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Determine the Food Access among Low-Income Households in Rural Area, Kedah, Malaysia

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ABSTRACT

Objective –This study aims to determine the low-income group in rural areas to food access. This study also determines the main source of choice for this group to get food.
Methodology –This study was conducted in Baling, Sik, and Padang Terap districts in Kedah. There is 200 respondent involved in this study.
Findings– The results showed that 97.87% of low-income households in Baling, 82.36% in Sik, and 71.43% in Padang Terap had low food access status and were prone to food deserts areas. Low -income households in the area prefer grocery stores for food access over supermarkets. A large number of low-income households access food at the supermarket once a month causing geographical factors.
Novelty-In conclusion, policymakers need to determine the measurement and assessment of food deserts in rural areas in Malaysia. Kedai Rakyat 1 Malaysia (KR1M) and the KedaiRuncit Transformation Program (TUKAR) can be re-implemented with the improvement of their implementation structure to improve food access in rural areas.

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JEL Classification: D13. D14, D19.
Keywords: Food Access; Low-Income Households; Food Deserts; Rural Area; Kedah
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1. Introduction

Food security happens when all people have physical and economic access to safe and nutritious food that satisfies their nutritional needs and desires for an active and balanced life at all times (FAO 2008). Food access is one of the key aspects of food security that must be met to achieve food security status. Food access, described as a sufficient supply of food at the national or international level, does not guarantee food security at the household level. Concerns regarding inadequate food access have prompted policymakers to place a greater emphasis on wages, expenditures, economies, and prices to achieve food security goals (FAO 2008).

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Food accessibility is a state of households and individuals within households having sufficient means and/or resources to obtain the food required for a nutritiously complete diet— in this instance, the food is taken to be available. Access to food has two fundamental aspects “physical accessibility” and “financial accessibility.” Accessibility is determined by the availability of recourses such as capital (to pay for the food), human mobility (to physically obtain the food), and knowledge (to enable decisions about accessing the food). This suggests that adequate access to food cannot only be determined by households being able to produce food but also having the ability to get to and purchase food from the market. Thus, even when a household can produce food, its ability to generate income is pivotal to achieving food and nutrition accessibility. Simply put, food accessibility ensures people can acquire food, both physically and economically, through various means which include growing, purchasing, gifts, food aid, and bartering or trading (Simelane & Worth, 2020)

Food access is related to the food deserts situation. People in food deserts have limited access to a range of nutritious foods. This may be due to a tight budget or a lack of access to nutritious and affordable food (Jessica Caporuscio, 2020). Meanwhile, the United States Department of Agriculture (USDA) describes a food desert as a region with a poverty rate of at least 20% and a median family income of at least 80% of the statewide median family income in urban areas or 80% of the statewide median family income in non-urban areas (Dutko et al., 2013).Low-income areas, both urban and rural, that have restricted access to full-service supermarkets or grocery stores are referred to as “food deserts” (USDA, 2009; Walker et al., 2010). Food access is characterized by proximity to a supermarket or large grocery store, which typically offers a range of nutritious foods at a fair price. (USDA, 2009; (Apparicio et al., 2007) ; Coveney J and O'Dwyer 2008) Food desert elimination has been a top priority of national food and nutrition policies. Food deserts must be accurately described and identified for these policies to be implemented (Jiao, J., Moudon, A. V., Ulmer, J., Hurvitz, P. M., &Drewnowski, 2012).Food access studies helped to illustrate the level of inequalities that occur in resource-limited areas including rural communities (Morland et al., 2002; Powel et. al 2007 & Liese AD, Weis KE, Pluto D, Smith E, 2007) and gave rise to the word "food desert." (Whitacre et al., 2009). As a result, this study aimed to look into food deserts in low-income households in Kedah, Malaysia. This study is very important to highlight because it measures how low-income communities in rural areas guarantee food access in households. This situation will be determined wheater individuals to adequate resources for acquiring appropriate foods or not for a nutritious diet purpose. This study also measures the distance to food resources among low-income households in rural areas. If the long distances to access food resources will be affected to food guarantee and cause to food deserts situation. This situation must be a priority to make sure low-income households in rural areas achieve food security.

