



Gaza Strip Food Insecurity

28/5/24 – Minderoo Foundation

Abstract

Minderoo Foundation’s medical and statistics teams, which include primary health care doctors, used available data to estimate that **without adequate food and medical aid being made immediately available, it can be conservatively estimated that up to 1 million people within the Gaza Strip, including at least 400,000 children, are at immediate threat of starvation and associated disease related mortality.**³ The number of infants and children affected could be higher as their reduced physiological reserve predisposes them to higher rates of mortality from malnutrition and disease.

Minderoo’s Actions

In October 2023, Minderoo Foundation responded immediately to the Gaza crisis providing AUD\$10m of funding to UNICEF, UNOCHA and Médecins Sans Frontières for immediate relief efforts. This matched a contribution provided by the Australian Government. Since this time, Minderoo has remained closely engaged, deepening its understanding of the situation on the ground through extensive engagement with active NGOs in Gaza, key UN agencies and in-person visits. In March 2024, Minderoo provided a further AUD\$1.5m to the Global Empowerment Mission enabling them to deliver 48 trucks comprising 7 million meals to Gaza. Throughout Minderoo’s ongoing involvement, it has become clear that disruption is required to reach the required amount of aid into Gaza to eliminate the rapid onset of famine across the community. Minderoo with support from Fortescue, a world-leading logistics company, has iteratively developed a set of simple solutions to dramatically improve the flow of aid to Gaza.

Introduction

Food insecurity is a critical issue affecting the Palestinian population of the Gaza Strip, with significant implications for public health, economic and political stability.

This analysis aims to provide an estimation of the current state of food insecurity in the Gaza Strip and blockaded cities, emphasizing the caloric needs of the resident population and the deficits resulting from inadequate food supplies since the latest hostilities commenced in October 2023. A recent working paper released by Isakov et al. also sheds light on alternative and more recent data captured by COGAT regarding

aid delivery into Gaza.¹ This new COGAT data set provided to Israeli academics is not yet available to Minderoo. We have reached out to the authors of this paper in an effort to obtain these new data but can only operate on verifiable, public information.

The analysis considers the following key factors:

- **Population Demographics**
- **Average Caloric Needs**
- **Food Sources and Availability**

To generate:

- **Caloric deficits per person and across the Gaza Strip**
- **Health implications for the population and their subsequent caloric requirements**

Summary of Results

Since January 2024 there has been a significant and worsening food shock to people in the blockaded cities of the Gaza Strip, with Gaza City and Rafah City particularly impacted.

At a steady state, maintenance of the caloric needs of the population of the Gaza Strip will require ~2,530 tonnes of food aid equating to 253 trucks per day (@ 10 tonnes each) on an ongoing basis.

However, within the four primary cities in the Gaza Strip the total accrued per person caloric deficit since January 2024 amounts to approximately 206,000 kcal per person. **To address this nett caloric deficit, the Gaza Strip population will require an additional ~ 209,000 tonnes of food aid requiring 20,900 trucks (@ 10 tonnes each). If this deficit was met over a 21-day period, it will require an additional 995 trucks per day for a total of 1,248 trucks per day over the period 1 June – 22 June.**

In March 2024, the Integrated Food Security Phase Classification (IPC) Global Initiative estimated that ~70 per cent of the population of Gaza Strip would be in a “famine/humanitarian catastrophe” state (IPC Phase 5) by July and the United Nations Relief and Works Agency (UNRWA) stated that prior to the latest hostilities, 81 per cent of the population were below the poverty line.^{2 3}

¹ Nutritional Assessment of Food Aid delivered to Gaza via Israel during “Swords of Iron”, Isajov et al. “Working Paper” May 2024.

² <https://www.unrwa.org/gaza15-years-blockade>, accessed 16 May 24.

³ Integrated Food Security Phase Classification – Global Initiative Special Brief on Acute Food Insecurity. Published 18 March 2024

The rapid increase in malnutrition related infectious disease and the increased morbidity and mortality that has been well documented in other famine crisis situations can be expected to drive hundreds of thousands of additional and preventable excess deaths.

Children and infants are disproportionately at risk of malnutrition due to their reduced physiological reserve, particularly in a disease state. Additionally, infants under 24 months old who experience malnutrition are at a risk of life long developmental delay. North Gaza has the highest rate of malnutrition in children and infants with 98 per cent having had less than two food groups in the last 24 hours.³ Meanwhile, Rafah has the lowest rate which is still 89 per cent.³

Figure 25. Evolution of populations in IPC Phase 5 (Catastrophe) in the Gaza Strip

