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Netherlands Institute of International Relations

Clingendael Alert

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From hunger to death

An estimate of excess mortality in Sudan, based on currently available information

Community kitchen in Khartoum, Sudan
Photographer: a displaced humanitarian activist who must remain anonymous

Summary

This Alert describes an update to the food balance analysis found in the policy brief From Catastrophe to Famine: Immediate action needed in Sudan to contain mass starvation | Clingendael (Hoffmann, February 2024, The Clingendael Institute). Literature study and discussion with experts generated possible formulas to relate cumulative energy intake deficit and body mass index (BMI), and BMI and excess mortality. Using food balance estimates based on published data on harvest and stocks, and somewhat optimistic estimates of stocks at household level, wheat imports and humanitarian food aid, excess mortality was calculated under a number of scenarios. **A scenario in which the hungriest people are given small amounts of extra food by others leads to an estimated excess mortality of about 2.5 million people (about 15% of the population in Darfur and Kordofan, which are likely worst affected) by the end of September 2024.** A tipping point at which large-scale hunger transitions into large-

scale death has likely already been reached in parts of the country in May. Key observations are:

- About 90% of excess mortality will be concentrated among about 10% of the population.
- Mortality is strongly linked not only to the severity of hunger, but also to its duration. One cannot survive at emergency levels of food consumption for a long time. This is cause for serious concern for the 2025 lean season.
- Even a modest redistribution of food to the hungriest people can substantially reduce excess mortality. Sharing of food is a common practice in Sudan, but as scarcity deepens this could become difficult to sustain. It therefore needs to be complemented by support to agricultural production and a rapid, large-scale increase of food flows into Sudan.

Work is ongoing to estimate post-harvest recovery and possible mortality levels in the 2025 lean season.

Introduction

Since fighting between Rapid Support Forces (RSF) and Sudanese Armed Forces (SAF) broke out in April 2023, for much of the population an already difficult food security situation has gotten substantially worse. Apart from the disruption of logistics and general increases in prices, the harvest was much less than usual[1] and cereal imports are at or below 40% of the level of previous years.[2] Recent reports indicate that malnutrition and mortality are increasing sharply[3]. One of the only reports currently available that looks ahead to the end of the 2024 lean season is the February 2024 Clingendael policy brief,[4] for which the author of this Alert developed the scenarios. It is worth noting that the published harvest data indicate that Sudan faces a nationwide cereal deficit comparable with the worst-case scenario in the February 2024 policy brief. That document looked at the distribution of hunger over the population, but took mortality as an input variable. Estimates for mortality figures were based on a comparison with nationwide mortality in other famines, in particular the 1984 famines in Ethiopia and Sudan. This present document updates the analysis by looking more specifically at excess mortality, and investigating what possibilities exist to reduce excess mortality. Such analysis is critical to understand the scale and severity of the crisis that is unfolding. Work is ongoing to develop mortality estimates for the 2025 lean season. This is urgent because the 2024 cultivation season will likely be poor[5], which could lead to a very difficult lean season in 2025.

Linking energy intake deficit to mortality

There is quite some research being done on excess mortality in famines, but a search of the literature did not provide a model that could link food scarcity to deaths. The relationship between hunger and death is not straightforward.[6] Low energy intake at any point in time is less important than cumulative energy intake deficit over time.[7] Also, very few people die

1 FAO, 2024. Special Report 2023: FAO Crop and Food Supply Assessment Mission (CFSAM) to the Sudan, 19 March 2024

2 Information from FEWSNET reports and information from sources familiar with cereal imports.

3 Sudan: As fighting escalates around El Fasher, major malnutrition crisis persists in Zamzam camp | Doctors Without Borders / Médecins Sans Frontières (MSF ..., 110 dead and potential polio surge in South Darfur Kalma camp - Dabanga Radio TV Online (dabangasudan.org)

4 Hoffmann, 2024. From Catastrophe to Famine. Immediate action needed in Sudan to contain mass starvation. Clingendael, Netherlands Institute of International Relations. Conflict Research Unit Policy Brief. February 2024.

5 Information received from experts, farmers and aid workers indicates that the obstacles to cultivation in 2024 are likely similar or worse than they were in 2023.