2. Literature Review

Food security refers to ensuring that everyone has access to nutritious and sufficient food in a socially acceptable manner to live a healthy life (Abdullah et al., 2019). Over the last 30 years, this concept has developed in the context of food security to reflect developments in government policy thinking (Clay, 2002). Food security refers to the ability to maintain a federal food balance and assure adequate food supply and availability to fulfill people's needs at the national level (Chen & Kates, 1994). The Food and Agriculture Organization (FOA) (2008) identified four essential features or pillars of food security, which are listed in Table 2, and each pillar must be met to ensure food security, whether at the national or household level.

Table 2: Dimension of Food Security

Dimensions	Definition
Food availability	The "supply-side" of food security is addressed by the level of food production, stock levels, and net trade, which is regulated by the level of food production, stock levels, and net trade.
Food Access	Food security at home is not guaranteed by an adequate supply of food at the national or international level. Concerns about food scarcity have pushed governments to focus more on incomes, expenditures, markets, and prices to accomplish food security goals.
Food utilization	The process by which the body makes the most of the various nutrients in the diet is known as usage. Appropriate care and feeding methods, food preparation, diet diversity, and intra-household food distribution result in individuals with sufficient energy and nutritional intake. An individual's nutritional status is defined by this, in combination with sufficient biological utilization of the food consumed.
Food Stability	Even if a person consumes enough food today, they are considered food insecure if they do not have regular access to food, putting their nutritional health at risk. Extreme weather, political instability, and economic difficulties (unemployment, rising food costs) can all have an impact on one's food security.

Source: FAO (2008)

Regarding food access among low-income households, the discussion is more focused on food access only. Food availability and access can be assessed at all levels, from global to person, according to (Leroy et al., 2015), while utilization refers to an individual's ability to consume and efficiently use the nutrients consumed for normal body functions. Quantity (enough food and energy), quality (foods that contain all essential nutrients), protection (food that is free of contamination and does not pose health risks), and cultural acceptability and desires are all factors in availability and access (i.e., foods that people like and that fit into traditional or preferred diets). Stability is a cross-cutting dimension that relates to food being safe and usable at all times, as well as sufficient use so that people are not at risk of being food insecure during certain seasons or as a result of external events. The problem of food deserts would be exacerbated by restrictions on food access(Cummins S, 2002) ,(Lang T, 1998).

According to (Dutko, 2012), a tract must meet both a low-income and a low-access requirement to be classified as a food desert. If a tract's poverty rate is 20% or higher, it is considered low-income. Alternatively, a tract may still be considered low-income if the median family income within it is less than 80% of the state's or neighboring metropolitan area's median family income. A track must have at least 500 inhabitants, or 33 percent of the population, residing more than a certain distance from the nearest supermarket (more than one mile in urban areas, or more than ten miles in rural areas) to be classified as low-access. While many outlets provide inexpensive and nutritious food, supermarkets, super centers, and large grocery stores are the subject of the tract-level concept of food deserts. These stores all carry a range of foods and also sell them at cheaper prices than other retailers such as grocery stores, according to industry standards. According to Walker et. al, (2011), food deserts occur in the United States because Americans who live in the same region, have low incomes, and are members of a minority community (in particular, African-Americans) have less access to healthy food. Food deserts, according to Robitaille and Bergeron (2013), are areas with limited access to grocery stores and are located in the lowest income quintile. They argue that the idea of food deserts is defined by four features in the literature: the first is the description of food ecosystem components. The majority of studies only include supermarkets, with a few grocery stores and fast food joints thrown in for good measure.

