

Loadshedding Impact on Food Spoilage: An Analysis of Household Experiences in South Africa

<https://doi.org/10.36369/2616-9045/2023/v12i2a11>

Online ISSN: 2616-9045.Print ISSN: 2218-5615

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Abstract

South Africa has been challenged with loadshedding for the past decade. Most recently, loadshedding became a crisis as the year 2022 was reportedly the most in which electricity was load shed compared to the previous years. Guided by the South African Constitution of 1996, the right of South Africans to access electricity is embedded within the constitutional obligations of Eskom. The power utility is mandated to provide reliable electricity supply and ensure just administrative action when taking actions that deprive citizens of electricity access (Pieterse, 2023). In practice, however, it has become evident that rendering services such as electricity remains a major challenge. South Africans experience loadshedding daily, which affects their energy usage. In essence, loadshedding has impacted negatively, especially the disadvantaged. Despite planned loadshedding stages, households still experience direct impacts of loadshedding. Appliances such as refrigerators become mal-functional, resulting in food kept in cool temperatures being spoiled. Although loadshedding food spoils have been identified as a phenomenon at household level, the current response in terms of household planning and awareness has not been adequately documented. The paper aims to address this by arguing that there is a need for households to engage in targeted measures that help households cope and adapt to loadshedding food spoils. Furthermore, the study provides a TO-DO list on how households can improve their ability to adapt and cope with loadshedding. The paper used a qualitative methodology focused on analysing the lived experiences of News24 participants. Literature review was conducted where journal articles, newspapers and books were analysed. Thereafter, lessons are drawn from literature, to develop and



provide a way forward towards dealing with loadshedding food spoilage at household level. The findings of the paper conclude that effective loadshedding and food spoil adaptation can limit food spoilage.

Keywords: Loadshedding, Energy, Refrigerator, Food spoil, Food waste, Household adaptation

Introduction

The most notable national electricity shutdown in South Africa was back in 2008 (Nkosi and Govender, 2022). Now about fifteen years later, the loadshedding challenge has reached its peak as the country witnesses continued blackouts. Loadshedding is implemented to respond to the insufficient power generation, which is caused by, among others, unsustainable infrastructure and insufficient upkeep of the coal fired power stations by Eskom. Persistent electricity black outs, resulting in 2022 dubbed as South Africa's most load shed year, with over 209 days blackouts. In 2021, 75 days of power cuts were recorded. Loadshedding schedules and higher electricity blackouts accelerated to stage 6. It is expected that the continued blackouts will persist until 24 months, as forewarned by ESKOM (ERERO, 2023).

According to Standard Bank (2023), the average Energy Availability Factor (EAF) decreased to about 58% in 2022, which was lower than the 62% in 2021 and 65% in 2020. It also remains far lower than the utility's target of 75%. It has since dropped to below 50% for the first time in the first week of January 2023 (Standard Bank, 2023). Since the inception of loadshedding about a decade ago, South Africans' daily lives and routines never returned to normalcy. The power cuts not only disrupt the functioning of the economy and businesses, but also carry with them price effects on the cost of households' lived experiences and cost of living. Industries and households alike have accepted as normal to live without electricity for several hours or days. Households have experienced living without electricity and seeing their electrical appliances damaged due to loadshedding (ERERO, 2023).

Research Objective

The paper examines the key concepts and constructs underlying loadshedding influences on food spoilage.



Methodology

This article used a prisma systematic review and applied a qualitative method, which looked at a global and African context. In particular, South African focused desktop review and analysis of case studies and newspaper analysis to assess the loadshedding and food spoilage nexus. The literature review used various data repositories such as Google Scholar and EBSCO host. The text that was used to source relevant data looked at ‘impact of loadshedding’ and ‘food spoilage as a result of loadshedding’ and ‘alternative energy sources’. The literature review was comprehensive, it included both academic and grey literature. It also incorporated literature from African and international institutions. Most literature looked at the relation between loadshedding and businesses, this literature was excluded. The researchers identified a number of loadshedding articles but a few had a literature review component on food spoilage. About 42 documents were assessed as relevant for this study. The assessed documents were then screened using the Risk and Vulnerability conceptual framework to assess the level of loadshedding impacts on households as severe or moderate given the ability of household members capacity (through employment and incomes) to adapt and cope to loadshedding. This screening yielded 9 interventions in a form of TO-DO List containing ways in which household members can prepare and adapt to loadshedding.

