report emphasizes that access to culturally appropriate and nutritious food remains a significant barrier for many in North Dakota and Clay County, Minnesota. 27% of surveyed respondents indicated a need for special dietary items like low-sodium or gluten-free foods, while others highlighted the inaccessibility of traditional and cultural foods, such as Native American staples. This lack of access further diminishes the ability of food-insecure households to maintain healthy and culturally relevant diets. Finding these gaps in food

availability through improved logistical support and partnerships could enhance the effectiveness of food pantries in meeting the diverse needs of their clients (Great Plains Food Bank, 2023).

Fruits and Vegetables in Food Pantries

Fruits and vegetables are essential components of a healthy diet, yet they are often in limited supply at food pantries. These are nutrients that are vital for a balanced diet and often found in fruits and vegetables. Acting as anti-obesity agents, they contain high amounts of water and fiber and can be consumed in a relatively larger amount, contributing to the maintaining of a normal weight. Sufficient intake of fruit and vegetables has also been related to a reduced risk of many diseases, such as cancers and cardiovascular disease (Pem and Jeewon, 2015).

Food pantries contribute a substantial amount of food to client diets, and changes in food pantry food supply could have significant effects on client diet quality (Caspi et al., 2021). Food pantries serve a vital role in supplementing household food supplies, and the organizations sometimes struggle to support exclusively healthy diets as they predominantly offer nonperishable items, which are consistently less nutritious than fresh produce (Simmet et al., 2017).

Providing fresh produce at food pantries can significantly improve the health and well-being of clients. Research has shown that when food pantries are able to offer a wider variety of fresh and perishable foods, clients' dietary quality improves (Simmet et al., 2017). Therefore, increasing the number of fruits and vegetables in food baskets at the EFP is likely to improve the diet of food pantry users through an increase in vitamins and calcium. Members who rely on food pantries for long periods of time and for a substantial portion of their household foods will become less likely to develop chronic diseases as mental health challenges (Pem and Jeewan, 2015).

Data and Methodology

To help EFP quantify their strategic goals of better serving those in the community with dietary and cultural food restrictions, and distributing more fruits and vegetables to the community, the current infrastructure for these systems was analyzed. For tracking dietary and cultural food restrictions, the EFP sends out annual surveys in the fall to their members, inquiring about their experience at the EFP including questions collecting data around allergies and food restrictions, ability to consume food, etc. The survey results are then compiled to make decisions annually. For tracking fruits and vegetables, whenever the EFP receives a donation, a volunteer weighs the donation in parts, firstly as everything that is not fresh produce, and secondly as just the fresh produce. These numbers, alongside the donor's name and donation description are written down on a piece of paper and later transcribed to a Microsoft Excel Workbook so that the totals for donation weights can be totaled easily for reporting purposes.

To improve this process and enable it for better tracking and support future data analysis, it was decided to utilize the Microsoft Office Suite of applications to build a flow of modules that allow for more reliable data collection, compiling, and visualizing the results dynamically. The applications used to create this analysis were Microsoft Forms, Power Automate, Excel, and Power BI.

The first thing completed to improve the ability to track these results was to create two new Microsoft Forms, the first to reserve the purpose of the annual fall survey in the form of a QR code in each received food basket, and the second to serve the purpose of the piece of paper to record food donation weights. Both forms are available in the English and Spanish language to meet the needs of the EFP diverse membership and allow for all members of the population to participate in the data collection. These forms collect the data in a central location and in a

format that will make quantifying these strategic goals easier. The form responses are then piped into an Excel Workbook alongside other form responses. This workbook can be used to see a transcript of all responses. Power BI was used to create two dashboards to summarize, both numerically and visually, the results of these two Excel data tables.

Food Basket Survey Flow

The Basket Feedback form contains up to 15 questions, depending on how a member answers the questions. It first collects the date of the most recent food basket pick up by a member, it then asks questions to understand the general dietary restrictions of the entire population of people who receive baskets. After getting data on the general population, it asks if the member feels as though their dietary needs are considered in their food baskets. It then asks whether the member was able to consume all the items in their feed basket. If the member selects “no”, the form is then prompted to ask questions specifically about which dietary restrictions made the member unable to consume the food, whether that be all their restrictions, or just one. This is meant to narrow down the population data into basket-specific feedback; to compare with one another to see which population restrictions most influenced the direct consumption of food in the baskets. After these questions are complete, the form then asks questions related to the freshness, variety, and packaging of the basket. The form ends with an option for members to enter any other feedback or recommendations. Following the submission of this form, Power Automate detects a response to the form and writes the values from the questions into a table in the form responses Excel workbook.

