FoodBev SETA

Food & Beverages Manufacturing
Sector Education and Training Authority

The Effects of the KwaZulu-Natal Flooding on the Food and Beverages Manufacturing Sector

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Abstract

South Africa experienced major societal disruption through the Kwa-Zulu Natal floods which occurred in April 2022. The flooding had a gross impact on various business entities across the KwaZulu Natal. Despite the extensive coverage given to the impact of the floods on the national economy, little attention was given to the immediate effects of the phenomenon on South Africa's food and beverage manufacturing sector. This paper, therefore, reports on the effects of the KwaZulu-Natal floods on the country's Food and Beverages Manufacturing sector. A mixed-method approach was employed and data for the study were collected through surveys and focus group discussions with industry stakeholders. The findings showed that less than 35% of the Food and Beverages Manufacturing sector was affected by the KwaZulu-Natal floods. Damages to public roads, company infrastructure and equipment and increased operational costs were the key challenges faced by the companies during and soon after the floods. Even though the effect on the sector has been moderate to severe, companies remain resilient in their operations and producing food and beverages for the country.

1. Introduction

Food and beverage manufacturing is the biggest cluster of South Africa's agro-processing sector. The food industry covers diverse activities including food supply, production, harvesting, processing, packaging, transportation, distribution, consumption, and disposal (Sadiku *et al,* 2019). Several studies have emphasised the importance of food industry to South Africa's economic development (Chitonge, 2021). The importance of the food and beverages manufacturing industry is in its being a key driver for economic growth. The sector is one of the largest manufacturing sectors as it contributes significantly to gross domestic product (GDP) at R507 billion annually and employment at 190 144 employees (Stats SA, 2020). It is for this reason that the sector has been recognized by the government as one of the strategic industries in the economy, with the potential to contribute significantly towards inclusive growth and employment creation (Mahlauli, 2019 and Chitonge, 2021).

The sector plays a crucial role in public health, food safety, food security, social development, and nutrition (Sadiku *et al.*, 2019). The South African food system is susceptible to local shocks which affect many other sectors of the South African economy. Thus, due to local shocks, the food industry has gone through rapid and constant changes caused by technological advances, climate change, changes in consumer behavior, globalisation and food safety (Telukdarie *et al.*, 2020). The effect of these factors has forced the sector to create more sustainable food systems. Apart from climate change, food safety, health and nutrition,

globalisation and technology which are the sectors' main change drivers; there is a need to go deeper into the change drivers and also consider a variety of other factors which affect the performance of the food and beverages manufacturing industry.

In April 2022, the country was affected by the Extreme rainfall that caused flooding in the KwaZulu-Natal, the second largest provincial contributor to South Africa's economy after Gauteng. This extreme weather condition has been attributed to climate change (Wolski *et al.*, 2022). The floods severely damaged some crops, infrastructure including roads, industrial buildings such as manufacturing premises, communication towers, and warehouses and also resulted in the loss of lives (Wolski *et al.*, 2022). All the above factors combined continued to have a devastating effect on the South African economy, however, the impact on the food and beverages manufacturing sector has not been ascertained.

Scant research attention has been afforded to the effect of this crucial event on the food and beverages manufacturing sector, meaning that South Africa is yet to get a complete picture of the effect in the sector. Although the effects have been noted extensively in the media, the SETA has no knowledge on the percentage of the sector which was affected. Furthermore, how companies registered the SETA were affected by the floods. This is where the current study has a role to play in addressing the lacuna. The study determines the effect of the April 2022 flooding in KwaZulu-Natal on the food and beverages manufacturing sector in South Africa. The ability of the sector to be a driver of growth in South Africa is dependent on possessing, among other things, information about the effect of disruptions to be able to implement measures to withstand future shocks.

2. Aim and Objectives of this Study.

2.1 Aim

The study aims to ascertain the effect of flooding in KwaZulu-Natal on the food and beverages manufacturing sector in South Africa.

2.2 Objectives

i. To determine the level of effects from the April 2022 KwaZulu-Natal floods on the food and beverages manufacturing sector in South Africa.
ii. To determine business operations that are affected by the floods.

3. Literature Review

3.1 Impact of floods

The African continent is substantively susceptible to climate change shocks and impacts (Mordecai *et al.*, 2020). Although the continent of Africa is full of resources to sustain its development, political instability, lack of sustainable development and poverty has hindered progress. Most of the African population lives below the international poverty line and is increasingly affected by growing starvation, malnutrition, undernourishment and the acute manifestation of food insecurity in pockets across the continent (Ngcamu and Chari, 2020). The lack of development and poverty has made it harder for countries to respond to climate change adequately and effectively.

