Floods in Bangladesh, May 2024

The impact of the floods on agriculture and livelihoods

DIEM-Impact assessment, FAO
May 30, 2024

Since the onset of the monsoon season, Bangladesh has been affected by tropical cyclone REMAL-24 and heavy flooding. Tropical cyclone REMAL-24 made landfall on 26 May 2024 with wind speeds up to 102 km/h and particularly affected the coastal part of Bangladesh. This was followed by heavy rain, triggering flooding and flash floods across Bangladesh between 26 and 29

May 2024. The Data in Emergencies (DIEM) team at the Food and Agriculture Organization of the United Nations (FAO) examined satellite images in the days following these floods to understand the impact. This StoryMap provides an assessment of the potential impact of the flooding on agricultural production and livelihoods in Bangladesh.

Key highlights

- Due to tropical cyclone REMAL-24 and following heavy rains, large parts of Bangladesh, from southwest coastal districts to inner areas, were impacted between 26 and 29 May 2024.
- According to satellite based findings, over 768 000 ha were flooded, over 400 000 ha of cropland were possibly affected by flooding and nearly 50 000 ha were heavily destroyed on 27 May 2024.
- The most affected divisions were Barisa, Chittagong, Khulna and Sylhet. The most affected districts in those divisions (between 10–15 percent of the flood extent) were Bagerhat, Barisaland, Bhola, Brahamanbaria, Habiganj, Jhalokati, Khulna, Maulvibazar, Patuakhali, Satkhira, Sunamganj and Sylhet.
- The most affected cropland areas were found in Khulna and Sylhet divisions. The most affected districts in those divisions (between 17–27 percent of the flood extent) were Bagerhat, Habiganj, Jhalokati, Maulvibazar and Sylhet.
- According to the findings, the most affected *upazilas* (between 30–42 percent) were, in order: Lakhai, Kutubdia, Bagerhat Sadar, Bijoynagar, Morrelganj, Kanthalia, Nabiganj, Tungi Para and Rampal. The most affected cropland areas (between 36–50 percent) were, in order: Gendaria, Kutubdia, Bagerhat Sadar, Bijoynagar, Lakhai, Tungi Para, Nabiganj, Bakalia, Morrelganj, Kanthalia and Fenchuganj *upazilas*. Nearly 50 percent of the cropland was found to be flooded in Gendaria *upazila* in Dhaka district and Kutubdia *upazila* in Cox's Bazar district.
- The most affected crop in terms of cultivated area was *kharif* vegetables, followed by fruits (mangoes, for example) and

oilseeds (sesame, for example). However, it should be noted that most of these crops only sustained minor impacts.

- Over 110 000 ha of tree cover and over 55 000 ha of mangroves were affected by the floods. The overall flooded area in the Sunderbans reserve was over 45 000 ha and within the reserve, the Khulna and Satkhira ranges were most affected by flooding.

Description of hazard

Tropical cyclone REMAL-24 made landfall at the border between Bangladesh and India on 26 May 2024. It caused high tides up to 12 feet and reached a maximum wind speed of 102 km/hour – category 1.5 as defined by the Global Disaster Alert and Coordination System (GDACS). The tropical cyclone affected coastal districts in the southwest of the country, such as Bagerhat, Barishal, Bhola, Khulna, Lakshmipur, Noakhali, Patuakhali, Pirojpur and Satkhira. This was followed by heavy rain which triggered flooding across the coast and northeast of Bangladesh. Due to these floods, large parts of Bangladesh – from the south to the north – have been impacted. Sunderbans national reserve was particularly affected. Major rivers overflowed due to tidal surges, damaging embankments.
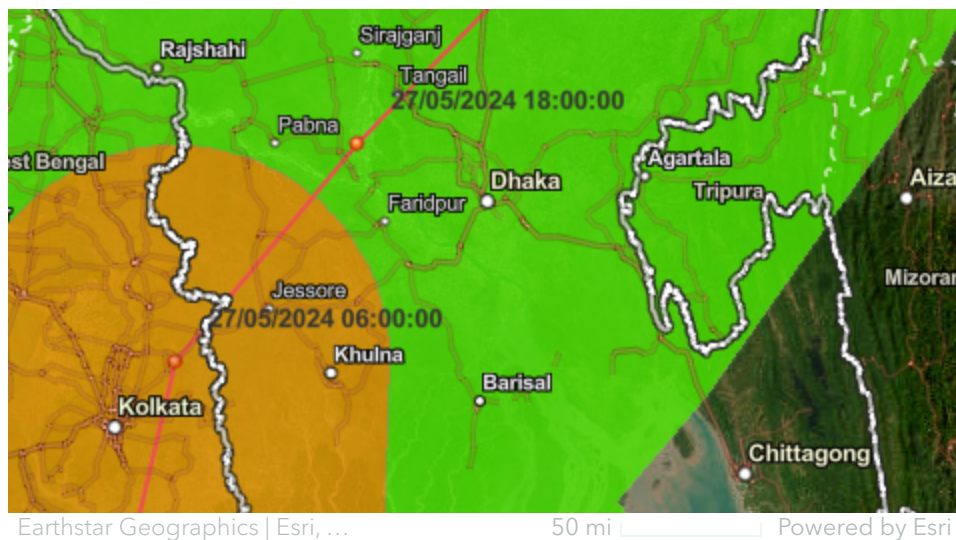