Case studies were identified, articles, and newspapers were reviewed to understand the related socio-economic and political contexts of loadshedding and how they incorporated and enabled household vulnerability and risk to food spoilage. The documents were reviewed to base the findings and fill in any information gaps.

Conceptualising Risk and Vulnerability

Vulnerability definition: Is defined as susceptibility to harm (Martin, 2023). An exposure or possibility of exposure to harm. The likelihood of exposure creates a loophole or weakness that reduces or limits a system’s ability to withstand a threat. Thus, the exposure represents a system’s vulnerability. Vulnerability is understood as a cause-effect phenomenon (Deshpande et al., 2023). Vulnerability can be exposed on physical, human and infrastructure objects. For example, a refrigerator is a physical object that is vulnerable to loadshedding. Consequently, household members become vulnerable when their preserved foods spoil.

Risk: The risk of refrigerators being exposed to loadshedding is that the food stored in household refrigerators can easily during loadshedding. The risk of consuming contaminated foods is that household members can become sick due to bacteria and fungi build-up (Sangani et al., 2023).



The Risk and Vulnerability framework is designed to provide guidelines and best practices that help households to quickly identify new ways to become resilient, cope and adapt to loadshedding schedules and loadshedding refrigerator challenges. In adapting and coping, household members need to apply effective methods and behaviour that can help them cope. The framework is designed to assist vulnerable members of a community. The threat with not assisting the vulnerable could result in household food spoilage and ultimately impact negatively on household food availability.

Literature Review

The inclusion of Goal Number Seven in Sustainable Development Goals (SDGs) in the development agenda meant that the global leaders have recognised energy as one of the pillars that sustain development. Item number 7 in the SDGs ensures that there will be universal access to affordable, sustainable and modern energy services by 2030. To achieve universal access to energy, in particular, electricity is paramount to achieving the rest of the 16 SDGs (World Bank, 2017). The International Energy Agency (IEA) predicted that by 2030, the world energy needs would have increased by 60%, from a difference of 6.2 billion in 2002 to almost 8.1 billion in 2030 (IEA, 2009). The increased global energy supply prediction comes at a time when currently, there are more people who remain without access or sufficient energy in their daily lives. Nindhia et al. (2021) state that, about 1.4 billion people which is over 20% of the global population, had no access to electricity while 2.7 billion people relied on traditional forms of energy source, such as wood.

As economies grow, the demand for electrical energy increases with the growing population, industrialisation and income (Umar & Kunda-Wamuwi, 2019). It is expected that power utility companies will develop their electricity generation and supply to counter the increasing demand from commercial and household users. However, in developing countries, power utility companies, which are often state controlled, fail to rapidly increase their generation and supply infrastructure to meet the energy demand. The challenge to expanding the grid is influenced by the lack of sufficient generation capacity, poor transmission and distribution infrastructure, low prices charged by electricity companies on advice from the government, high costs of supply to rural and remote areas, the inability of low-income households to pay connection charges, and the weak financial state of the utilities (World Bank, 2017). All the above impacts on the ability of parastatal companies' ability to keep the electricity grid powered, thus further creating implications on issues such as household electrification and food storage.

Theme 1: The Emergence of Loadshedding in South Africa

During apartheid in South Africa, electricity was reserved or designated to benefit a minority population, predominantly of white descent. However, this changed when South Africa transitioned into a rainbow nation or a state of a new dispensation. The previously



excluded ethnic groups (black) were to be accommodated into the same electricity grid. Despite the urgent need for inclusion, government institutional bodies failed to cater to the growing demand. This failure has since escalated to loadshedding as we know it today. Loadshedding occurs when there is a huge demand of electricity versus available supply.