Over the few decades, adverse weather patterns have caused droughts and flooding. Flooding has displaced populations and created food-scarce environments. Recently, Nigeria, Namibia, and Zambia have experienced devastating floods that impacted local food production (Nkrumah, 2018; Echendu, 2022; Mabuku *et al.*, 2019). In Namibia, flooding damaged infrastructure and caused an overflowing of dams across the country. Nigeria also battles flooding across many of its states damaging infrastructure, displacing communities, and causing casualties (Echendu, 2022).

Droughts and flooding affect the availability and quality of the raw materials required manufacture food and beverages for both industrial and non-industrial sectors. Local food production systems are often displaced and disrupted during droughts and flooding (Durodola, 2019; Atanga and Tankpa, 2021). Flooding has a damaging effect on food production from an agricultural perspective. Flooding uproots and displaces crops which have been planted or stored for transportation. Apart from the immediate disruption, the duration between the floods and the drying of the land to replant is often too long and the condition of the land may not be different. Thus, increasing the scarcity of food for the local population (Atanga and Tankpa, 2021; Week and Wizor, 2020). Furthermore, the damage to road infrastructure required for the transportation of goods exacerbates the scarcity of food. Droughts prevail in the absence of average rainfall. The lack of rain and soaring temperatures starve the land of water, consequently, water becomes scarce. As the land goes through the drought, it dries out and becomes less usable to the population. Traditional farming lands change depending on the access to water either becoming less usable for farmers or unusable for traditional crop planting (Ngcamu and Chari, 2020; Twongyirwe *et al.*, 2019). Floods and droughts culminate in increased in prices for production in industrial and non-industrial sectors (Nkrumah, 2018). Consequently, the of producing food rises significantly affecting consumers.

3.2 KwaZulu-Natal flooding

South Africa's food and beverages manufacturing sector is vulnerable to the effects of climate change and resultant weather events. High frequency and intensity of precipitation due to climate change can negatively affect food availability, including food chain activities from production to process, storage, distribution, and trade (Binns *et al.*, 2020; Teressa, 2021). As evidenced in April 2022, the heavy rainfall which led to flooding resulted in infrastructure damage and many deaths across the affected areas (Ghosh *et al.*, 2022; Wolski *et al.*, 2022). KwaZulu-Natal Province is a significant producer of agricultural products like sugar, fruit, milk, and poultry. As a result, the disruption to business and consumer activity in the province notably effected the overall South African economy. A survey research conducted by the Department of Trade, Industry and Competition has revealed that at least 826 companies were affected by the recent floods in KwaZulu-Natal, with the cost of the damage estimated at R7 billion (SA News, 2022).

Over the years, research by FoodBev SETA has revealed that Gauteng, Western Cape and KZN hold critical positions in the country's food manufacturing (FoodBev SETA, 2022). The three provinces are epicentres of food manufacturing in the country. Furthermore, KZN plays a critical role in connecting South Africa's food system to the world (Wolski *et al.*, 2022). The port of Durban is one of the largest and most busy shipping terminals in South Africa (Tatsvarei *et al.*, 2021). The flooding has damaged the infrastructure which links the Durban port operations to the rest of the country (Wolski *et al.*, 2022), resulting in dire consequences for South African businesses.

From the food manufacturing perspective, the supply of food and consumer goods within the economy was disrupted by a slowdown in port, road traffic, closure of factories and other businesses (Wolski *et al.*, 2022). While food systems were interrupted by flooding, the effect on food and beverage manufacturing companies has not been ascertained. This gap is addressed in this research.

4. Methodology

4.1 Study site and Selection of respondents

The study was conducted in South Africa and the study population covered all the food and beverage companies across all nine provinces of the country. A simple random sampling approach was employed for the study. The study had a population of eight hundred (800) companies. A sample size of 213 was determined using a confidence interval of 95% and a margin of error of 5%. A total of 217 stakeholders completed the survey. For the qualitative approach, a simple random approach was employed and targeted 30 company representatives.

4.2 Study Approach

The research study adopted a mixed method approach, which integrates qualitative and quantitative methods. Using a combination of quantitative and qualitative methods allowed for the use of different means of data collection and analysis for an in-depth understanding of the problem under investigation (Dawadi and Giri, 2021). A convergent parallel design was adopted as the quantitative and qualitative of the research were performed independently while the respective results were merged during the overall interpretation. In this study, the quantitative research approach involved collecting and analysing numerical data from online questionnaire designed by the FoodBev SETA research team. Qualitative methods included open-ended information. The use of qualitative and quantitative allowed for triangulation. The research team believed that no single methodology would identify all local factors affecting the performance of the food and beverages manufacturing sector. Therefore, different techniques complemented one another, each compensating for the potential shortcomings of the other. The results from different research tools were then compared and verified to ensure the trustworthiness of the data. The section below details the process of data collection.

