

Understanding DEI Initiatives and Performance Metrics in Food Bank Operations

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Abstract

Food banks provide services and food assistance to those facing food insecurity, a challenge that can affect families and individuals from various backgrounds and communities. Diversity, equity, and inclusion (DEI) are principal factors in food bank operations. This study focuses on diversity as measured by client ethnicities and the rurality of the counties served by the food banks. Over 44 food banks were interviewed to understand their operations. Key performance indicator (KPI) metrics in each organization were identified and classified as Community Focused (CF), involving tailored services based on community needs, and Organizational Efficiency Focused (OE), involving processes and strategies to increase output and minimize resources. A clustering analysis was conducted to group these organizations depending on the percentage of rural counties served by the food banks and their respective z-score based on diversity index, so four clusters (tiers) were created (Tier 1 are the least diverse and the most rural, while those in the fourth tier are the most diverse and the least rural). The KPIs in each tier organization were examined and results suggest that organizations in Tier 1 use more OE KPI metrics whereas those in Tier 4 use a more balanced combination of CF and OE metrics. This research provides hunger-relief organizations insights to adopt practices that acknowledge, accommodate, and celebrate the diverse needs and characteristics of the neighborhood they serve.

Keywords

Key performance indicator (KPI), diversity, food bank, food insecurity

1. Introduction

Food banks are nonprofit organizations that battle against food insecurity and hunger. These organizations distribute food and services to their partner agencies, then the partner agencies distribute these resources directly to their neighbors. According to Feeding America, a national nonprofit organization that has a network of over 200 food banks, approximately 49 million people in 2022 turned to food assistance for extra help in the United States [1]. Subsequently, 15.3% of U.S. households were food insecure and did not have access to enough food for an active, healthy life, for all household members throughout 2022 [2]. In addition, food insecurity has been proven to be more prevalent and significantly higher in certain population groups [3]. Thankfully, hunger relief organizations have been at the forefront of culturally shifting the world of “emergency food” by, “beginning to organize against exploitation of systemic hunger and address the root causes of food insecurity” [4]. Rather than food services and resources “pushed” out to clients, there will be a foreseen shift toward a “pull” system that incorporates more information about the people needing services, where they are located, and what could be holding them back from accessing help [5]. In the recognition of broad societal inequities, food banks are increasingly fostering the need to implement operations that seek to understand their neighbors.

As explained by Zeynep et al., [6] diversity is a broad term, either real or perceived physical or socio-cultural differences attributed to people and the representation of these differences in organizations; equity as fairness in how others are treated encompassing both opportunity and outcome; and inclusion pertaining to cultivating a culture that promotes belonging and incorporation of diverse groups, typically against exclusion or marginalization. The beauty of diversity is not singular but multi-dimensional, making each individual unique. For example, the spectrum of attributes includes age, ethnicity, gender, race, income, geographic location, educational background, religious beliefs, and work experience, among others [7]. Many organizations have already begun to assess their programs through a diversity, equity, and inclusion (DEI) lens [8] and the need for food banks to provide services and resources to the community using this lens is crucial, especially because food insecurity does not discriminate.

Key Performance Indicators (KPI) are a quantifiable value that illustrates how effectively objectives are executed [9]. Over 44 Food banks across the United States were engaged in interviews and their KPIs were collected and classified as Operational Efficiency (OE) and/or Community Focused (CF). Metrics categorized as OE focus on optimizing processes and resources. On the contrary, CF metrics are linked to understanding and responding to community needs and preferences. Together, these metrics contribute to overarching DEI initiatives, emphasizing that diversity, equity, and inclusion are necessary elements of both operational efficiency and community focused efforts. In the context of receiving resources from food assistance programs, accessibility is heavily influenced by both demographics of the population and geography of the location [10]. Hence, this study incorporates and evaluates two dimensions of diversity-namely, the ethnicities of beneficiaries using a diversity z-score and the geographic landscape of where they reside, categorized into urban and rural counties within the food bank's service area. K-means clustering was used to establish levels of diversity (tiers) based on the groupings, and the results of the KPI classifications were presented in a table corresponding to their respective diversity tiers.