Wind buffer of tropical cyclone REMAL-24. Source: GDACS, 2024

The tropical cyclone and the subsequent rainfall came at the beginning of the monsoon season following an atypical climatic pattern, which was characterized by a late onset of rain. The cumulative precipitation (5.81 mm during April 2024) was less than the long-term average (35.5 mm – as measured from 1989 to 2015, according to the Global Information and Early Warning System on Food and Agriculture (GIEWS). There had also been hot temperatures of up to 5° C above average.

Magnitude and extent of the hazard

According to satellite-based findings, over 768 000 ha were flooded on 27 May 2024 when tropical cyclone REMAL-24 made landfall. The tropical cyclone heavily affected coastal districts of Bangladesh in the southwest such as Bagerhat, Barishall, Bhola, Khulna, Lakshmipur, Noakhali, Patuakhali,

Pirojpur and Satkhira. Until 29 May 2024, heavy rains continued and flash floods affected Sylhet and parts of Dhaka and Mymensingh.
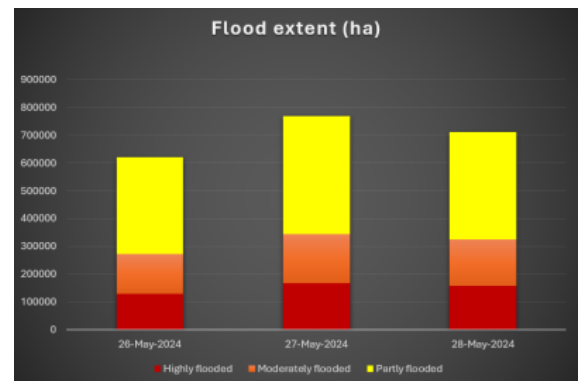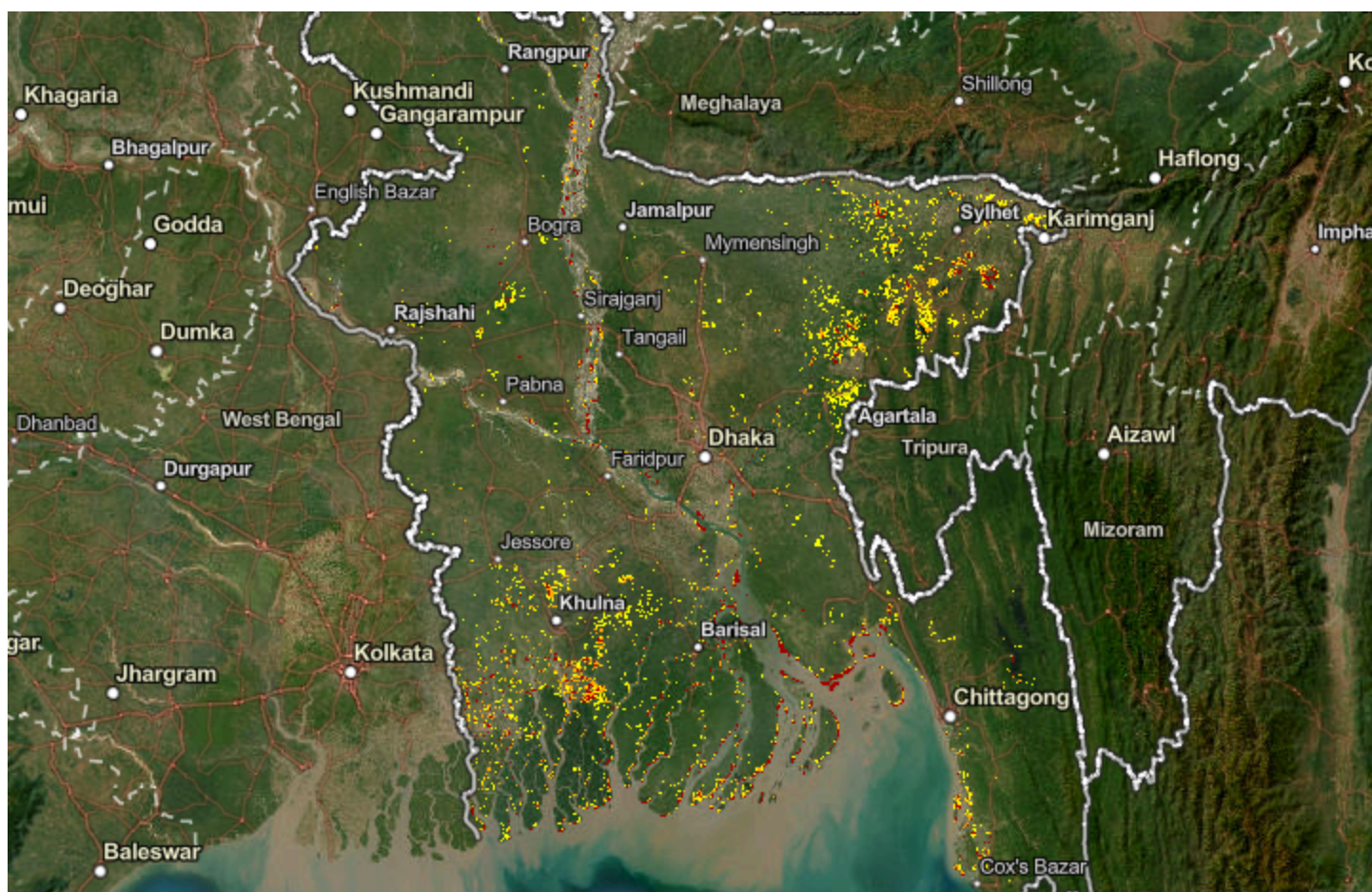
	Flood extent (ha)			
	26-May-24	27-May-24	28-May-24	29-May-24
Partly flooded	345 991	423 633	386 976	358 715
Moderately flooded	144 459	176 329	166 533	155 476
Highly flooded	129 220	168 204	157 620	145 055
Total (ha)	619 670	768 166	711 129	659 246