Although food deserts do not directly cause food insecurity, they do serve as good indicators of places where it is more likely to occur (Hossfeld, L. H., Rico Mendez, 2018). Also, according to (Hossfeld, L. H., Rico Mendez, 2018), the state's food system is characterized by high persistent hunger, limited access to nutritious foods, and a largely rural landscape with limited vehicle access). Food deserts, according to Dutkoet. al. (2012), are more likely to occur in areas with the following characteristics: (i). very large or very sparse populations; (ii) low income; (iii) high unemployment; (iv) insufficient transportation; and (v) a small number of food stores supplying fresh produce at reasonable rates. Food deserts, according to the US Department of Agriculture, are areas in the US "with limited access to affordable and nutritious food, especially in areas composed of primarily lower-income neighborhoods and communities" (USDA, 2009). Despite the presence of minority communities, low-income families, and low educational achievement levels in other food deserts, factors such as low access, inadequate food choices (within the neighborhood's limited food outlets), poor eating patterns, and a lack of healthy or healthful food options shape the community's condition. Individuals that are forced to eat inexpensive, unhealthy meals due to a lack of or restricted access to grocers carrying fresh fruit and vegetable choices would be impacted by this circumstance.

Given the idea of a food desert, it's no surprise that areas designated as such have higher poverty rates. Residents with lower educational attainment, lower wages, and higher rates of reliance on public assistance live there as well. Lower-income levels mean that people have less money in which to buy healthier foods, and a lack of education may indicate a lack of understanding of the health consequences of poor nutrition. (Dutko et al., 2013).

The physical distance between the centroids of spatial units of analysis (e.g., census tracts or the 1-km grid as the neighborhood) or between the centroids of spatial units housing the population and the nearest supermarket or large grocery store has traditionally been used to quantify food deserts and food access. For city dwellers, various distance thresholds have been used: The distance is 0.8 kilometers. (Algert et al., 2006)(Bodor et al., 2008)1 mile (USDA, 2009), 2 kilometers (Berg, Nathan and Murdoch, 2008), 2.5 kilometers (Rose et al., 2009), and 2.5 kilometers (USDA, 2009a). (Coveney & O'Dwyer, 2009) 10 miles have been used in rural areas (Rose et al., 2009). (Blanchard & Lyson, 2005). Food access can also be calculated based on the distance to the nearest store, according to (ver Ploeg et al., n.d.). Food access is divided into three categories (high, medium, and low), each of which is designed for one of two forms of access: walking or driving. Walking access refers to the range of distances over which a person can walk to a supermarket, while drivable access refers to the range of distances over which a person can drive to a supermarket. It is established a time-based distance calculation that is equal to both walking and driving. If a supermarket is within a half-mile, the walkability range is high; if a supermarket is between 12 and 1 mile, the walkability range is medium; and if the nearest supermarket is more than a mile away, the walkability range is low. A drivability range is also calculated for rural areas. If a supermarket is within 10 miles, drivability is high; if a supermarket is between 10 and 20 miles, drivability is medium; and if a supermarket is more than 20 miles away, drivability is poor. Many rural Malaysian households rely on a convenience store (kedairuncit). A convenience store provides a limited selection of cooked and ready-to-eat meals, bottled and fountain beverages, home necessities, tobacco products, and magazines. Convenience stores are generally modest in size, have extended hours of operation, and are manned by a small group of cashiers, stockers, and managers (Petersen, 2019).

While individual convenience stores may differ somewhat, these businesses are stocked, situated, and built for consumers who are on the go and just require a few goods. When conventional stores are closed, many people rely on them for emergency purchases of ice, milk, eggs, or over-the-counter pharmaceuticals. Prices in convenience stores are nearly usually greater than those at a typical grocery shop (Petersen, 2019) or supermarket.

Furthermore, according to (Petersen, 2019), grocery stores specialize in the sale of both fresh and pre-packaged food, as well as non-food home items. Fresh fruit, meats, dairy products, and, in certain cases,

bakery items are sold alongside canned, frozen, and prepared meals at a conventional grocery shop. A grocery store will also sell a wide variety of domestic, healthcare, and personal care products. However, a grocery store or supermarket is located outside of the rural region, in the city or suburbs.