6 See for example Checchi, F., S. Frison, A. Warsame, K.T. Abebe, J. Archen, E.A. Ategbo, M.A. Agoya, I. Kassim, B. Ndiaye and M. Nyawo, 2022. Can we predict the burden of acute malnutrition in crisis-affected countries? Findings from Somalia and South Sudan. BMC Nutrition (2022) 8:92. DOI: 10.1186/s40795-022-00563-2

7 Arsenault, J., 2015. Review of adaptability of adults and children to short and long-term energy restriction. Literature Review Part 2. Unpublished paper.

of starvation alone.[8] Rather, a structural energy intake deficit increases a person's vulnerability to disease and disease-related mortality. Therefore, a conceptual model was developed from scratch, using available knowledge on steps in the chain connecting hunger to death. In order to estimate excess mortality, a multi-step approach was taken. First, the available cereal was distributed over the population – assuming that only 20,000 MT of cereal stocks would remain just before the next harvest. This cereal balance can be calculated based on reasonable, available estimates of the volumes of harvests, in-country stocks from previous seasons, imports[9] and donated food aid. That leads to an estimate of energy intake deficit and hunger (as was done in the scenarios presented in Clingendael's February 2024 policy brief). Second, a relationship between cumulative energy intake deficit and body mass index (BMI) was deducted from literature. Such a relationship allows for estimates of (changes in the) distribution of BMI values over time. Third, a relationship between BMI and mortality was also deducted from literature. That relationship allows for estimating total excess mortality. On top of this, attention was needed for demographic changes. Deaths, births and migration influence the total population size and thus the cereal consumption balance: if the population increases, there is less food per person, and if the population reduces, the remaining food will be shared among fewer people. The methodology and underpinning assumptions are explained in more detail in the annex.

It is clear that access to food and income differs across Sudan, and among different social classes and livelihoods groups. Since harvest estimates are available at state level, an analysis at sub-national level would be an important contribution to building increasingly precise scenarios. Harvest data and information obtained from different parts of the country indicates that food shortages will likely be worst in Darfur, Kordofan, and in conflict-affected areas along the Nile.

The importance of cereal In Sudanese diets

Sudanese diets are heavy in cereals. Cereal is complemented by cooking oil, sesame and groundnut, meat (and some fish along the Nile), beans (and some imported lentils), and vegetables (especially leaves, okra, tomato and onion). Apart from this, sugar can be an important source of energy.

For this analysis, an assumption that 70% of energy intake is from cereals (based on FEWSNET documentation) is maintained. After the war broke out, the availability and affordability of cereal were reduced substantially, but the same happened to the availability and affordability of other foods. It is unlikely that many people have been able to compensate the reduction in cereal consumption by increasing consumption of other foods. Meat has been suggested,[10] but only a limited percentage of households have access to herds of sufficient size. There are indications that many vulnerable households (especially the displaced) have lost their livestock, and affordability is limited because meat prices have gone up.[11] None of the other foods are available in sufficient quantity to allow for nationwide compensation for the loss of cereal. Wild foods will be available after the rains start, but – as mentioned in the February 2024 policy brief – the per capita availability is likely limited, and concentrated in thinly-populated, rural areas.

Food sharing mechanisms

Sudan has a long tradition of sharing food. After the war broke out and hunger spread, community-level initiatives for sharing food

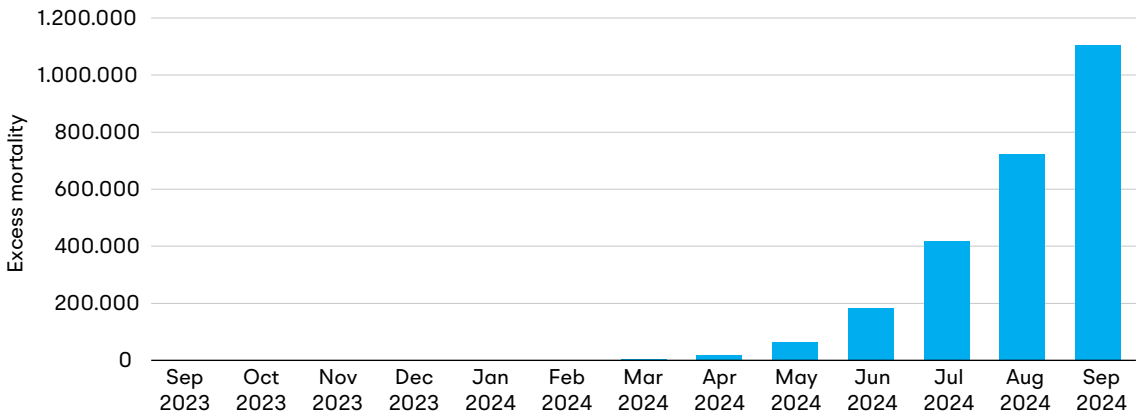
8 De Waal, A., 1989. Famine that Kills. Darfur, Sudan, 1984-1985. Oxford, Clarendon Press