2. Problem Description

Food banks provide services and food assistance to families and individuals that face food insecurity, which can affect people from diverse backgrounds and communities. Based on this "pull" system referred to by Constanzo [5], hunger relief organizations must acknowledge and understand what makes each individual unique to accommodate them. However, this is a consistent challenge in ensuring food banks can handle efficient distributions and position their operations relevant to community needs and preferences. Without intentional initiative, there is a risk of perpetuating systemic disparities and overlooking the challenges faced by vulnerable beneficiaries. Additionally, without the knowledge of clear indicators to measure progress, food banks may struggle with detecting gaps, areas to improve, and the overall impact of their DEI efforts. Therefore, it is imperative to evaluate food bank performance metrics and their respective level of diversity.

3. Related Research

The academic exploration of understanding food bank performance metrics and the spectrum of diversity through clustering has received limited attention. While there are numerous broader research themes on performance metrics, clustering, and diversity separately, merging these topics is notably underrepresented. Many studies have addressed food bank operation metrics through optimization, with stochastic, or deterministic models. For example, studies by Orgut et al. [11] and Hasnain et al. [12] consider effectiveness, efficiency, and equity to reduce inequalities by proposing optimization models to allow for stochastic variation in partner agency capacity and capture decision maker preferences. The existing literature demonstrated by Melesse et al., [13] has made strides in developing a comprehensive set of metrics that considers all components of food system approaches to improve diets in low- and middle-income countries. While their work offers a valuable framework, there is still a need to understand metrics based on practical experiences, challenges, and success faced by food banks themselves, especially from an operational perspective that address diversity. A similar clustering study uses the Gaussian Mixture Model (GMM) technique to group variables, including population demographics and the geographical distance of food agencies in Ohio [10]. The main focal point of that research is to characterize regions with limited access to food assistance and explore ways to enhance access [10]. While the authors incorporate some aspects of diversity, there is an absence that considers another element of diversity, client ethnicities and how that relates to geographic location. Narrowing the gap can help food relief organizations to develop more comprehensive strategies that accommodate the diverse needs of communities that are challenged by accessing essential food resources.

4. Methodology

4.1 KPI Development

Our team conducted virtual interviews with more than 44 food banks across the U. S. through Zoom, a virtual conference system. During these interviews, food bank employees provided valuable insights into the challenges related to food insecurity and their job role and understanding what drives the success of their organization. The responses obtained through this process were analyzed using recordings and transcripts. 54 metrics were synthesized, covering diverse aspects such as healthy food distributions, measuring pounds of food, data management, finance, development, retention, and feedback indicators. These metrics were assigned and tagged to each interview based on their responses to KPIs. Subsequently, the comprised list of tagged metrics was categorized as Community-Focused (CF) and/or Organizational Efficiency (OE). In a few cases, some interviews mentioned tags that could represent the

combination of CF and OE, so ‘OE/CF’ was classified. Then, the distribution of the KPIs were developed based on the frequency of metrics used in the interviews.

4.2 Evaluating Food Bank Diversity

In the pursuit to identify and classify diversity in food banks based on geographic locations and client races/ethnicities, a detailed process was undertaken. This project compiled a list of the interviewed food banks and corresponding counties they serve, identified through a Feeding America database. Then, the municipality classification of each county was determined by referencing a list of rural and urban counties from the US Census. For a county to be considered urban, the territory has at least 2,000 housing units or has a population of at least 5,000 [14]. Similarly, the diversity index for each county was obtained using the PolicyMap data visualization tool. The diversity index provides the probability that two individuals chosen at random would be different races or ethnicities [15]. This information was then aggregated by food banks to calculate the percentage of rural counties and the average diversity index served by each. Additionally, the overall diversity mean was calculated.

The percentage of rural counties in a food bank’s service area is calculated by the total number of rural counties divided by the total number of urban and rural counties. To gain insights into the diversity levels of each food bank and facilitate comparisons, the diversity index was standardized using a z-score for each organization as seen in Equation (1) where x_i is the diversity index for each organization, $\bar{x}$ is the mean and s is the standard deviation. The importance of normalized z-scores establishes the comparison of the diversity level and percentage of rurality between food banks.