The most affected divisions were, in order: Khulna, Sylhet, Barisal and Chittagong.

The maps below show the flood locations on each day between 26 and 29 May 2024. The colours (yellow, orange or red) reflect the magnitude of the floods. The flooding occurred on the coast

when the tropical cyclone made landfall and also impacted the haor over the entire northeast area in the following days.
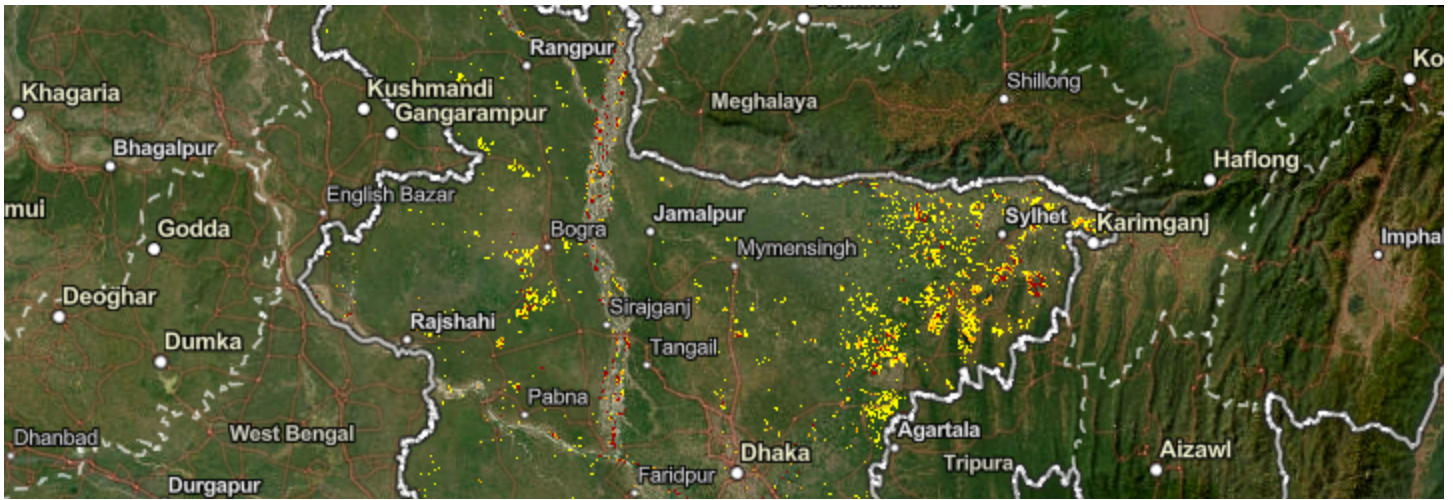
- Scroll down and click on the titles to see the flood extent on the different dates (26, 27, 28 and 29 May).