9 One element that is difficult to estimate is informal cross-border trade. However, compared to total cereal demand this is likely to be relatively limited.

10 Personal communication with several external experts.

11 As famine looms in Sudan, the hungry eat soil and leaves (reuters.com) talks of people hunting cats; there are also stories of people eating locusts (personal communication).

Chart 1: Excess mortality by month



sprang up across the country.[12] These 'soup kitchen' initiatives are often informal, but can be very well organised. Funds that are received are used to buy food, which is then prepared and made available to hungry households. In a situation where humanitarian aid struggles to reach affected communities, these initiatives redistribute some of the available food towards the hungriest. Their functioning is however precarious.[13] If community groups are harassed, resources dry up or are blocked by internet shutdowns[14], or if food availability in markets dwindles, the number of people who can be served reduces – often at a time when the need increases. The lack of formal registration and/or conventional accountability structures has deterred many international aid agencies from working with them at scale.

Findings

Chart 1 presents excess mortality by month for a scenario in which local food sharing mechanisms continue to function to some extent, and the hungriest households are able to access 50% (rather than 45%) of their daily energy requirements. **This leads to an estimated excess mortality of about 2.5 million people by the end of September 2024**. Since hunger will likely be worst in Darfur and Kordofan (because the north, east and southeast of Sudan have access to food from outside and to comparatively high local production), **this implies that about 15% of the population in Darfur and Kordofan will die from hunger and disease by September 2024** if there are no rapid improvements in food availability before the rains make transport very difficult by early July.[15] The tipping point where excess mortality becomes higher than 'normal mortality' has likely already been reached in parts of the country in May 2024. Note that this analysis depends on the assumption that, on top of reported stocks with government stores and large companies[16], farming households and small shop owners together had 370,000 metric

12 See for example Local responders' experiences of delivering aid in Sudan - - CSF[:] (csf-sudan.org), Youth-led 'emergency rooms' shine rays of hope in war-torn Sudan | UN News, Sudan - Sudan Humanitarian Update (31 August 2023) | Digital Situation Reports (unocha.org) Sudan facing humanitarian crisis as relief funding dwindles | News | Al Jazeera, The New Humanitarian | A mutual aid volunteer reflects on a year of war in Sudan and Famine looms in Sudan | Features News | Al Jazeera

13 See for example The New Humanitarian | In Sudan, mutual aid groups face security threats and funding gaps, Sudan govt cracks down on grassroots service committees in the entire country - Dabanga Radio TV Online (dabangasudan.org) and Sudan aid workers risk 'kidnap and rape', experts warn | Features | Al Jazeera

14 Internet Lifeline Sudan | Clingendael

15 While 2.5 million deaths sounds exceptionally high, the percentage of mortality is actually not that unusual: a review of other severe famines (Nigeria (Biafra) 1969, Ethiopia 1984, Somalia 1992 and 2010) indicates that mortality among the population in affected areas was in the range of 10-20%.