$$Z - SCORE_{diversity\ index} = \frac{x_i - \bar{x}}{s} \quad (1)$$

A positive z-score indicates that the food bank has a high diversity index score, surpassing the mean. This suggests that the food bank serves an area characterized by a more diverse ethnic and racial landscape. Meanwhile, a z-score of zero serves as a benchmark meaning that the food bank’s diversity level is neither high nor low, but it is in line with the average level of the entire sample. On the other hand, if a food bank has a negative z-score, the organization has a lower diversity index compared to the mean and serves areas that are less ethnically or racially diverse. The combination of z-scores and the percentage of rural counties can be used in a cluster analysis to group similar food banks and establish diversity clusters (tiers). The k-means clustering analysis is a common machine-learning technique that groups instances into similar clusters by identifying relations between the instances in a dataset [16]. The mean value of each cluster is grouped based on their similarity to the centroid of the cluster. In this case, this algorithm is essential to distinguish similarities and differences among diverse communities and in terms of the distinct geographic characteristics of urban and rural communities served by interviewed organizations.

5. Results

5.1 KPI Distribution

Despite the greater prevalence of OE metrics, food banks consistently emphasized the significance of community-focused tags more frequently, as illustrated in Figure 1. In an overarching sense, food organizations acknowledged the importance of their KPIs in becoming community-focused and meeting their needs. This can be accomplished by prioritizing and sourcing the “right food” or offering culturally relevant food to the community (tagged as ‘Culturally Relevant’). Additionally, organizations are interested in how impactful their distribution services are, like hearing stories from the community or how they are positively affected by nutritious food and other services (tagged by ‘Impact’). These two highest metrics are instrumental in DEI efforts, revealing that food banks are intentionally trying to meet the diverse needs and preferences of their communities.

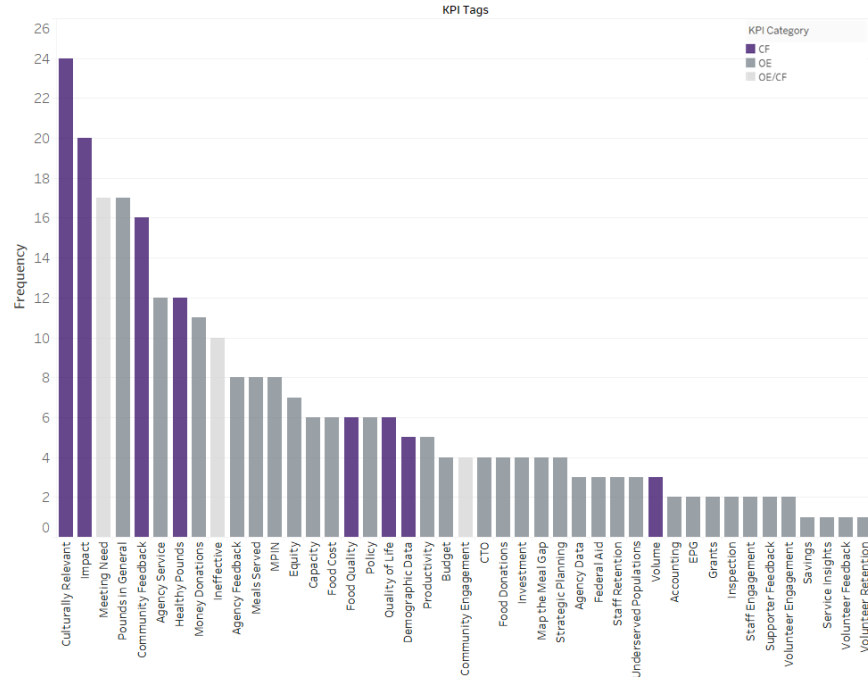


Figure 1: Distribution of all KPIs mentioned in interviews.

5.2 Clustering Analysis

Four clusters were generated from the analysis and were named Diversity Tiers 1-4. As illustrated in Table 1 and Figure 2, results reveal distinct patterns in the county service areas of organizations across different Diversity Tiers. In Diversity Tier 1, food banks serve communities that are the least diverse with a pronounced focus on the most rural areas. However, Diversity Tier 4 serves the most diverse communities in extremely urban settings. Notably, Diversity Tiers 2 and 3 present interesting results. Organizations in Tier 2 may concentrate on serving less diverse neighborhoods within urban areas. While Tier 3 food banks cater to more diverse communities in more rural counties. Interestingly, a food bank in this tier distributes food to untapped areas like rural and urban food deserts [17], which can be perceived as a comprehensive approach to address diversity across various community types and geographical settings.