- Click anywhere on the map to interact with the data. To navigate, zoom in and out using the icons at the bottom right.

Flood extent on 26 May 2024
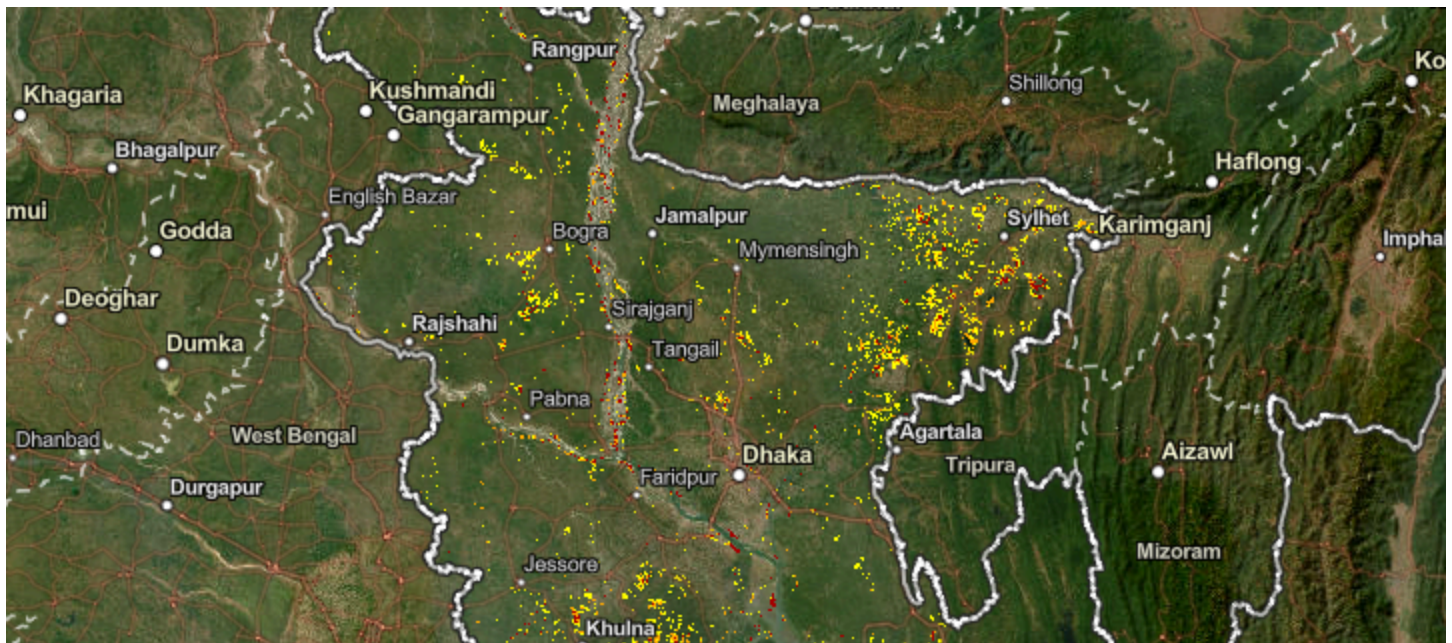
Flood extent on 27 May 2024
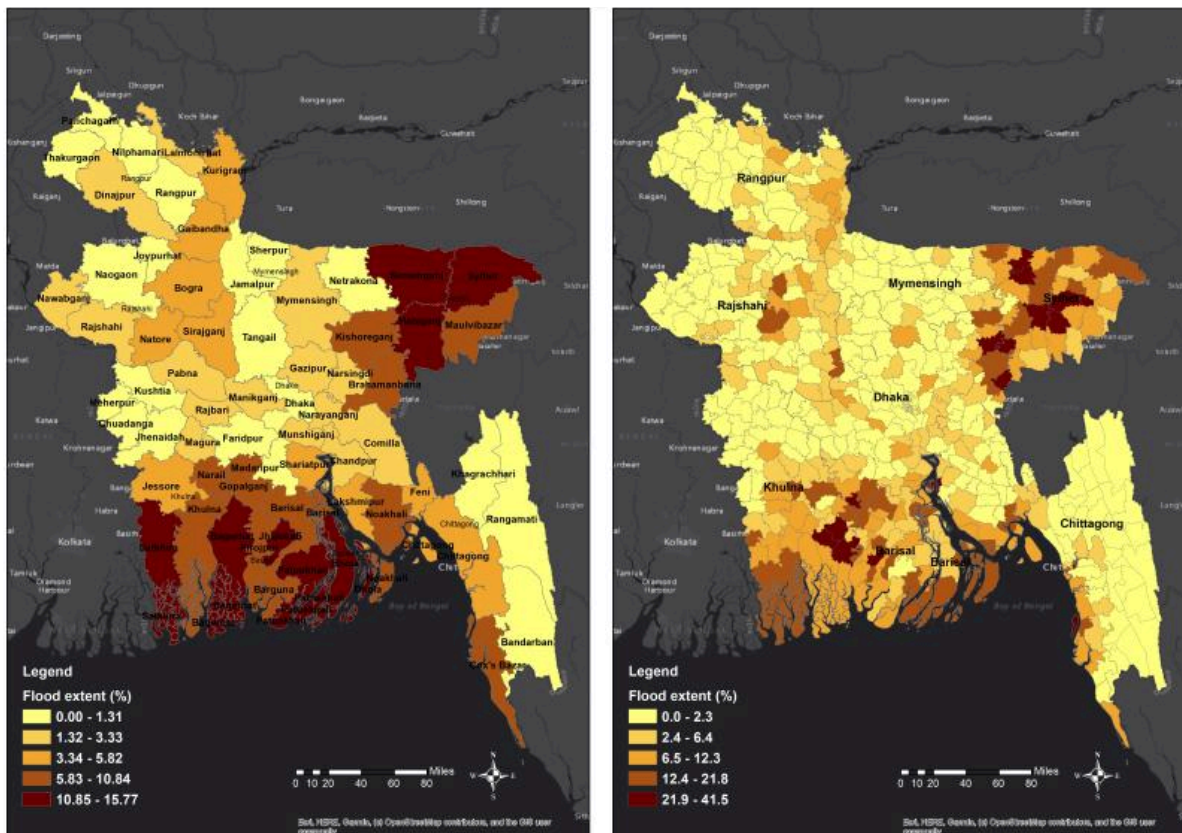

