

**SAF Airstrike Campaign in North Darfur:  
Markets Damaged, Civilians Impacted**

10 October 2024

**Yale** SCHOOL OF PUBLIC HEALTH  
*Humanitarian Research Lab*

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## I. Key Findings

The Yale School of Public Health's Humanitarian Research Lab (HRL) has assessed conflict-related damage consistent with airstrikes to markets in both Kutum and Kuma, North Darfur between 9 August and 6 October 2024 in satellite imagery analysis. This damage is highly likely due to airstrikes by Sudan Armed Forces (SAF). Open sources reported that both Kutum and Kuma's markets were damaged due to SAF airstrikes on their respective market days, on 30 September and 4 October 2024.

Likely SAF airstrike activity has reportedly increased as fighting expands across Darfur.<sup>1</sup> These airstrikes are killing civilians and Internally Displaced Persons (IDPs). Attacks on markets, especially on market days, increases the chances of civilian casualties and likely destroys food stores and other critical goods. The Famine Early Warning System Network (FEWS NET) has determined that Kutum and Kuma face Integrated Phase Classification (IPC) 4 Emergency conditions, the second highest level of food insecurity.<sup>2</sup> Markets are likely to be densely populated on market days and serve as critical infrastructure. Attacks on markets in these communities, which include IDPs, will likely make current food insecurity conditions more severe. Rapid Support Forces (RSF) have controlled both Kutum and Kuma since at least June 2023 and April 2024, respectively, and used these locations as a part of RSF's siege on El-Fasher.<sup>3</sup> Conflict parties have certain obligations to protect critical infrastructure under international humanitarian law.<sup>4</sup>

### Kuma

Yale HRL corroborates open source reports of airstrikes to the Friday Market in Kuma, North Darfur through satellite imagery analysis of damage to structures between 9 August – 5 October 2024. Open sources reported that an alleged SAF airstrike killed at least 65 people, including 13 children, and wounded approximately 200 people. The airstrike, which occurred on the regular market day in Kuma, impacted the “crowded” weekly Friday market on 4 October 2024.<sup>5</sup> This airstrike is one of the deadliest reported in this conflict.<sup>6</sup> Kuma has served as the civil administration of the Ziyadiya, who are part of the northern Rizeigat ethnic group.<sup>7</sup> Open sources have reported that fighting in El-Fasher has displaced people to Kuma, and Yale HRL has identified temporary structures in satellite imagery consistent with IDP shelters in Kuma.<sup>8</sup>

### Kutum

Yale HRL corroborates open-source reports of airstrikes to the market in Kutum, North Darfur through satellite imagery analysis collected between 25 September and 6 October 2024. Open sources reported that SAF airstrikes on Monday 30 September damaged the Kutum city market on a market day, as well as residential neighborhoods, killing at least five people.<sup>9</sup> Yale HRL also identifies prior conflict-related damage consistent with an aerial attack on the west side of the same market through satellite imagery analysis collected between 20 August and 25 September 2024. The Protection Cluster in Sudan estimates as of 30 June 2024 that 200,000 people reside in Kutum and neighboring Kassab and Fata Borno IDP camps.<sup>10</sup> Kutum is home to both Rizeigat and non-Arab populations, including a large Zaghawa community.<sup>11</sup>

## Methodology

Yale HRL utilizes data fusion methodologies of open source and remote sensing data analysis. Yale HRL produced this report through the cross-corroboration of open source data, including social media, local news reporting, multimedia, and other verified reports, and remote sensing data, including satellite imagery and thermal sensor data. This analysis involves identifying possible events, geolocating them, and assessing the likelihood that an event has occurred through the cross-corroboration of both open source and satellite imagery data.

Researchers analyzed open source data across social media, news reports, and other publicly available sources to identify and verify incidents. Analysts assess the credibility and reliability of open source data based on a source's past reliability and the corroboration of other independent sources.