16 FAO, 2024. Op.cit.

Chart 2: Distribution of excess mortality over population percentage groups

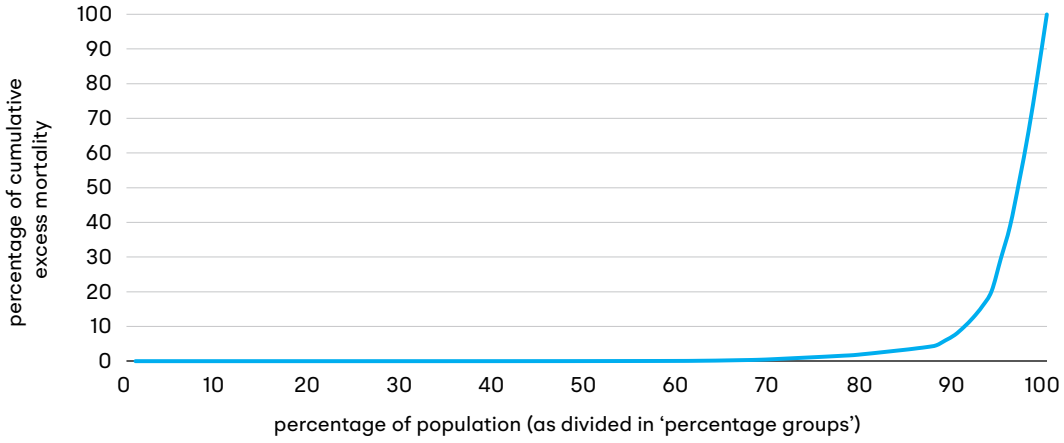
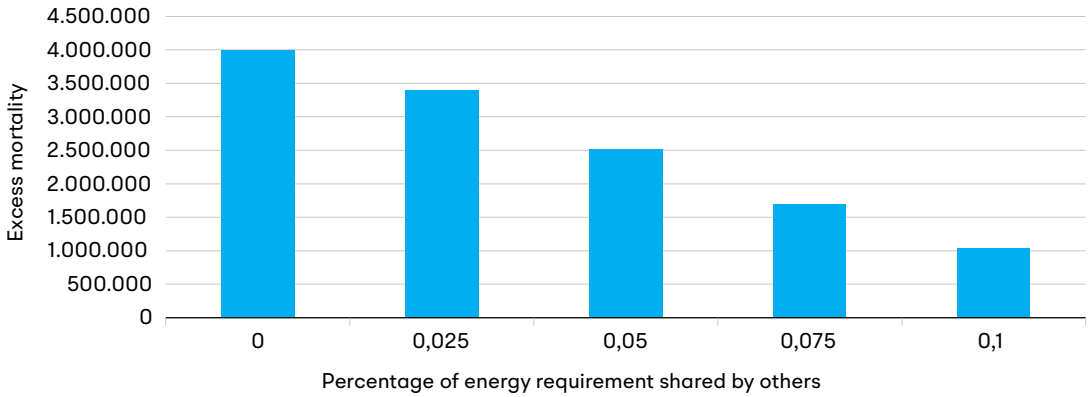


Chart 3: Total excess mortality by the extent of sharing with those with BMI below 15 kg/m²



tons of cereal in stock in September 2023[17], after five months of war. Without these household-level stocks, estimated excess mortality surges to 6.1 million. It also depends on the assumption that enough food can move through the country to allow for food sharing with the hungriest. Since shortages are mostly concentrated west of the Nile, this would depend on food moving from the east of Sudan to the west.

It is worth noting that mortality is concentrated among that part of the population that faces the worst, and most sustained, energy intake deficit: about 90% of total excess mortality is found among only 10% of the population (chart 2).

Sensitivity analysis revealed that the extent to which some food is shared with the hungriest people (such as through the well-documented community soup kitchens) can have a large effect on reducing mortality. Chart 3 shows that excess mortality reduces substantially with even a modest increase in the amount of food that is shared. If the amount of food that is shared with the hungriest part of the population is increased to just under 200 kcal/p/d (that is, one to two pieces of bread a day for everyone with a BMI below 15 kg/m²), excess mortality drops from 2.5 million to about 1 million. This is without any increase in commercial imports or food aid volumes. If, on the other hand, food sharing mechanisms are disrupted because

17 This is an estimate based on the assumption that the 20% of Sudanese households had on average 500 kg left in store (which adds up to 320,000 tons), and that small shop owners across the country together had about 50,000 tons of grain in stock. Indications from conversations with knowledgeable people are that this may well be optimistic.

funds run out, because markets run out of food, or because they are stopped from functioning by those in charge, excess mortality could reach about 4 million by the start of the 2024 harvest season.