Flood extent on 28 May 2024

Earthstar Geographics | Esri, TomTom, Garmin, FAO, NOAA, USGS   100 mi   Powered by Esri

Flood extent on 29 May 2024

In the maps below, the most impacted districts (left) and *upazilas* (subdistrict) (right) have been mapped based on flood extent (%) on 27 May 2024. According to the findings, the most affected divisions were, in order: Khulna, Sylhet, Barisal and Chittagong. The most affected districts in those divisions (between 10–15 percent of the flood extent) were, in order: Bagerhat, Habiganj, Sylhet, Jhalokati, Satkhira, Bhola, Sunamganj, Patuakhali, Brahamanbaria, Maulvibazar, Barisaland and Khulna.

The most affected *upazllas* (between 30–42 percent) were, in order: Lakhai, Kutubdia, Bagerhat Sadar, Bijoynagar, Morrelganj, Kanthalia, Nabiganj, Tungi Para and Rampal.

Left: Flood extent (%) by district on 27 May 2024. Right: Flood extent (%) by *upazila* on 27 May 2024. Source: WFP, 2024.

Agriculture exposure

Based on the findings, over 400 000 ha of cropland were possibly affected by flooding and nearly 50 000 ha were heavily destroyed on 27 May 2024.

The maps below show flooded cropland (red) and other flooded land (purple) on the left, and the overall cropland area (yellow) on the right with the satellite imagery background. The centre line can be moved to visualize the flooded cropland and the overall cropland area.

	Flooded cropland (ha)
Partly flooded	265 945
Moderately flooded	87 708
Highly flooded	49 821
Total (ha)	403 474

Click anywhere on the map to interact with the data. Navigate by using the zoom in and out functions (+/- at the bottom right-hand