The neighborhood food environment, is also an underlying determinant of access in the sense that it affects the cost of purchasing an adequate diet. In neighborhoods without supermarkets, residents likely face higher prices for many healthy foods, because small stores typically charge more for items such as fresh produce. Often healthy food items, such as nonfat milk or whole-grain bread, are not found in these stores, so residents need to travel to outlying supermarkets to acquire them. This transportation cost increases the overall expense of acquiring a healthy diet. For those who do not own a car, or who are not on a convenient public transportation line, the cost in out-of-pocket expense, as well as in time, can be substantial. (Rose, 2010). Based on the discussion above, the question arises as to whether the low-income household, especially in rural areas, obtains adequate food from existing sources(Ibrahim et al., 2014), (Powell et al., 2007).

3. Research Methodology

Since the data for this study was gathered through a survey, it is classified as scientific analysis (Cavana, R., Delahaye, B. &Sekaran, 2002). Quantitative research entails a large number of participants, usually 100 or more, and produces findings that are reflective of the entire population (McCullough and Tabak, 2010). Proportionate stratified random sampling was used in this analysis. When samples are taken from recognizable groups (strata), subgroups, and so on, stratified random sampling is used. A self-administered questionnaire was distributed to 200 vulnerable groups in the Kedah, Malaysian districts of Baling, Sik, and Padang Terap (Figure 1). The respondent, on the other hand, returned 196 questionnaires. Baling, Sik, and Padang Terap were chosen for this study because they are among the most impoverished districts in Kedah (EPU, 2020). The primary data was obtained using a standardized questionnaire that has two sections: a demographic profile of the respondents and a list of statements describing their food access status. The scale of food deserts suggested by (ver Ploeg et al., n.d.) as Table 2 was used to assess food deserts within the study's vulnerability category in evaluating areas of food deserts. Furthermore, supermarkets are used as substitutes for food stores that sell a variety of healthy, inexpensive retail food (USDA 2009), and they appear to carry a wider range of food items at lower prices than many other food retailers (Dutko et al., 2013).

Figure 1: Research area

Table 2 Classification food deserts area

Level	Distance
High	the supermarket is within 10 miles (< 6km)
Medium	the supermarket is between 10 and 20 miles (6km-12km)
Low	the supermarket is greater than 20 miles away. (>12km)

Sumber :(ver Ploeg et al., n.d.)

4. Results

Household Characteristics and Socio-Demographics

Based on the study, (Table 3) male-run 60.7 percent of households in our survey sample of vulnerable Baling, Sik, and Padang Terap households, while women run 39.3 percent. A household has an average of 4.3 people living in it. For vulnerable populations, the average age of the household head was 47 percent, ranging from 41 to 60 years old. Furthermore, the majority of household heads have a poor degree of schooling (5.1 percent with no studies and 33.2 percent with only primary school, and 58.6 percent with secondary school). They mostly live in married families (84 percent), with an average monthly income of RM1744.96 and a monthly income expenditure of RM1073.88. In addition, 93.4 percent have a motorcycle and 69.9% have a vehicle. In addition, 93.4 percent have a television, 25.5 percent have a radio, 93.9 percent have a washing machine, and 56.6 percent have a cell phone (Table 3).