The Basket Feedback Dashboard, powered by Power BI, displays relevant visualizations of the responses from the Basket Feedback Form. It includes three graphs displaying the three categories of dietary restrictions (Allergies/Sensitivities, Personal Restrictions, and

Cultural/Religious). A toggle functionality allows users to switch between population-level data (population dietary restrictions) and basket-level data (basket-related dietary restrictions). You can toggle between these data levels by clicking the related labeled buttons. The dashboard also included pie chart visualizations for data related the freshness/variety of the basket (indicating satisfaction with quality) and consideration of member restrictions. There is a text table the display the last ten responses of additional feedback for easy access. Clear counts and visual flags are included of inadequate packing and unappealing food items in baskets.

Food-In Donation Flow

The Food-In Donation Form contains up to 7 questions. Firstly, it collects the date of the donation and who donated. The only donors that can drop off fresh produce are walk-ins, so if the donor is selected as walk-in, then the questions regarding fresh produce appear, i.e. did fresh produce come in the donation, the weight of the fresh produce, and a brief description of the fresh produce donated. Following these questions or immediately following the name of the donor if it is anything other than walk-in, the weight of the donation and a description of the item donated, excluding fresh produce, appear. Following the submission of this form, Power Automate detects a response to the form and writes the values from the questions into a table in the form responses Excel workbook.

The Donation Tracking Dashboard, powered by Power BI, displays visualizations of the responses from the Food-In Donation Form for a specified range of donation dates. Firstly, the data may need to be refreshed as to include the most recent form responses in the dataset. Secondly, to toggle between different date ranges, use the Date Range visual in the top right corner to select a starting and ending date either with the calendar button or by dragging the dots along the bar. The range of these dates is dictated by the form responses, extracting the smallest

date for the initial starting date and the largest date for the initial ending date. The values in the remaining visuals will update based on the starting and ending dates. Donations Over Time shows the total donations per date of record, summing the produce and non-produce weights. Produce and Non-Produce Over Time shows donations per date of record, but broken down by produce and non-produce. Walk-In Donation Including Produce shows the percentage of walk-in donations that included fresh produce. Donations per Association displays a data table of each association and their produce donation weight and their non-produce donation weight in the given time interval. This can be used to quickly generate numbers for reporting back to agencies monthly or yearly. Recent Donation Descriptions shows a list of descriptions of recent donations for both produce and non-produce, anonymous of donor.

Future Work/Improvements

The Basket Feedback Dashboard does not include time-filters such as the ones provided in the Donation Tracking Dashboard. It is unable to show the valuable feedback that it could provide about improvements made over time or its time splices where specific information would be helpful. It right simply provides a framework for displaying all the data entered in clear visualizations, filters beyond toggling between data levels that would be helpful for the EFP are possible and encouraged. Additional questions can be added to the Basket Feedback Form depending on data the EFP would like to be collected, framework for storing this data is provided in the current existing flow. The Donation Tracking Dashboard can be expanded to include other categories of donations, such as dairy, dry goods, supplies, etc. As data is collected moving forward, both dashboards can have visualizations implemented the show changes over time in data, e.g. line graph of member satisfaction in food baskets throughout 2024 or difference in produce donations throughout 2025.

Conclusion

The Emergency Food Pantry (EFP) plays an essential role in addressing food insecurity in the Fargo-Moorhead region, providing not only immediate food assistance but also striving to meet the diverse dietary and cultural needs of its clients. This project aimed to enhance EFP's operational effectiveness by introducing data processes to quantify and evaluate fresh produce distribution and client satisfaction regarding dietary needs.

Through the development of streamlined data collection processes and dynamic dashboards using Microsoft Forms, Power Automate, Excel, and Power BI, the project provides EFP with insights into its operations. The Basket Feedback flow allows for detailed tracking of client dietary restrictions and preferences, while the Food-In Donation flow quantifies produce and non-produce donations. These tools will enable EFP to make data-driven decisions and measure progress against strategic goals, therefore strengthening its impact on the community and its mission to alleviate hunger.

References

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Links of Deliverables

[Basket Feedback Form](#)

[Food-In Donation Form](#)

[Basket Feedback PA Flow](#)

[Food-In Donation PA Flow](#)

[Food-In/Basket Feedback Data Dump Excel Workbook](#)

Power BI Dashboard: attached file