Satellite imagery analysis relies on multi-temporal change detection, which involves the comparison of two or more satellite images of the same area captured at different times to detect differences in coloration, visual properties, and presence, absence, or positional change of objects across the images. Visual indicators of damage include: discoloration to the analyzed structure, including indicators of possible burning or charring; observable difference in structural texture compared to pre-event dates including total or partial collapse or serious failure of the walls and roofs of the analyzed structure; munitions impact points; and presence of damage proxies such as debris. Analysts assess the type and source of damage based on a range of indicators, including the qualities and extent of damage to a structure and surrounding area and other signatures of munition impacts or other forms of damage.

## Limitations

There are significant limitations to the data fusion methodology. The information environment in Sudan does not have the breadth of data available in other locations and there is likely a significant reporting bias for those who provide open source reporting.

The tools and techniques present significant challenges to assess activities such as extrajudicial detention, conflict-related sexual violence (CRSV), and conflict-related casualties, particularly in environments with limited data.

Satellite imagery analysis is limited by available imagery over time and space. Available nadir angles of satellite imagery can produce challenges to assess structural damage, until multiple angles and ground-level photographic and video materials emerge to help inform the analysis.

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<sup>1</sup> Sarah "Over 500 Sudanese killed in air strikes" Dabanga Radio TV Online. 8 October 2024. <https://www.dabangasudan.org/en/all-news/article/over-500-sudanese-killed-in-air-strikes>, archived at <https://perma.cc/5XLR-XG4F>; Caitlin N. Howarth, Kaveh Khoshnood, Nathaniel A. Raymond et al. "Confirmation of High-Tempo Aerial Bombardment in El-Fasher, 1-6 October 2024." 07 October 2024. Humanitarian

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<sup>2</sup> FEWS NET, "Famine (IPC Phase 5) is ongoing in part of Al Fasher, North Darfur" 2024, <https://fews.net/east-africa/sudan/food-security-outlook/june-2024>, archived at <https://perma.cc/3CJX-7SCM>

<sup>3</sup> Radio Dabanga, "North Darfur's Kutum has fallen into RSF hands" June 6, 2023, <https://www.dabangasudan.org/en/all-news/article/north-darfurs-kutum-has-fallen-into-rsf-hands>, archived at <https://perma.cc/MMS3-5ABV>; <https://www.darfur24.com/2024/04/24/%d9%82%d9%88%d8%a7%d8%aa-%d8%a7%d9%84%d8%af%d8%b9%d9%85-%d8%a7%d9%84%d8%b3%d8%b1%d9%8a%d8%b9-%d8%aa%d8%b4%d8%af%d8%af-%d8%a7%d9%84%d8%ad%d8%b5%d8%a7%d8%b1-%d8%b9%d9%84%d9%89-%d9%85%d8%af%d9%8a%d9%86/>

<sup>4</sup> Sudan War Monitor, "Wave of SAF airstrikes in North Darfur kills dozens of civilians," <https://sudanwarmonitor.com/p/wave-of-saf-airstrikes-in-north-darfur>, archived at <https://perma.cc/4C8B-F2DS>; International Committee of the Red Cross (ICRC), "Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I)," United Nations Treaty Series 1125, no. 17512 (8 June 1977), Article 57, <https://www.refworld.org/docid/3ae6b36b4.html>, archived at <https://perma.cc/9BY8-Y537>; International Committee of the Red Cross (ICRC), "Rule 10. Civilian Objects' Loss of Protection from Attack," <https://ihl-databases.icrc.org/en/customaryihl/v1/rule10>, archived at <https://perma.cc/4KBF-7ECE>; International Committee of the Red Cross (ICRC), "What objects are specially protected under IHL?" August 14, 2017, <https://blogs.icrc.org/ilot/2017/08/14/objects-specially-protected-ihl/>, archived at <https://perma.cc/KH5T-ZG99>