4.3 Data Collection

Preliminary data collection for the study involved a comprehensive review of previous reports and articles to get a glimpse of the factors previously identified to be affecting the food and beverage manufacturing sector in the KZN province. Findings from the desktop literature review informed the building of the survey instrument used for quantitative data collection. The second step of data collection involved an online survey. The survey instrument was distributed to FoodBev SETA companies via email and through FoodBev SETA's social media platforms. A structured questionnaire was, therefore administered to 217 respondents to collect data on the effects of the KZN floods. A 5-point Likert Scale with the following response options: (1) No impact, (2) Low impact, (3) Moderate impact, (4) high impact and (5) Severe

impact (CITE) were used. This Likert scale was used to determine the level of impact across respective areas within organisations.

More than 20 stakeholders were identified during the planning of the fieldwork; the stakeholders represented a broad base, including sector representatives (e.g. professional and industries associations). A total of four one-on-one interviews and eight focus group discussions were conducted with representatives of industry associations, unions and companies operating in the food and beverages manufacturing sector. The names of these individuals are not included in the report for data privacy reasons. A semi-structured interview technique was used to guide the interview process.

4.4 Data Analysis

Quantitative data were analysed using Statistical Package for Social Science (SPSS) version 28. The Cronbach Alpha test was conducted to measure the reliability of the research instrument or internal consistency of the responses given. The obtained Cronbach's Alpha score was $\alpha = 0.79$ showing that the consistency of responses is reliable. Univariate and bivariate statistics were used to present the findings of the analysis. However, one limitation of the study is the weighting, statistical weighting was not applied to the data and may not present a balanced view of the result.

5. Findings and Discussion

A total of 217 company representatives completed the survey, however, less than 35% were affected by the KwaZulu-Natal Floods. Only 20% of the affected companies were in KwaZulu-Natal, 48% were in Gauteng and 32% were from the rest of the seven provinces. The Production, Processing and Preservation of Meat, Fish, Fruit, Vegetables, Oils and Fats Chamber (32%) were mostly affected by the floods compared to the other chambers (Figure 1). Meat (16%), Other Food Products (16%), and fruits and vegetables (10%) were the most affected industries. The majority of companies affected by the floods were large (56%) and small (28%), companies followed by medium companies (16%).