While the combination of strengthening local mechanisms for food redistribution (including cross-line movement of food to the hungriest areas) can make a large difference in the immediate future, it will not be enough to stop hunger, and it will not be enough to avoid death in the longer term. While the IPC classification considers the severity of hunger, it is the duration of hunger that may need more attention: if food deficits are below what the body can adjust to for long enough, many people will die even though they do not fall into the category of 'catastrophic hunger'.[18] For Sudan, all indications are that conflict, high input prices and other challenges will lead to a below-average harvest in 2024, even if the rains are good. There are also no indications that commercial imports of cereal will return to their pre-war levels in the near future. Besides, health systems, water supply and sanitation across much of the country are in a dismal state, which increases the risk of diseases spreading. Unless there is a rapid, structural and large-scale increase in the availability of food, and a recovery of health and WASH systems, it can be expected that after a limited recovery immediately following the harvest, the 2025 lean season will bring even worse hunger and death than 2024.

Annex: more details on methodology and assumptions

In order to get a sense of the possible variation in hunger and death, calculations of cumulative energy intake deficit, change in BMI, and death were done separately for 100 'percentage groups', each containing 1% of Sudan's population in September 2023. For each 'percentage group', an assumption of starting energy intake and BMI was made (see table 1).

Within each group, BMI was assumed to be reasonably homogenous, based on the assumption that households with similar access to food and income will face similar energy intake deficits. No distinction by gender or age was made. Because young children and other vulnerable groups are at higher risk of death than adults, this likely means that the analysis in this document underestimates actual mortality.

It is fair to assume that those caught up in conflict zones, internally displaced people (IDPs), and those who were unable to cultivate are likely among the 'percentage groups' with the worst starting condition and energy intake, and that wealthier people living in quiet areas with better access to food (mostly in the north and east of Sudan) are likely among the 'percentage groups' with the best starting condition and energy intake.

The relationship between cumulative energy intake deficit and BMI

Useful sources of information for the relationship between energy intake deficit and BMI are in chart 4[19], and a literature review on the topic.[20]

When the numbers in the table are adjusted to smoothen out the lines[21], this leads to the graph of change in BMI over time by energy intake deficit as presented in chart 5.

Because human energy consumption reduces with lower BMI[22], a more useful relationship is that between BMI change per month and starting BMI. Interestingly, this relationship appears to be linear, as shown in chart 6: delta BMI = (3.0 x deficit) – (0.096 x (22 – BMI_{t-1})). The change in BMI over a month is equivalent to 3.0 times the energy intake deficit for that month (as a fraction

18 The New Humanitarian | Hunger deaths aren't simply about famine or no famine

19 Table produced by FEWSNET

20 Arsenault 2015, op.cit.

21 Since the table gives BMI values with one digit, adjustments up to +/- 0.05 were made to these BMI values to smoothen the lines. Literature does not suggest stepwise changes in BMI over time, thus relatively smooth lines seem reasonable.

22 Allen, L.H. and C.P. Howson (eds.), 1995. Estimated Mean per Capita Energy Requirements for Planning Emergency Food Aid Rations. Washington: National Academy Press

Chart 4: BMI levels over time at different energy intake deficits

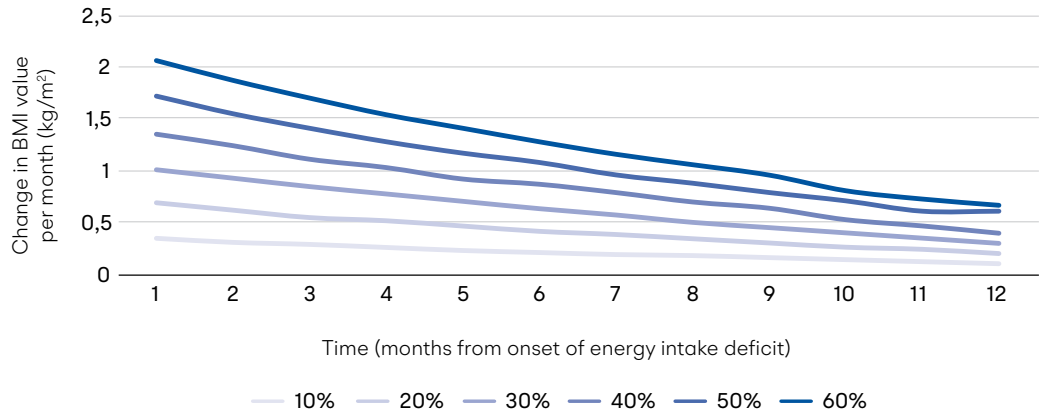
Adaptability to energy restriction (adults)