<sup>5</sup> Radio Dabanga, "El Koma in North Darfur buries 65 victims of Sudan air force attacks," October 6, 2024, <https://www.dabangasudan.org/en/all-news/article/el-koma-in-north-darfur-buries-65-victims-of-sudan-air-force-attacks>, archived at <https://perma.cc/73V5-CMTW>; UNICEF, "Amid relentless attacks on children in Sudan, at least 13 children reportedly killed and another 4 injured in Al Kuma, North Darfur," October 7, 2024, <https://www.unicef.org/sudan/press-releases/amid-relentless-attacks-children-sudan-least-13-children-reportedly-killed-and>, archived at <https://archive.ph/tB87u>; International Organization for Migration, "DTM Sudan Flash Alert: Conflict in Al Koma (Al Koma Town), North Darfur," October 6, 2024, <https://mailchi.mp/iom/dtm-sudan-flash-alert-conflict-in-al-koma-al-koma-town-north-darfur-update-001>, archived at <https://perma.cc/M7J5-DLQG>; Blue News, "مقتل وإصابة 350 مواطناً جراء قصف طيران الجيش لسوق مدينة الكومة بشمال دارفور، اليوم الجمعة." October 4, 2024, <https://bluefornews.net/?p=13284>, archived at <https://perma.cc/72NW-84ST>; Medameek News, "عشرات القتلى والجرحى جراء غارة جوية للجيش استهدفت سوق مدينة الكومة بشمال دارفور جميع الحقوق محفوظة لصحيفة مداميك، لقراءة المزيد قم بزيارة" October 5, 2024, <https://www.medameek.com/?p=157815>, archived at <https://perma.cc/U4T6-F878>; Sudan Tribune, "انتقادات لقصف الجيش سوقاً في شمال دارفور وقتل العشرات" October 5, 2024, <https://sudantribune.net/article291726/>, archived at <https://perma.cc/A6F5-TVM9>

<sup>6</sup> Darfur24 "100 People Killed and Injured in Army Airstrikes on Hasahisa" *Darfur24*. 8 October 2024, <https://www.darfur24.com/en/2024/10/08/100-people-killed-and>

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<sup>7</sup> Al-Rakoba, “مسلمون قبليون لحماية طريق تجاري يربط دارفور بشمال السودان” April 1, 2024, <https://www.alrakoba.net/31916804/%D9%85%D8%B3%D9%84%D8%AD%D9%88%D9%86-%D9%82%D8%A8%D9%84%D9%8A%D9%88%D9%86-%D9%84%D8%AD%D9%85%D8%A7%D9%8A%D8%A9-%D8%B7%D8%B1%D9%8A%D9%82-%D8%AA%D8%AC%D8%A7%D8%B1%D9%8A-%D9%8A%D8%B1%D8%A8%D8%B7-%D8%AF/>, archived at <https://perma.cc/SXK3-MPVZ>

<sup>8</sup> Darfur24, “وصلوا سيرا على الأقدام.. نزوح الآلاف من الفاشر إلى الكومة” August 15, 2024, <https://www.darfur24.com/2024/08/15/%D9%88%D8%B5%D9%84%D9%88%D8%A7-%D8%B3%D9%8A%D8%B1%D9%8B%D8%A7-%D8%B9%D9%84%D9%89-%D8%A7%D9%84%D8%A3%D9%82%D8%AF%D8%A7%D9%85-%D9%86%D8%B2%D9%88%D8%AD-%D8%A7%D9%84%D8%A2%D9%84%D8%A7%D9%81-%D9%85%D9%86/>, archived at <https://perma.cc/R2K5-EYRT>

<sup>9</sup> Mohamed Haj Nour, “مقتل خمسة على الأقل وإصابة عدد آخرين جراء قصف الطيران على مدينة كتم” Sudan War Monitor, September 30, 2024, <https://sudanwarmonitor.com/p/859>, archived at <https://perma.cc/R948-KVSP>; Radio Dabanga, “تجدد المعارك في الفاشر، وقصف جوي على كتم بشمال دارفور” September 30, 2024, <https://www.dabangasudan.org/ar/all-news/article/%D8%AA%D8%AC%D8%AF%D8%AF-%D8%A7%D9%84%D9%85%D8%B9%D8%A7%D8%B1%D9%83-%D9%81%D9%8A-%D8%A7%D9%84%D9%81%D8%A7%D8%B4%D8%B1-%D8%8C-%D9%88%D9%82%D8%B5%D9%81-%D8%AC%D9%88%D9%8A-%D8%B9%D9%84%D9%89-%D9%83%D8%AA>, archived at <https://perma.cc/W57C-QQVA>