corner). Click on the menu icon at the bottom left to open the legend
and see the meanings behind the different colours. Move the line in
the middle to see the corresponding layers in the two maps.
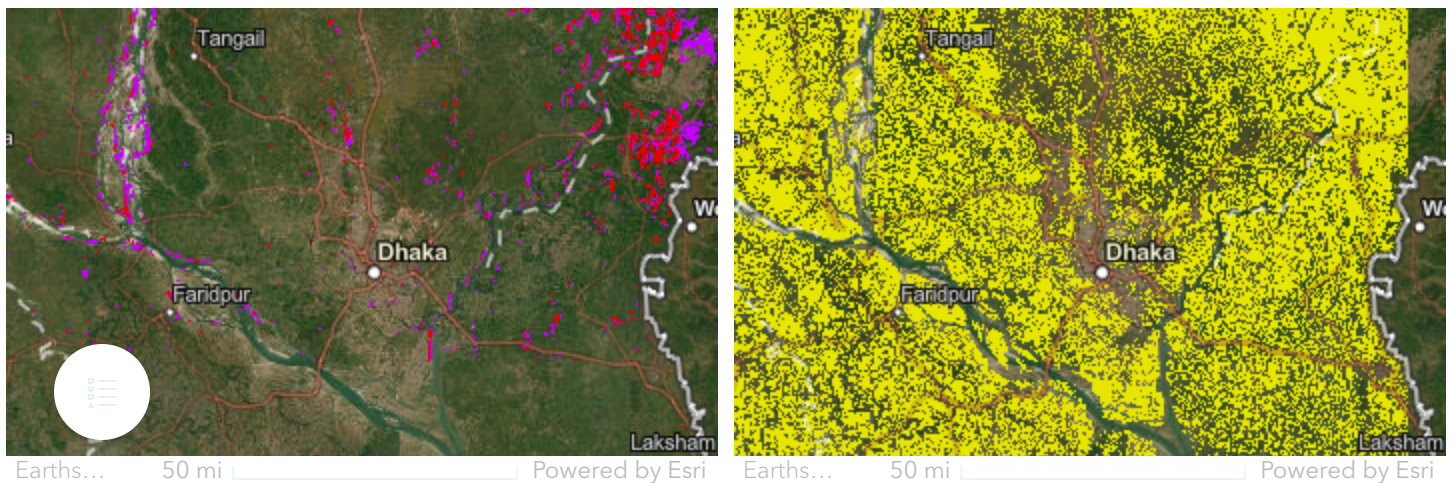
Left: Flooded cropland (red), other flooded land (purple). Right: Overall cropland coverage (yellow) with the satellite imagery background. Sources: WFP, 2024. ESA WorldCover, 2022.

In the maps below, the most impacted districts (left) and *upazilas* (subdistrict) (right) have been mapped based on flooded cropland (%) on 27 May 2024. According to the findings, the most affected cropland areas were found in Sylhet and Khulna divisions, and the most affected districts (between 17–27 percent of the flood extent) in those divisions were, in order: Bagerhat, Habiganj, Maulvibazar, Sylhet and Jhalokati.

The most affected cropland areas (between 36–50 percent) were, in order: Gendaria, Kutubdia, Bagerhat Sadar, Bijoynagar, Lakhai, Tungi Para, Nabiganj, Bakalia, Morrelganj, Kanthalia and Fenchuganj *upazilas*. Nearly 50 percent of the cropland was found to be flooded in Gendaria *upazila* in Dhaka district and Kutubdia *upazila* in Cox's Bazar district.
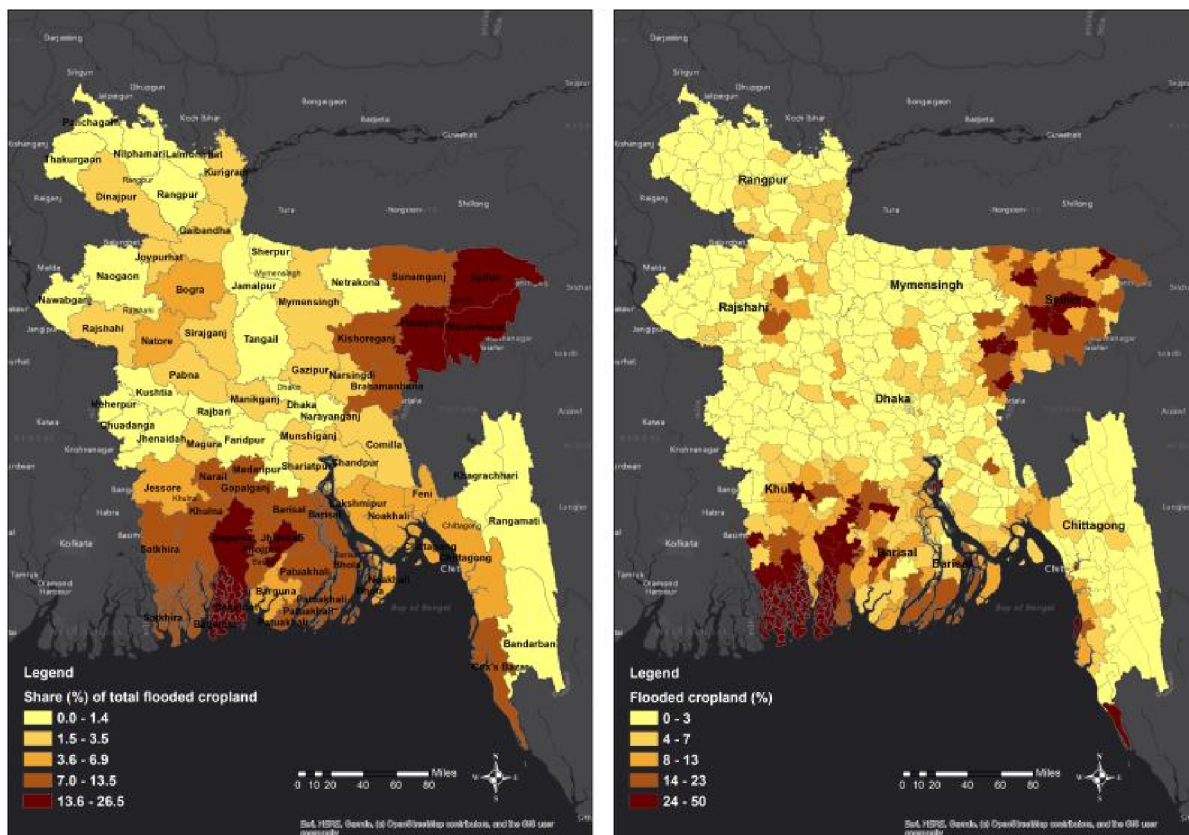
Left: Flooded cropland (%) by district on 27 May 2024. Right: Flooded cropland (%) by *upazila* on 27 May 2024. Source: WFP, 2024.