Loadshedding has been defined as a predetermined power outage, as the electrical power system is forced to shut down, allowing some areas to receive electricity while others are temporarily cut off. Loadshedding is administered when power supply can no longer meet the entire demand (Ibrahim et al., 2023). The Department of Minerals and Energy's white paper in 1998, wrote then that, "Eskom's latest Integrated Electricity Plan projected that Eskom's present generation capacity will be fully utilised by approximately 2007 and that timely steps would have to be taken to ensure that demand does not exceed available supply capacity and that appropriate strategies, including those with long lead times, are implemented on time" (Department of Minerals and Energy, 1998:53; Potgieter, 2010).

Despite the forewarning detailed by the Department, the government did not heed the advice and implement decisive action as advised. The ripple effects of black outs and loadshedding became a South African phenomenon intertwined with the lived experiences of South Africans. According to Meyer et al. (2023), loadshedding will continue in future as electricity generation infrastructure is approaching a time lapse in which it will need to be replaced. The track record of South Africa trying to build new electricity generation capacity has not been successful since the loadshedding crisis began in 2007. Debt Rescue said loadshedding, since being introduced by Eskom about 15 years ago, had become a way of life for South Africans – albeit forced – and the country had endured bouts of ongoing power outages that had gone from bad to worse. The year 2022 was set to become the worst year of loadshedding on record. According to Eskom, as of "October 8, the country had experienced 1 949 hours, or 81 days of national loadshedding in 2022. This is almost double that of the 1153 hours over 48 days in 2021" (Majola, 2022).

Agricultural Business Chamber (Agbiz)'s chief economist, Wandile Sihlobo, cautioned that "while South Africa was in a better place regarding food security, being the continent's leader did not mean it should be complacent". He advised that South Africa would need to continue improving food security through expansion in agricultural production and job creation in various sectors of the economy (Majola, 2022). Although in terms of food security South Africa stands relatively better ranked than other countries in the same continent, it cannot be ignored that some South Africans already suffer from food insecurity despite the grants made available to some households. These grants become a source of livelihood for many household members instead of the intended eligible grant recipient. About 71% of household members are supported by social grants (Niyimbanira et al., 2021).



A case study by Chakona and Shackleton (2019) revealed that households receiving social grants were in fact more food insecure; as such, most of these households relied on wild foods to keep afloat. Therefore, it is difficult to ascertain whether most South African households would still be food secure given the ongoing electricity blackouts. Firstly, with the lack of available job opportunities and retrenchments, it can become difficult for ordinary South Africans to buy food, let alone to meet their dietary food intake, as Mosoetsa (2011) notes that households without jobs are compelled to eat from one pot. This comes at a time where most South Africans cannot afford a full nutritious meal a day. A study by Fielding-Miller and Dunkle (2015) revealed that not everyone can afford an apple a day in South Africa. Thus, household survival dynamics have compelled household members to share food. Similarly, a study by Mkhawini et al. (2015) concurred with the latter authors that it has become difficult for South African households to access nutritional foods as they are unable to afford a basic food basket. The latter compels one to conclude that although South Africa is ranked highly as food secure, the impact of loadshedding on households' daily experiences has an enormous potential of changing the narrative, if efficient interventions are not considered. This is because most disadvantaged people, especially in urban informal settlements rely on electricity for keeping food properly stored and refrigerated, among others. Informal residents have a high demand for energy to an extent that they connect their households to the electricity grid through illegal means (Monyai et al., 2023).

Theme 2: Food Spoilage Due to Loadshedding a Challenge in South African Households

It is important to learn and understand the different nuances and challenges faced by household members so as to assist policy makers to make informed decisions on how best to help the people who experience loadshedding. The issue of having intermittent electricity cuts is problematic. When electricity trips, it damages electrical appliances that were "on" before the loadshedding. News24 newspaper has detailed the experiences of some household members thus:

"Many were angry that their appliances had stopped working" (Etheridge, 2019).

Loadshedding had messed up my household electronics.

A 2022 study by Debt Rescue in 2022, revealed that because of loadshedding "93% of South Africans have been forced to throw away food which was spoilt in refrigerators during loadshedding while 38% had to replace their refrigerators due to the damage caused by power outages" (Majola, 2022). Spoiled food can be very dangerous for consumption. Health risks are highlighted by the US Department of Agriculture, which notes that all delicate food, such as raw meat, fruit, and vegetables should be preserved or refrigerated



within two hours after purchase. When these foods are exposed to room temperature from 4.44 to 60°C, they move into the danger zone as a health risk (Opperman, 2023). Households having to throw away food due to food spoilage comes “at a time when two-thirds of the population can no longer afford three meals per day, with 41% saying their monthly grocery budget is no longer enough to feed their families” (Stadler, 2022).