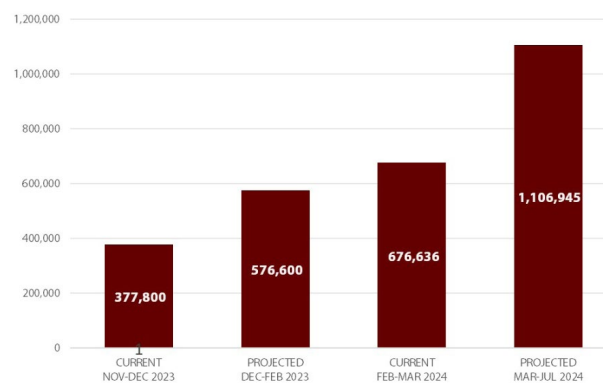


Figure 1: March 2024 report from Integrated Food Security Phase Classification (IPC) demonstrating the growing population under IPC Phase 5 (Catastrophe) conditions. IPC Phase 5 is the highest severity rating for food insecurity and is defined as “the absolute inaccessibility of food to an entire population or sub-group of a population, potentially causing death in the short term (ACF, Introduction to Food Security Intervention Principles, 2008)”.

Supporting Assumptions and Calculations

Population

- Gaza Strip total – 2,300,000 (1,000,000 children = ~43%)⁴
- Gaza City – 560,000² (~240,000 children = 43%)
- Rafah City – 200,000⁴ (~86,000 children, assuming 43% are children)
- Dier Al Balah City – 300,000² (~129,000 children, assuming 43% are children)
- Khan Younis City - 450,000² (~194,000 children, assuming 43% are children)

The movement of refugees between cities in the Gaza Strip based on IDF activity since October 2023 has been significant but is impossible to model for this analysis.

⁴ Preliminary Results of the Population, Housing and Establishments Census, 2017. Accessed 16 May 24.

Caloric Needs

Caloric needs are affected by a myriad of factors not limited to gender, age, and circumstance. We use the below values as a conservative starting point averaged across the entire population. The Australian Nation Health and Medical Research Council uses 8,700kJ (or 2080kcal) as a population average.⁵

- Adults – 2,500kcal/day (20% above average due to health stressors + displacement)
- Children – 2,000kcal/day (20% above average due to health stressors + displacement, averaged over ages)

Food Sources

Damage to agricultural areas has limited domestic food production

As of January 2024, 65 per cent of agricultural land had been damaged, up from 35 per cent in November 2023. In addition, 70 per cent of livestock have been lost since October 2023. Restricted access to farmland and lack of agricultural supplies such as fertiliser and fuel have significantly limited Palestine’s internal ability to produce food.

Map 4. Damage to Agriculture Areas Imagery Analysis Maps - November 2023 (left), December 2023 (middle) and January 2024 (right). Source: UNOSAT, 2023-2024



Figure 1: Damage to agricultural land from 2023 to today.

International Aid is a key source of calories and has been in decline

Since October 2023, the flow of aid into Gaza has declined significantly. In January and February 2024 alone, 51 per cent of planned aid missions were denied access.⁶ Data

⁵ National Health and Medical Research Council, Australian Government Department of Health and Ageing, New Zealand Ministry of Health. Nutrient Reference Values for Australia and New Zealand.

specifically looking at food trucks entering Gaza shows that the daily average has fallen from 150 trucks pre-October 2023 to only 60 post-October, a decrease of 60 per cent.⁶

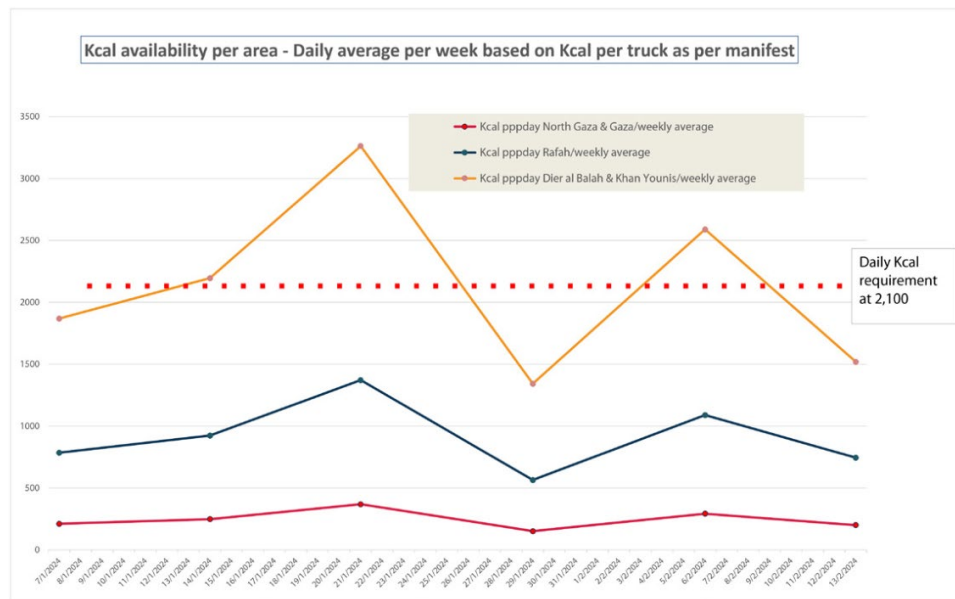


Figure 2: Caloric availability from aid by region. Source - UNRWA, Gaza Supply and Dispatch

Using the above UNRWA data we see that each person across the four major cities within the Gaza Strip has accrued a net caloric deficit of 206,050kCal since Jan 2024. The hierarchies that inevitably exist in populations under stress mean that aid is certainly not being equitably distributed. Children, pregnant women and those below the poverty line will face greater malnutrition.