<sup>10</sup> Global Protection Cluster, “Protection Hotspots in Sudan,” July 2024, [https://globalprotectioncluster.org/sites/default/files/2024-07/idps\\_hotspot\\_localities\\_dashboard\\_as\\_of\\_30\\_june\\_24.pdf](https://globalprotectioncluster.org/sites/default/files/2024-07/idps_hotspot_localities_dashboard_as_of_30_june_24.pdf), archived at <https://perma.cc/33ZL-72TE>

<sup>11</sup> Sudan Tribune, “موسى هلال يتبنى مؤتمر صلح بين الرزيقات والزغاوة بشمال دارفور” September 26, 2014, <https://sudantribune.net/article77108/>, archived at <https://perma.cc/U7ZN-VV67>; Maud Jullien et al., “The Kutum Massacre,” Lighthouse Reports, Sky News, and Le Monde, September 9, 2024, <https://www.lighthousereports.com/investigation/the-kutum-massacre/>, archived at <https://perma.cc/J2ZG-D5ZJ>



## Market, Kuma, North Darfur

### CONFLICT-RELATED DAMAGE OBSERVED BETWEEN 09 AUGUST-05 OCTOBER 2024



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Analysis of satellite imagery collected between 09 August and 05 October 2024 shows damage consistent with that from an aerial attack to structures of the market in Kuma.

Open sources reported that the market had been damaged by SAF airstrikes on Friday 04 October 2024. Kuma's market day is reportedly Friday.



05 October 2024 © 2024 SkyFi

Sources | Radio Dabanga, "El Koma in North Darfur buries 65 victims of Sudan air force attacks," October 6, 2024, <https://www.dabangasudan.org/en/all-news/article/el-koma-in-north-darfur-buries-65-victims-of-sudan-air-force-attacks>, archived at <https://perma.cc/73V5-CMTW>; Sudan Tribune, "انتقادات لقصف الجيـش سوفاً في شمال دارفور وقتل العشرات" October 5, 2024, <https://sudantribune.net/article291726/>, archived at <https://perma.cc/A6F5-TVM9>.



# Market, Kutum, North Darfur

## CONFLICT-RELATED DAMAGE OBSERVED BETWEEN 25 SEPTEMBER-06 OCTOBER 2024

Analysis of satellite imagery collected between 25 September and 06 October 2024 shows damage consistent with that from an aerial attack to structures adjacent to a mosque in the market area of Kutum.

Open sources reported that the market had been damaged by SAF airstrikes on 30 September 2024, which is reportedly a market day.



25 September 2024 © 2024 Maxar, USG-Plus



06 October 2024 © 2024 Maxar, USG-Plus

Sources | Mohamed Haj Nour, " Sudan War Monitor, September 30, 2024, <https://sudanwarmonitor.com/p/859>, archived at <https://perma.cc/R948-KVSP>; Radio Dabanga, "تجدد المعارك في الفاشر، وقصف جوي على كتم بشمال دارفور" September 30, 2024, <https://www.dabangasudan.org/ar/all-news/article/%D8%AA%D8%AC%D8%AF%D8%AF-%D8%A7%D9%84%D9%85%D8%B9%D8%A7%D8%B1%D9%83-%D9%81%D9%8A-%D8%A7%D9%84%D9%81%D8%A7%D8%B4%D8%B1-%D8%8C-%D9%88%D9%82%D8%B5%D9%81-%D8%AC%D9%88%D9%8A-%D8%B9%D9%84%D9%89-%D9%83%D8%AA>, archived at <https://perma.cc/W57C-QQVA>



## Market, Kutum

### CONFLICT-RELATED DAMAGE OBSERVED BETWEEN 20 AUGUST-25 SEPTEMBER 2024



20 August 2024 © 2024 Maxar, USG-Plus

Analysis of satellite imagery collected between 20 August and 25 September, shows damage consistent with that from an aerial attack to structures and a tree on the west side of the market in Kutum.

The structures are visibly obscured by the tree in 20 August imagery. However, imagery from 25 September shows the tree collapsed and its body burned, with the charred remains of building foundations beneath.



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