The concern here is that some South Africans are resorting to buying unhealthy foods, as continuous power cuts are compelling them to consume fast foods regularly, as having no electricity means disrupted opportunities to cook fresh meals at home. The dietician and Association for Dietetics in South Africa (ADSA) spokesperson, Zitandile Mfono said, “It is a pity that the positive home cooking trend we saw during Covid-19 lockdowns is now being reversed and replaced by buying fast foods because of loadshedding during meal preparation times” (Coetzee, 2023). It is already a challenge for working parents to put healthy home-cooked meals on the table due to either being unemployed or their busy lives, and now, they must contend with power outages as soon as they get home from work and start to focus on making dinner. It is not surprising that people would rather opt for the convenience of fast foods than contending with waiting to cook as per loadshedding schedules. The consumption of fast foods means an increase in high-fat, high salt and high-sugar foods in the family diet. South Africa already has high rates of obesity and Type 2 diabetes. These are the continued downward spirals the country cannot continue to endure. Additionally, purchasing fast foods relative to cooking at home is pricier, especially when looking at the total monthly cost (Coetzee, 2023).

“My fridge blew. My LED lights in my house are popping like corn. I had to replace six lights already at R200 a unit and my house intercom I installed two month[s] back is faulty,” he said.

“I would just like to know if I can claim from Eskom?”

The above excerpts are sufficient to confirm that household members believe that electrical appliances are an important daily extension of themselves. Without consistent electricity, their lives are at risk and vulnerable. Appliances like refrigerators are easily damaged by the on-and-off operations. The underlying question on the minds of News24 interviewees was whether all damages caused by loadshedding would be compensated as loadshedding was becoming costly. The next question was ‘What becomes of households when they do not have sufficient funds to re-purchase a damaged appliance? Jobs were also on people’s minds. Unemployment and local businesses down returns are becoming precarious household topics in the South African loadshedding economy:

Durbanite Alain Latham said “that Umgeni Road became gridlocked during day time power outages, blocking customers from accessing shops and businesses. “Sales are down 50-80%,” he claimed.



“We earn for work done on contract and no power, no earn”. It’s a disaster.”

The owners of several manufacturing companies told News24 “they were losing countless production hours, some over their peak period of business” (Etheridge, 2019).

It has become clear that the South African economy is run by loadshedding. Everyone in business is being run by loadshedding. Most retailers have been forced out of business. Numerous household members have been asked to leave work while those remaining at work only get to work when there is electricity.

Past studies show that loadshedding and its impacts are strongly interlinked with people’s socio-economic background (Mukoni, 2012). If you are poor, you are most likely to be affected with bounds of loadshedding relative to income stable households living in up-market communities. This further intensifies the degree of vulnerability towards those who are already on the margins of food insecurity and underdevelopment. The term “loadshedding socio-spatial segregation’ has been used to describe the inequalities in loadshedding hours and timing across the urban landscape” (Cobbinah & Adams, 2018). It is important to acknowledge these inequalities as they highlight how poor households are most likely to throw away their spoiled food due to loadshedding relative to their well-off counterparts, who use energy efficient alternative sources during loadshedding. “Thus socio-spatial segregation with respect to loadshedding could increase rural-urban inequalities” (Aidoo, 2015). According to Debt Rescue Chief Executive Officer (CEO), Neil Roets, loadshedding has severe socio-economic consequences for everyone in the country. Roets made a call to every household for a robust intervention after he observed that 68% of power outages had caused a financial strain that saw household owners losing their electrical appliances like televisions, geysers, stoves and refrigerators (Majola, 2022). Failure to do this could potentially be South Africa’s downward spiral from being ranked food secure in Africa.