Corresponding IPC Phase	Size of energy deficit	Deficit in kcal	Month												
			0	1	2	3	4	5	6	7	8	9	10	11	12
3	10% Energy Deficit	256	22.0	21.6	21.3	21.0	20.8	20.6	20.3	20.2	20.0	19.8	19.7	19.6	19.4
3	20% Energy Deficit	512	22.0	21.3	20.7	20.1	19.6	19.1	18.7	18.3	18.0	17.7	17.4	17.2	16.9
4	30% Energy Deficit	767	22.0	21.0	20.1	19.2	18.4	17.7	17.1	16.5	16.0	15.5	15.1	14.8	14.4
4	40% Energy Deficit	1,023	22.0	20.7	19.4	18.3	17.3	16.3	15.5	14.7	14.0	13.3	12.8	12.4	11.9
4	50% Energy Deficit	1,279	22.0	20.3	18.8	17.4	16.1	14.9	13.8	12.9	12.0	11.2	10.5	10.0	9.3
5	60% Energy Deficit	1,535	22.0	20.0	18.1	16.4	14.9	13.5	12.2	11.1	10.0	9.0	8.2	7.6	6.8

WHO BMI categories

>18,5 kg/m²: Healthy
17-18,5 kg/m²: Mild Thinness
16-17 kg/m²: Moderate Thinness
<16 kg/m²: Severe Thinness

Chart 5: Change in BMI per month by energy intake deficit, over time



of 100%), minus 0.096 times the difference between 22 and the BMI in the previous month.

An important comment here is that these are data for adults. Children need additional energy for growth, and especially young children are at higher risk of disease and death. The assumption was made that adults will share their food with their children, thus keeping the (percentage) energy intake deficit for the children similar or lower than their own. Still, not specifically accounting for child mortality likely leads to an underestimation of total mortality.

The relationship between BMI and (excess) mortality

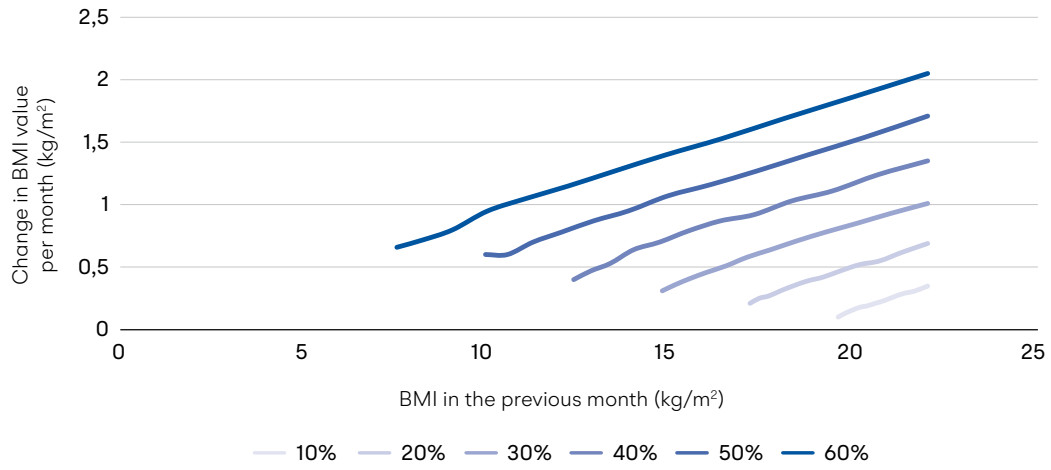
In order to come to a relationship between BMI and excess mortality, two elements found in literature were combined. A study by Aune et al[23] (fig. 2) found that mortality among people with a BMI of 15kg/m² is about double that of people with a BMI of 22-28 kg/m². Henry[24] documented that a BMI of 12 kg/m² can be used as the limit for human survival (and thus a mortality of 100%).