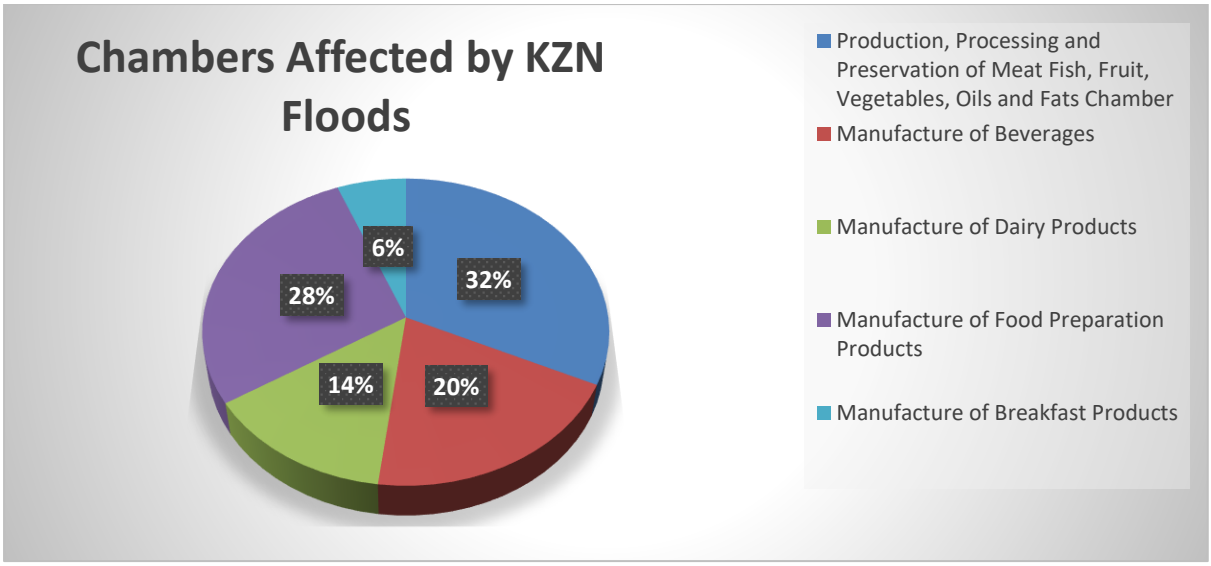

Figure 1:Chambers Affected by KwaZulu-Natal Floods

The sector was significantly affected by the floods as shown in Table 1 below. The reliability of the responses was found to be very consistent with a Cronbach Alpha result of 0.79. Companies indicated that the effect of the flooding was substantive on business premises equipment at 50%. This caused significant disruption to daily operational activities within organisations. Production interruptions and delays were immediate effects on the organisations. The immediate damage on equipment resulted in an immediate interruption in production plans and times, resulting in delays. The production interruptions and delays varied for large, medium, and smaller organisations. Larger organisations could recover or use other alternatives compared to medium and small companies.

The floods immediately affected the organisation's logistics, income and profit margins. This finding was triangulated through one-on-one interviews with company representatives who indicated that damaged road infrastructure was one of the most significant challenges for organisations. Most participants indicated that the reduced movement of goods affected income and profit margins of their organisations. The lack of movement of goods affected profits for many companies that rely on roads to deliver orders to businesses and respective clients illustrated in Table 1. This was the case for companies in KZN, companies that have a provincial and national footprint. Most of the companies (32%) situated outside of Kwa-Zulu Natal and Gauteng indicated a moderate to server impact on the movement of goods in or out of the province.

Table 1:Effect of Kwa-Zulu Natal Floods

	No impact	Low impact	Moderate impact	Moderate to Severe	Severe
Damages to premises and business equipment	49%	4%	26%	10%	11%
Damaged or lost stock	30%	23%	12%	15%	20%
Loss of income, reduced profit	14%	22%	23%	14%	27%
Logistics in and out delayed	6%	11%	11%	40%	32%
Forced reduction of the number of employees	43%	27%	10%	8%	11%
Loss of power, telecommunications, and water	47%	2%	15%	12%	24%

Although companies could navigate around power, telecommunications, and water issues, it was a significant factor that affected business operations. Most companies rely on the telecommunications, power, and water infrastructure the government provides. The loss of these vital infrastructures has a major effect on companies in or surrounding areas that rely on the services. This translates into reduced production time and, thus, reduced output. This cascades to the need to release some employees to ensure the sustainably of the business. The plan to return to business-as-usual will take some time companies in the province are yet to fully recovers from the disaster.

6. Conclusion

This study determined the effect of the April 2022 flooding in KwaZulu-Natal on the food and beverages manufacturing sector in South Africa. The study found that over 30% of the food and beverages manufacturing sector was effect by the KZN floods. The effect of the KZN floods on the food and beverage manufacturing sector was moderate to severe. The floods damaged equipment resulting in disruptions and delays in production. The production/manufacturing delays were delayed and in some cases, stopped due the water damages in various equipment's which were inter connected. The organizational logistics were disrupted in terms of storage of raw materials and manufactured goods as well as the transportation of the latter. Furthermore, the cold storage and other storage units were either flooded or damaged affecting the quality of raw materials for manufacturing and manufactured goods. Thus, culminating in lower income levels and reduced profits because of the loss in raw materials and manufacture goods. The study has shown that floods had a significant effect on the sector and its affects have been difficult to recover from. However, the sector is resilient and will continue to rebuild for the sake of the country as witnessed during the peak of COVID-19 pandemic. Climate change is a significant change driver in the sector, the floods has illustrated this. Although climate change and its affects cannot be predicted, the sector can survive if it anticipates and plans against climate change outcomes.