Bangladesh has a diverse agricultural calendar. Agricultural activities, including those for staple crops vary from region to region due to soil properties and agro-ecological conditions.

The timing of the tropical cyclone coincided with the *boro* harvest (late-planted), *aus* planted/seedbed, *rabi* maize harvest (late-planted), *kharif* maize growing and *kharif* mung bean growing season. Although the combined area for rice cultivation was the highest among all of the crops, it was primarily constituted of *aus* rice and *aus* rice beds, as most of the *boro* rice had been harvested. The most affected crops in terms of cultivated area were *kharif* vegetables followed by fruit (mangoes, for example) and oilseeds (sesame, for example). However, it should be noted that most of these crops only sustained minor impacts.

The map on the right highlights two areas (outlined in red) in the Sylhet division which were highly impacted by the flash floods from 26 to 29 May 2024.

The images below were prepared with Sentinel-2 satellite images false colour composites on 15 May 2024 – before the tropical cyclone – and on 1 June 2024 – after the tropical cyclone. The images depict the extent of the flooding and impacts on the region's several small lakes around the Fenchuganj *upazila*, in Sylhet division. Twenty-five percent of the *upazila* was flooded and 36 percent of the cropland area was flooded. This area is highlighted with a red rectangle towards the bottom of the right-side map .
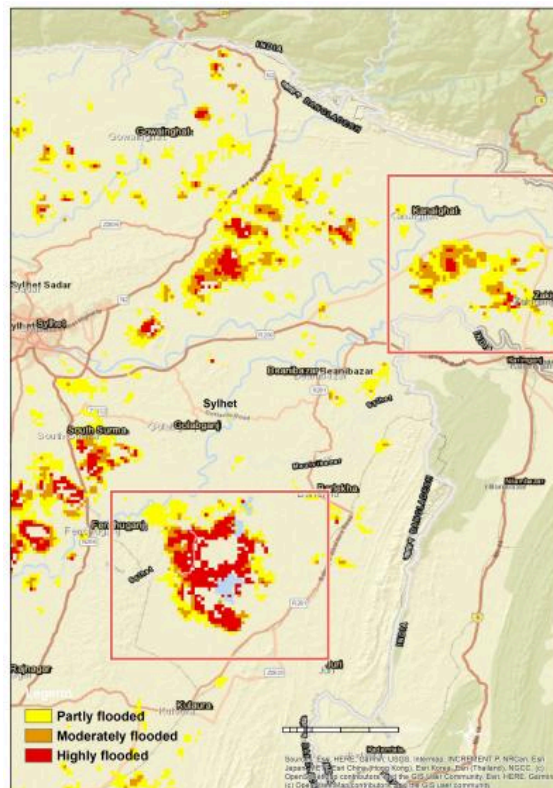
Drag the line in the centre to see the different images obtained before and after the floods for the same area.
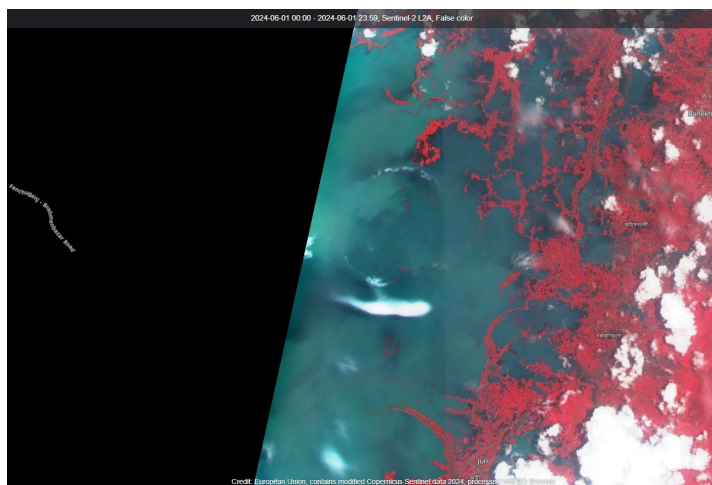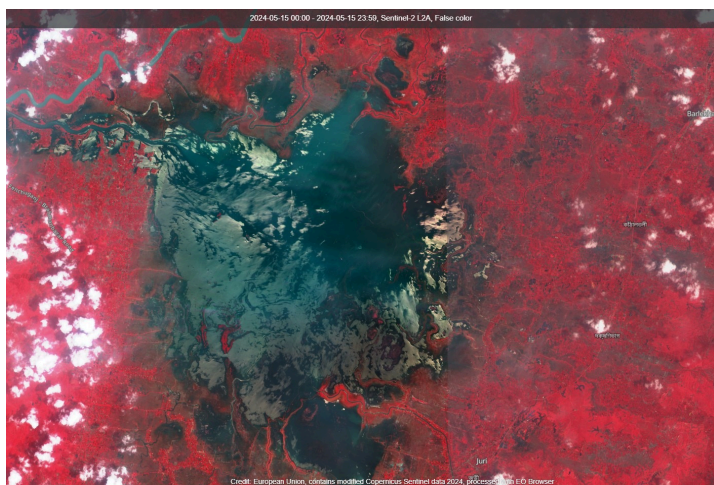
False colour composites of Sentinel-2 satellite images on 15 May 2024 , before the tropical cyclone (left side), and on 1 June 2024, after the tropical cyclone (right side) of the lakes around the Fenchuganj *upazila*. Source: Sentinel hub, 2024.