Table 3 Socio-Demographics and Household Characteristic

Household criteria	**Frequency (%)**	**Household criteria**	**Frequency (%)**
Age		**Education**	
Below 20 years	1.5	No studies	5.1
21 years- 40 years	29	Primary	33.2
41 years-60 years	47	Secondary	58.6
61 years-80 years	22	Higher	3.1
Above 80 years	0.5		
Sex		**Income per month**	
Male	60.7	Mean income	RM 1744.96
Women	39.3	Income expenditure	RM 1073.88
Race			
Malay	93.6	**Asset Ownership**	93.4
Chinese	5.6	Motorcycle	69.9
India	0.8	Car	4.1
		Lorry	22.4
Family status		Bicycle	93.4

Non- marital cohabitation	5.0	Television	25.5
Married	84.0	Radio	100
Widow	11.0	Gas stove	93.9
		Washing Machine	96.6
Family size (people)		Refrigerator	56.6
0	4.6	Mobile phone	
1-3	37.8		
4-6	48.9		
7-9	7.7		
Above 10	1		

Table 4 indicates the study's indicators of supermarket access in rural areas only. The percentage of the population with high, medium or low access to supermarkets is estimated for each of the deprived groups, as well as the median distances to supermarkets. Based on the findings of this report, three districts with food access issues are depicted. Baling District had the highest proportion of people living in rural areas, with 97.87 percent, Sik 82.36 percent, and Padang Terap 71.43 percent. This is a summary of the people in this region who are dealing with the problem of food deserts. Furthermore, this study reveals that this region has a high rate of rural poverty. Food deserts have higher rates of hunger, according to a similar study by (Dutko, 2012). Around the same time, people living in food deserts have lower educational attainment, lower wages, and are more reliant on government assistance. This condition demonstrates that people in rural areas have fewer means with which to buy nutritious foods. And a lack of education may lead to a lack of understanding of the health consequences of poor nutrition.

Table 4 Food Access Status

District	Food Acces Status (%)		
	High	Median	Low
Baling	2.13	-	97.87
Padang Terap	5.19	23.37	71.43
Sik	16.17	1.47	82.36

Table 5 Food Access Resources

Source	Frequency (%)					
	Everyday	1 time/ week	2-3 time /week	4-6 time/ week	Once a month	Seldom
Convenience store	55.1	4.6	32.1	4.6	1.5	2.6
Farmers' markets	5.1	26.5	15.8	4.1	22.4	24.5
Markets	7.1	17.3	17.3	7.7	27.6	23
Grocery Store/Supermarket	3.6	9.7	5.6	7.7	51.5	21.9
Fishmonger to the villages	7.7	1.5	3.6	3.6	33.7	50

In terms of (Table 5), most respondents prefer grocery stores to markets or supermarkets as a food source. In these three districts, 55.1 percent of respondents get their food from grocery stores. At the same time, the

study revealed that 5.1 percent of people got their food from farmers' markets. In terms of food, fishmongers who visit the village are often used as a source of food. Fishmongers who come to the village provide food to a total of 7.7% of the residents in the study area. This explains why the task of the fishmonger visiting the village is critical in ensuring the supply of food raw materials to the households. Meanwhile, as opposed to other locations, respondents are more likely to get food supplies from the grocery store within a week. The percentage of people who go to the grocery store every day is 55.1 percent. In comparison to the supermarket, though, the grocery store's food supply is more limited to everyday use. The percentage of people who depend on fishmongers coming to the village for food is also poor. Fishmongers provide food to 7.7% of the residents in the study area daily. At the same time, supermarkets are not frequent sources of food for households. Once a month, the average resident receives a food supply in the region. Meanwhile, 26.5 percent of residents get their food from night markets/farmers' markets at least once a week. This explains why rural households shop for food in grocery stores more often than they do elsewhere. Convenience stores are preferred by most households for their food needs due to factors such as proximity and the number of items purchased. At the same time, markets and night markets/farmers are used to meet food needs.

5. Discussion

The status of food deserts among households in the vulnerable communities of Baling, Sik, and Padang Terap Districts in Kedah, Malaysia, was investigated in this study. To assess the status of food access households, a supermarket was used as a proxy. In comparison to other resources such as grocery stores and farmers' markets, this study chose supermarkets because they sell a range of nutritious foods at a competitive cost (USDA, 2009). Food deserts, as described by USDA (2009), are areas with limited access to food, limited food choices, and poor eating habits. This aspect would lead to a shortage of nutritious or safe food choices, which will shape the community's condition and cause them to consume low-cost, unhealthy meals. Since food access is restricted, one might conclude that a smaller variety of food was served in the home based on the study. This is a serious concern because it has been linked to negative health outcomes.