7. Recommendations

Based on the findings of the research, the following recommendations are made:

- The sector needs to build resilience against shocks like floods. The resilience of food and beverages manufacturing sector demands a comprehensive approach that integrates responses to climate change and food insecurity.
- There is a need to priorities skills development interventions for employees tasked to manage smart early warning systems against natural disasters. This will enable companies to operate during natural disasters or put mitigation plans to minimise the effects from the disasters.
- Furthermore, there is an urgent need to build the capacity of Food and Beverage, and Environmental Science Professionals working across the food systems in the country. This will ensure development and better management, of climate change related disaster risks management strategies within Food & Beverages Manufacturing sector.
- The FoodBev SETA must target Research and Innovation bursaries to research proposals that focus on climate change mitigation strategies.
- The SETA in the med term can partner with establish organizations that can give the basic skills, knowledge on mitigation and disaster management for the sector.
- In depth analysis on the impact of KZN floods on levy contributions within the Food and Beverages Sector.
- The findings of this study have implications to FoodBev SETA in that this newly exposed vulnerability in the sector needs to be addressed through initiatives such as graduates placement that targets Environmental Science or Environmental management graduates. Furthermore, this means that there is now a need for FoodBev SETA to infuse Environmental management knowledge and skills in the development of new qualifications so that there is an inherent awareness amongst the sector's workforce about climate change, its impact and mitigation and adaptation strategies.

References

Atanga, R.A. and Tankpa, V. (2021) 'Climate Change, Flood Disaster Risk and Food Security Nexus in Northern Ghana', *Frontiers in Sustainable Food Systems*, 5(August). Available at: https://doi.org/10.3389/fsufs.2021.706721.

Binns, C.W. *et al.* (2020) 'Climate Change, Food Supply, and Dietary Guidelines', *Annual Review of Public Health*, 42, pp. 233–255. Available at: https://doi.org/10.1146/annurev-publhealth-012420-105044.

Chitonge, H. (2021) 'The Agro-processing Sector in the South African Economy: Creating Opportunities for Inclusive Growth Working Paper Series Number 2021-3'.

Dawadi, S. and Giri, R.A. (2021) 'Mixed-Methods Research : A Discussion on its Types , Challenges , and Criticisms', pp. 25–36.

FoodBev SETA (2022) *Food and Beverages Manufacturing SETA Sector Skills Plan 2023/2024*. Johannesburg.

Ghosh, A. *et al.* (2022) 'A rapid geospatial analysis of the flood impacts on crops in KwaZulu-Natal and Eastern Cape provinces of South Africa in 2022'.

Mordecai, E.A. *et al.* (2020) 'Climate change could shift disease burden from malaria to arboviruses in Africa', *The Lancet Planetary Health*, 4(9), pp. e416–e423. Available at: https://doi.org/10.1016/S2542-5196(20)30178-9.

Ngcamu, B.S. and Chari, F. (2020) 'Drought influences on food insecurity in africa: A systematic literature review', *International Journal of Environmental Research and Public Health*, 17(16), pp. 1–17. Available at: https://doi.org/10.3390/ijerph17165897.

SA News (2022) *Damage to KZN companies estimated at R7 billion*, *South African Government News Agency*.

Sadiku, M.N.O., Musa, S.M. and Ashaolu, T.J. (2019) 'Food Industry: An Introduction', *International Journal of Trend in Scientific Research and Development*, Volume-3(Issue-4), pp. 128–130. Available at: https://doi.org/10.31142/ijtsrd23638.

Tatsvarei, S. *et al.* (2021) 'Situational Analysis and Strategic Advisory on Farming and Food Security In South Africa in the Aftermath of Widespread Public Violence and Looting in Kwazulu-Natal and Gauteng between 10-14 July 2021', *SAGE Sub-Committtee on Food Security*, (August), pp. 1–12.

Telukdarie, A., Munsamy, M. and Mohlala, P. (2020) 'Analysis of the Impact of COVID-19 on the Food and Beverages Manufacturing Sector', *Sustainability*, 12(22). Available at:

https://doi.org/10.3390/su12229331.

Teressa, B. (2021) ‘Impact of Climate Change on Food Availability—A Review’, *International Journal of Food Science and Agriculture*, 5(3), pp. 465–470. Available at: https://doi.org/10.26855/ijfsa.2021.09.017.

Twongyirwe, R. *et al.* (2019) ‘Perceived effects of drought on household food security in South-western Uganda: Coping responses and determinants’, *Weather and Climate Extremes*, 24(March), p. 100201. Available at: https://doi.org/10.1016/j.wace.2019.100201.

Week, D.A. and Wizor, C.H. (2020) ‘Effects of Flood on Food Security, Livelihood and Socio-economic Characteristics in the Flood-prone Areas of the Core Niger Delta, Nigeria’, *Asian Journal of Geographical Research*, (January), pp. 1–17. Available at: https://doi.org/10.9734/ajgr/2020/v3i130096.

Wolski, P. *et al.* (2022) *Climate change exacerbated rainfall causing devastating flooding in Eastern South Africa*. London. Available at: https://www.worldweatherattribution.org/wp-content/uploads/WWA-KZN-floods-scientific-report.pdf.