A formula that was empirically found to fit well with these data points was $0.00023*e^{((18.5-BMI_{t-1})^{1.36})}$. BMI_{t-1} is the BMI value for

23 Aune, D., A.Sen, M. Prasad, T. Norat, I. Janszky, S. Tonstad, P. Rommundstad, L.J. Vatten, 2016. BMI and all cause mortality: systematic review and non-linear dose-response meta-analysis of 230 cohort studies with 3.74 million deaths among 30.3 million participants. BMJ 2016, 353:i2156. Doi:10.1136/bmj.i2156.

24 Henry, C.J.K., 2001. The Biology of Human Starvation. British Nutrition Foundation Nutrition Bulletin, vol. 26, pp. 205-211

Chart 6: Monthly change in BMI by energy intake deficit and BMI value for the previous month



the previous month. This formula calculates no excess mortality at BMI values above 18.5 kg/m², gradually increasing mortality levels below this, and rapidly increasing mortality rates for BMI values below 13 kg/m².

Note that the data presented by Aune et al[25] was largely from North America and Europe, among generally healthy populations with reasonable to good access to health care, water and sanitation. The challenges in health care, water and sanitation in Sudan mean that vulnerability to disease and death is higher, especially for people weakened by hunger. It is thus very well possible that mortality in Sudan will be higher at BMI levels between 13 and 16 kg/m².

Assumptions on BMI levels and energy intake deficit levels in September 2023

Prior to the outbreak of the war in April 2023, Sudan had gone through several years of economic crisis that affected the food security of a large part of the population.[26] After the outbreak of war, this situation worsened substantially. Considering the high cost of travel, many of the people who were able to reach Egypt from Khartoum were comparatively well-off – and likely with relatively high BMI levels.

Table 1 gives an overview of the assumed BMI levels by September 2023, about 5 months after the outbreak of the war. This table indicates a population that largely has healthy BMI levels. This estimate may be optimistic. Further, higher consumption levels are associated with higher starting BMI levels: it is assumed that the better-off have higher BMI levels, and can afford more food than the poorer parts of the population.

The daily energy intake levels were assumed to be below requirement for the majority of the population. This means that already in September 2023, a substantial part of the population was facing hunger. As the initial cereal balance analysis presented in the Clingendael policy brief[27] indicates, the cereal deficit in Sudan is such that a higher consumption level at the start of the analysis period would mean that even less cereal remains by September 2024, and hunger levels will be much higher.

Allen and Howson[28] have highlighted the importance of people's physical activity level for their energy intake requirement. What is now the standard for food aid of 2,100 kcal/p/d is based on a light activity level for the adolescent and adult population, which is mostly applicable in camp settings where people only work to a limited extent. Very malnourished people are

25 Aune et al (op.cit.)

26 Thomas, E. and A. de Waal, 2022. Hunger in Sudan's Political Marketplace. Occasional Paper #32. World Peace Foundation. Conflict Research Programme. April 2022

27 Hoffmann 2024 (op.cit.)

28 Allan and Howson (op.cit.). See p.17

Table 1: Assumed BMI levels by September 2023

Total energy intake (kcal/p/d)	2200	2000	1800	1600	
Cereal intake (kcal/p/d)	1540	1400	1260	1120	Total
BMI = 30 kg/m^2	1%				1%
BMI = 29 kg/m^2	1%	1%			2%
BMI = 28 kg/m^2	1%	1%			2%
BMI = 27 kg/m^2	1%	2%			3%
BMI = 26 kg/m^2	1%	4%	1%		6%
BMI = 25 kg/m^2		6%	1%		7%
BMI = 24 kg/m^2		8%	4%		12%
BMI = 23 kg/m^2		7%	8%	1%	16%
BMI = 22 kg/m^2		5%	10%	1%	16%
BMI = 21 kg/m^2		3%	10%	2%	15%
BMI = 20 kg/m^2		2%	7%	3%	12%
BMI = 19 kg/m^2		1%	3%	2%	6%
BMI = 18 kg/m^2			1%	1%	2%
Total	5%	40%	45%	10%	100%

Table 2: Assumed energy requirements linked to BMI

	BMI<15 kg/m^2	15<BMI<18.5 kg/m^2	BMI>18.5 kg/m^2
Energy requirement (kcal/p/d)	1,900	2,100	2,200

often unable to do very much, which brings the energy requirement for such populations to about 1,900 kcal/p/d. On the other hand, many people in Sudan are not in camps, and need extra energy for work and long-distance travel. The energy intake for a moderate activity level is estimated at 2,200 kcal/p/d. For calculations of energy deficit, energy requirements were linked to BMI as presented in table 2.