⁶ Gaza Market Monitoring Flash Update #7 – World Food Programme, 1/3/24. Accessed 16 May 24.



Kcal from Aid (kCal/person/day)	1/1/24	14/1/24	21/1/24	29/1/24	6/2/24	13/2/24*	15/5/24
Dier Al Balah + Khan Younis	1900	2100	3250	1400	2600	1500	1500
Rafah	750	900	1400	550	1100	750	750
Gaza City	250	250	750	150	600	400	400
Kcal Deficits (kCal/person/day)	1/1/24	14/1/24	21/1/24	29/1/24	6/2/24	13/2/24	15/5/24
Adult Intake in duress							
Dier Al Balah + Khan Younis	600	400	-750	1,100	-100	1,000	1,000
Rafah	1,750	1,600	1,100	1,950	1,400	1,750	1,750
Gaza City and North Gaza	2,250	2,250	1,750	2,350	1,900	2,100	2,100
Total Deficit for each period	59800	29750	16800	43200	22400	446200	
Total Deficit for Dier Al Balah + Khan Younis Cities	7,800	2,800	-6,000	8,800	-700	92,000	
Total Deficit for Rafah City	22,750	11,200	8,800	15,600	9,800	161,000	
Total Deficit for Gaza City and North Gaza	29,250	15,750	14,000	18,800	13,300	193,200	
Total Deficit for these cities	206,050 per person since 1/1/24						

*Last available data (13/2/24) has been extrapolated to today (15/5/24)

A sample of food items and their associated calories by weight are provided in the Table below. Our calculations assume aid is evenly split across the below food groups.

Food Type	kcal / 100g
Rice	176
Pulses and Legumes	348
Meat	165
Flour	366
Vegetables	80

Ongoing requirement for food aid

To maintain the ongoing caloric needs of the 2.3 million people in the Gaza Strip would require approximately 2,530 tonnes of food aid to be supplied per day (253 trucks @ 10 tonnes).

Food aid required to address accrued caloric deficit

However, on average an additional ~90kg of aid will be required for each person in the Gaza Strip just to address their caloric deficit accrued since January 2024.

For the 2.3 million people who live in the Gaza Strip this would equate to ~209,000 tonnes of food aid (20,900 trucks @ 10 tonnes). If we assume that this deficit needs to

be rectified over a 21-day period, this would require an additional 995 trucks/day every day throughout the period 1 June – 22 June.

Compounding effects of disease and health stressors

In addition to significant food insecurity, the inhabitants of the Gaza Strip have experienced reduced access to healthcare and worsening health stressors. Malnutrition and health are deeply intertwined.

WHO maintain a live disease surveillance dashboard called Health Cluster that captures frequent updates about medical system functionality and the incidence of disease. As of May 2024, Health Cluster reports that there are only 7 fully functioning hospitals in the Gaza Strip (which equates to 16 per cent of all hospitals).

A lack of sanitation and hygiene, rising levels of outdoor defecation and a collapsed health system combined with chronic malnutrition and an estimated 1.9 million people living in crowded shelters have created the perfect storm for disease to take hold.

WHO's Health Cluster shows a rapidly increasing number of cases of viral hepatitis, acute respiratory infections (ARI), and diarrhoea. Since mid-October there have been 814,000 reported ARI's and 451,000 cases of diarrhoea.⁷ Malnutrition is well documented to cause an increased case-fatality ratio in the most common childhood communicable diseases, including diarrheal disease and acute respiratory infections.

As far back as February 2024 a detailed report by the Global Nutrition Cluster found at least 90 per cent of children under age 5 in the Northern Gaza Strip were affected by one or more infectious disease. Seventy per cent had diarrhoea in the past two weeks, a 23-fold increase compared with the 2022 baseline.⁸

The combined effects of chronic food stress, rapidly increasing infectious disease incidence, and diminished access to healthcare have crippled the inhabitants of the Gaza Strip. In the absence of relief from food and medical aid and easing living conditions, hundreds of thousands of additional excess deaths related to disease can be expected.

⁷ <https://healthcluster.who.int/countries-and-regions/occupied-palestinian-territory>. Accessed 16 May 24.

⁸ <https://www.nutritioncluster.net/resources/nutrition-vulnerability-and-situation-analysis-gaza>. Accessed 16 May 24.