Musademba et al. (2012) in Zimbabwe observed that “preferential treatment was given to specific socio-economic classes in terms of hours of loadshedding experienced”. Residents of low-income areas experienced longer hours of loadshedding relative to their counterparts in high-income areas. In Ghana, Aidoo and Briggs (2019) observed similar inequalities. They highlighted that rolling blackouts proportionately affect the poor. Among the sources of this inequality are low-income households who are believed to be making minimal contribution towards economic outputs in society. Thus, they are secondarily considered during loadshedding.

This narrative of neglecting the poor does not consider that as much as the poor might contribute minimally, they are still significant contributors to various spheres of society. This narrative poses a risk and vulnerability threat, which can reach to a point where they



do not contribute at all, if they are not prioritised to access adequate services such as electricity. This can further increase the gap between the haves and the have-nots. It is also less considered that once the vulnerable are further pushed down below the poverty line, it becomes difficult to re-incorporate the poor into the economy. It also becomes difficult for the poor to put personal efforts to wiggle their way back into the system, as disproportionately unfavourable regulations such as loadshedding become a constant challenge in their daily lives (Currie & Musango, 2017). The poor consideration of the poor during loadshedding can also breed discontent between the poor against the rich, thus creating a volatile situation where the poor find it permissible to want to acquire resources from the rich as the well-off seem to have it.

Theme 3: Alternative Energy Sources to Loadshedding

The energy crisis has contributed to the wood fuel crisis in the Third World, further resulting in the decrease of forests in African countries. As coal cannot be relied on to produce electricity, communities often depend on forests to keep the lights on as an alternative energy solution in most African homes (Kimani, 2023; Mukumba & Chivanga, 2023). Alternatives to renewable energy however, can also create inequalities in energy access, which ultimately poses a challenge to the purpose of alternative energy approaches (Zhao et al., 2022).

A study by Ye and Koch (2023) indicated that about 30% of people living in rural South Africa rely on fuelwood instead of electrification, despite over 75% of households in South Africa having been electrified. This indicates that although households might have access to electricity, this does not always relate to its usage. A case study in Gonani Village, Limpopo Province, indicated that, although all the participants interviewed had access to electricity, they nevertheless continued relying on fuelwood for household needs such as heating water and cooking, as relying on electricity was said to be unreliable. The study further indicates that lack of access to free basic electricity are the causes for households' reliance on firewood (Sithole, 2023). A study conducted in the Eastern Cape concurred with the latter, indicating that South African households in rural areas live in energy poverty (Mukumba & Chivanga, 2023). Given that forests are chopped down to collect firewood, this poses an environmental change amidst the need for alternatives.

However, electrification is not a clear-cut alternative for most households, especially those living in rural or semi-urban areas. This is not only the case in South Africa but elsewhere. According to a study in Malawi, when respondents were asked about their alternative sources of energy for both cooking and lighting during loadshedding, they "said that the most used alternative source of energy for cooking was charcoal at 95.5%, 85.5% and 73.1% of the households interviewed from low, middle and high-income residential areas" (Zalengera et al., 2014). In Zambia, less than 1% of households from demographically high-income areas switched to using portable diesel generators to power their electrical



appliances, including stoves (Umar et al., 2022). In a study conducted in Zambia Mfune et al. (2018) indicated that during loadshedding, for lighting, alternatives were torches and candles. Candle use (21.8%) was very dominant among respondents from high-income areas, followed by those from the middle-income areas at (9.7%). Using candles was not considered an alternative for respondents from low-income areas, presumably because this was a norm for them. In total, less than 50% of the respondents turned to candle use during loadshedding.

Evidently, research shows that household adoption of alternatives is based on the household's environment and income bracket. Solar is expensive; therefore, only a few households use solar as an alternative. In Zambia, solar was highlighted as an alternative energy source used by less than 4% of the respondents from all the socio-economic classes in the study sites (Umar, 2022), while households that use inexpensive alternatives are based in rural areas. Loadshedding creates a divide allowing those who use expensive alternatives to not only use electricity for lighting but are also able to plug their refrigerators and continue with life as normal relative to disadvantaged households who get cut off from power supply. Therefore, alternative measures as a source of alternate energy to power refrigerators can prove inadequate for households reliant on coal and wood. It is therefore important that households apply easily accessible measures to help them avoid food spoils.