Note that the energy requirement for people with healthy BMI levels may be on the low side. Populations with heavy physical activity levels need a bit over 2,500 kcal/p/d. It is assumed that, while part of the population will definitely engage in heavy labor, this will not be the case for everyone.

Assumptions on 'normal mortality' deferral of births, and migration

For 'normal mortality levels' and birth rate, UN figures[29] were used. This gives a birth rate of 3.05%, and a death rate of 0.68% per year. Monthly rates were estimated by dividing these figures by 12.

Under conditions of conflict and severe malnutrition, births are deferred. It was assumed that the birth rate fell by 10% from January 2024 (about 9 months after the start of the war). Then, nine months after BMI levels of 'percentage groups' fall below 18.5 kg/m^2, the birth rate for that 'percentage group' is assumed to reduce with reducing BMI, and reach zero once BMI falls below 15 kg/m^2.

29 Sudan Birth Rate 1950-2024 | MacroTrends and Sudan Death Rate 1950-2024 | MacroTrends [accessed 20 May 2024]

For migration out of the country, it is assumed that between October 2023 and September 2024, 1 million additional people (on top of 1.2 million who had already fled the country by the end of September 2023[30]) will have left the country. There is likely a distinct seasonality in cross-border migration, with peaks in winter, when temperatures are low, and summer, when the rains give access to some water and wild foods along the way. Long distances (the vast majority of the population lives more than 300 km from any international border) and difficult conditions in Chad, South Sudan and northwestern Ethiopia[31] are likely a strong disincentive for large-scale migration unless people's situations become desperate.

Sharing of food and (in-country) distress migration

Finally, an assumption was made about sharing of food with the hungriest people. Initiatives like the Emergency Response Rooms that use the resources they receive to buy and prepare food for the hungriest people in their communities, often with support from diaspora and sponsors, are well documented.[32] There are also indications of distress migration, where households that almost run out of food move to areas where they expect to be able to access more food. Such mechanisms redistribute food, and do not increase imports and total food availability. If some extra food is bought for the hungriest people, there will be a little bit less for the rest.

Five scenarios were calculated, in which those 'percentage groups' with a BMI below 15 kg/m^2 are allocated an extra 0%, 2.5%, 5%, 7.5%, and 10% of their daily food requirements (on top of about 45% that they are estimated to be able to access), which is deducted pro-rata from the rest of the population. In all scenarios, the food balance was adjusted such that by the end of September 2024, 20,000 metric tons of cereal remain in stock in Sudan. This is to account for small numbers of households (shop owners, some farmers, some wealthy people) having small amounts of stock remaining. Reports of government confiscation of private stocks, looting, disruptions of remittance flows by the internet black-out, local bans on food export to other regions, and bans of soup kitchens[33] all suggest that the extent to which food is actually shared might be optimistic.

30 DTM Sudan - Monthly Displacement Overview | Displacement Tracking Matrix (iom.int) https://dtm.iom.int/reports/dtm-sudan-monthly-displacement-overview-01?close=true

31 There are also anecdotal reports of refugees returning to Sudan from Egypt because they cannot deal with the living conditions (personal communication)

32 See footnote 12.

33 Personal communication with several sources. See also footnote 13.

About the Clingendael Institute
Clingendael – the Netherlands Institute of International Relations – is a leading think tank and academy on international affairs. Through our analyses, training and public debate we aim to inspire and equip governments, businesses, and civil society in order to contribute to a secure, sustainable and just world.

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Timmo Gaasbeek has over 20 years of experience working on food security and water resources management in fragile and conflict-affected countries. From 2014 to 2018 he worked in Sudan. During this time he worked on water resources management and food security in Darfur and the east of the country. He has a PhD in Disaster Studies, and a MSc in Tropical Land Use.

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