According to the study, the majority of households in the study area have food deserts, with more than 70% having no access to food. As a result, it can be inferred that all of the households surveyed had some difficulty finding food. Since the study found that households used a variety of strategies to address the problem of food access, including consuming cheaper food and limiting portion sizes at meals, the researchers concluded that the households used a variety of strategies to address the problem of food deserts. At the same time, households with low education backgrounds and low income (RM 1744.96) compare national line income RM2448 contribute to the food deserts crisis. However, low-income households in the study have limited to access food in the supermarket but they have other alternatives to access the food through convenience stores, markets, and farmers' markets. In reality, this community is not critically impressed by the food deserts issues.

.This study found that low-income people in rural areas have limited choices for food because they depend on convenience stores, markets, and farmers' markets as the main resources for food access. This study also related to previous studies conducted by Walker et. al, (2011) (Dutko et al., 2013), Robitaille and Bergeron (2013). Many factors affected the food access among this group such as goods price inconsistency, limited options, supply chain management constraints from producer to the customer in rural areas, transportation, nutrition knowledge among the head of households, and income inconsistent. This factor will influence food access in households and the end affecting the nutrients needed by the body.

The study's drawback is that it used a limited sample size that might not be representative of the general population. Despite this limitation, this study provides a starting point for understanding the food access situation of vulnerable households in Kedah and can be viewed as a contribution to the increasing information on food deserts in vulnerable communities. Policymakers should consider developing a

comprehensive food access strategy system that focuses on fostering growth in greater social inclusion and improving the food security and nutrition of these rural households. In the Malaysian context, should determine national food deserts indicator to measure food access directly and food security indirectly especially in rural areas. Food deserts indicator is important to determine so that the government intervention through the social safety net will be more focused on the target group. At the same, Kedai Rakyat 1Malaysia (KR1M) and Program Transform as iKedaiRuncit (TUKAR) need to be re-implemented and improvements to strengthen the food access chain among the rural population.

6. Conclusion

To improve food access among rural areas, several realistic motivations will be applied based on the research and suggestions of (Dutko et al., 2013). To begin, learn about this national measure of food deserts and how the classification of certain low-income areas as food deserts differs based on population and economic factors. Second, identify any systemic variations in the composition of food deserts by comparing the demographic characteristics of low-access areas with those of other low-income areas. Identifying economic and demographic characteristics closely associated with restricted access to supermarkets and grocery stores can help policymakers better understand those communities with food access restrictions, how they have evolved, and possible challenges other than limited access to nutritious food that these residents face. This will help policymakers formulate policies that are tailored to the individual needs of these populations by providing surveillance for areas that could be on the verge of becoming food deserts. Finally, the findings of this study will aid policymakers and public health officials in developing theories for more research into the factors that cause food deserts, enabling policymakers to focus on root causes rather than symptoms.

The present study only investigated food access among low-income households in rural areas, Kedah only according to the food deserts measurement. The data could not fully explain how some factors influence food access among low-income households especially in the rural area. Therefore, propose that further research explores the proximate and underlying factors that influence the mechanisms of access to productive resources. For instance, how does access to food opportunities, or, how does the head of household influence the mechanisms used to access food resources.

In the future, the authors who intend to investigate the food access among low-income areas in a rural areas could be extending their research to Peninsular Malaysia as their respondent’s areas. It is also recommended for future studies to evaluate the supporting system or organization in achieving food security such as zakat institutions or community welfare organizations. Besides, the future study should enrich this literature by making a comparison between before and after Covid-19 shocks on food access to examine deeply the livelihood regarding the different impacts of economic crisis.

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