Rural households are not as affected by loadshedding because they do not rely on electricity, as opposed to households living in urban areas who rely on electricity. The households most affected by loadshedding are those living in urban areas with low incomes. For example, when households in the lowest income category are affected by loadshedding, it becomes difficult for them to replace their damaged appliances, especially for the unemployed. The disparities between the urban well-off and the poor can be easily identified by their inability to spend post the appliance damage caused by power cuts. Households that are well-off can still purchase R200 worth of a single bulb to re-install after three of the bulbs would have been damaged by loadshedding, which could amount to R600, just for three bulbs. On the contrary, a poor household cannot even afford buying food for the same amount, let alone replace a refrigerator. While the rich will be worried about eating unhealthy food from fast foods, the disadvantaged will be worried about having no food at all. With poor households not having accessible electrified alternatives as their right, this dilemma could quickly escalate to social and civil unrest. Social instability and economic scarcity have over the years influenced political unrest in urban South Africa (Visser, 2021; Miah et al., 2022).

The challenge with the alternatives used in South African households, such as coal and wood, is that these alternatives do not replace electricity. Users of these traditional alternatives remain outside the electrical grid, meaning that their refrigerators could still



be disconnected during loadshedding. These alternatives can be argued to be ineffective in solving the challenge of loadshedding and household food spoilage.

A Household (To-Do List) in Reducing Household Food Spoilage

The information below indicates *'how household members can minimise food spoilage and loss during loadshedding'*:

1. Households should not buy in bulk; instead, they should buy foods in small quantities depending on what is needed to eat that week.
2. Items that are in cans or in boxes are most preferred to buy as they have a long shelf life. As such, items become convenient to consume during loadshedding.
3. Preparing food in advance before scheduled loadshedding times becomes crucial and an option to consider.
4. Household members can consider putting enough ice packs in the fridge to allow ice packs to take over once loadshedding takes in. That way, the fridge temperature remains cool for a longer period.
5. Instead of always buying fast foods and thus affecting one's diet and increasing the bodies' salt and sugar levels, household members could buy tin/canned foods such as beans and tuna
6. Household members could prepare healthy leafy foods such as salads during loadshedding
7. Household members could avoid fast food during loadshedding by investing in an inexpensive gas stove.
8. Household members need to learn to plan their daily lives according to the loadshedding schedules to avoid disappointments of food spoils. That way, the person that needs to cook knows exactly when they can plan around making dinner or lunch meals.
9. When there is no other convenient option except to buy takeaways, it is advisable to keep the food plate model in mind. 50% of one's plate should be veggies, 25% should be healthy carbs, and 25% should be lean protein. Anything fried and creamy is not an advisable diet to purchase (Coetzee, 2023).
10. If the household has cooked enough food and there are leftovers, household members can consider donating the food to those who might need it.
11. The most effective alternative for household members would be to invest in alternative energy sources such as wind, solar and personal generators to help keep meat, dairy and fresh produce unspoiled.

Conclusion

The impact of loadshedding is evident in South African households, while the negative externalities of unemployment and unreliable alternatives further impact households' ability to deal with food spoils. However, this article holds the notion that households can play an important role in preserving their foods during loadshedding by putting in place measures that are effective in minimising extreme impacts of food spoil. The above household TO-DO list is a guide to what households can apply. Households can resort to buying food when they need it instead of buying in bulk and reserving the food in the refrigerator. This minimises the risks of the food being load shed which results in food loss. Food spoilage and wastage can be addressed through self-help strategies by creating awareness on the topic via social media, government gazettes, newspapers and public platforms.

The paper recommends that the government policy on energy should review current energy alternatives as they do not seek to benefit the already disadvantaged; instead, alternatives benefit the advantaged few, leaving the poor to use traditional energy sources. Traditional sources arguably cannot address issues of loadshedding and food spoils in South African households. Therefore, a speedy response to this needs to be established. Finally, further studies are needed using both qualitative and quantitative approaches to help expand the body of knowledge within the nexus of loadshedding and food spoils. It is imperative that such studies are conducted given that, if households struggle to adapt to loadshedding food spoils, this could hamper the attainment of the SDG2 goal, which aims to achieve zero hunger, food security and improved nutrition by year 2030.

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