Table 1: Descriptive Analysis of Clusters by Diversity Tier

Diversity Tiers	Description	Centers		
		Avg. Z-score	Avg. % of Rural Counties	Number of Food Banks
1	the least diverse & the most rural	-0.94625	67.98%	14
2	less diverse & less rural	-0.0067647	8.33%	6
3	more diverse & more rural	0.55657	62.67%	15
4	the most diverse & the least rural	1.5534	3.70%	9

5.3 KPI Performance Metrics and Diversity Tiers

The relationship between OE and CF metrics across Diversity Tiers is highlighted in Table 2. Diversity Tier 1, distinguished by serving the least diverse and most rural areas operate with more OE metrics than CF. This inclination suggests that these food banks place a slightly higher priority in optimizing operational processes that address the distinctive challenges associated with serving rural areas to enhance their distribution efficiency. Prioritizing OE metrics such as planning, transportation, and other metrics are crucial to survival where resources are scarce. Similarly, food banks in Tier 3 that distribute food to more rural areas, but in ethnically diverse communities, emphasize more

OE metrics than CF, but not by much. Tier 3 food banks contributed the highest CF metrics overall. On the contrary, food banks that are serving mostly urban communities resulted in using an equal amount of OE and CF tags. Tier 2 (less ethnically diverse and more urban) used 6 OE and 6 CF tags, while food banks in Diversity 4, serving the most urban and diverse areas used 9 OE and 9 CF metrics. Balanced metrics allow these food banks to efficiently meet organizational requirements while remaining responsive to the diverse demands of urban communities.

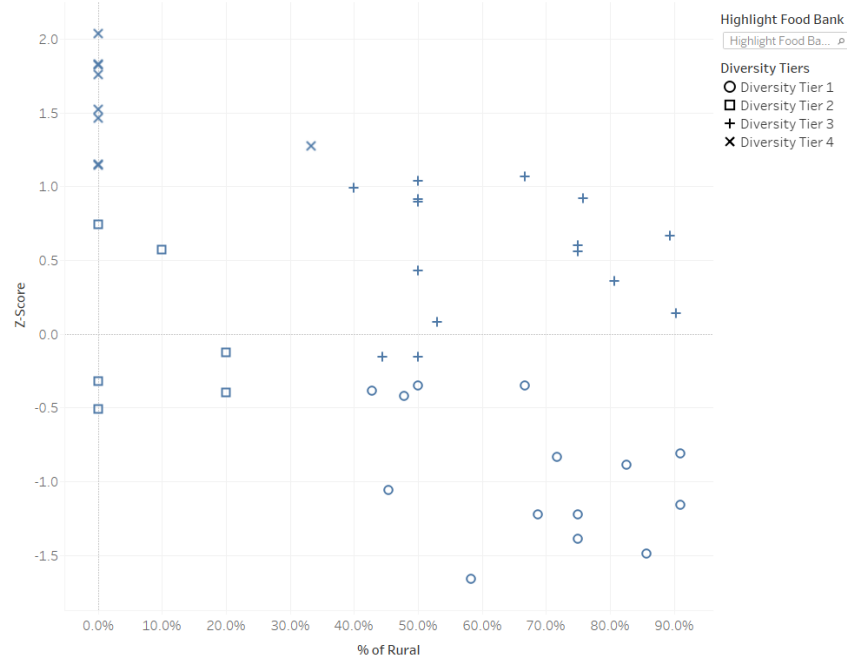


Figure 2: Cluster analysis for food bank diversity tiers by diversity index z-score and percentage of rural counties.

Table 2: Contingency Table

Diversity Tier	OE	CF	Sum
1	13	10	23
2	6	6	12
3	13	11	24
4	9	9	18
Sum	41	36	77

6. Conclusions

DEI practices have become integral components of organizational commitments and efforts across various industries, including hunger-relief. Food banks serve diverse communities, so they see the importance of enriching a diverse, equitable, and inclusive environment for their beneficiaries. The analysis and clustering of Diversity Tiers associated with Community-Focused and Organizational Efficiency KPI metrics show distinct patterns observed in rural and urban areas. Organizations in Tier 1 placed pronounced emphasis on OE metrics, while those in Tier 4 displayed to have equally amount of OE and CF metrics. Regardless, these findings underline the adaptability of food banks as they navigate the complex landscape of diversity, equity, and inclusion.

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