The images below were prepared with Sentinel-2 satellite images false colour composites on 25 May 2024 – before the tropical cyclone – and on 1 June 2024 – after the tropical cyclone. The images depict the extent of the flooding and impacts on the region's several rivers which come together around the Kanaighat *upazila* in Sylhet division. Seventeen percent of the *upazila* was

flooded and 19 percent of the cropland area was flooded. This area is highlighted with a red rectangle towards the top of the right-side map above.
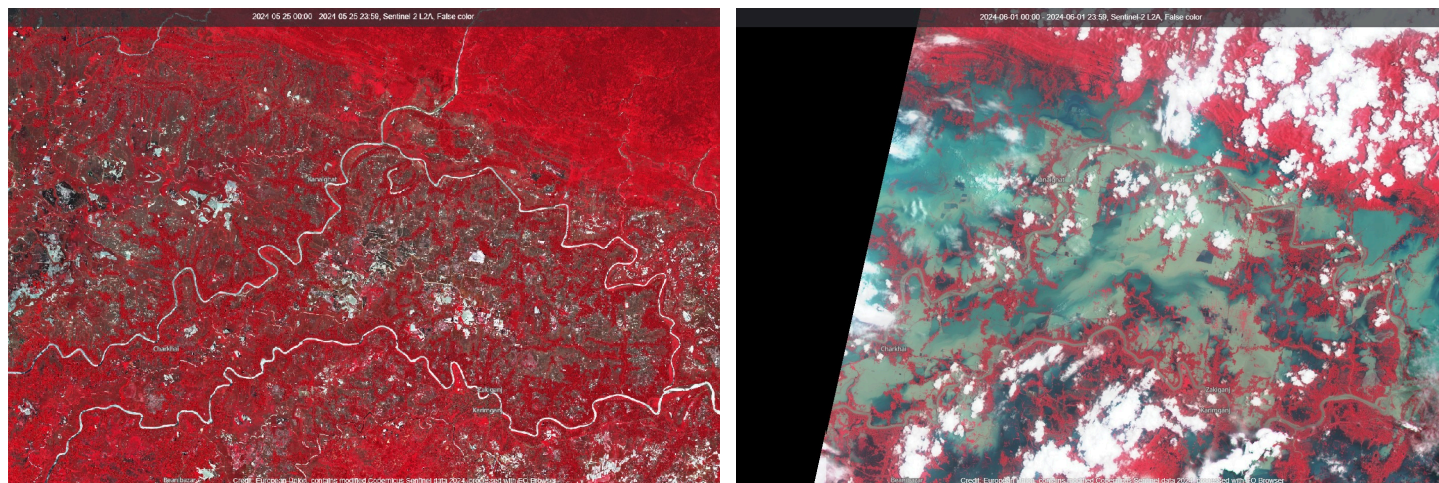
False colour composites of Sentinel-2 satellite images on 15 May 2024, before the tropical cyclone (left side), and on 1 June 2024, after the tropical cyclone (right side) of the rivers which come together around the Kanaighat *upazila*. Source: Sentinel hub, 2024.

Based on these findings related to agricultural exposure, standing crops have suffered minor damages. However, floods have likely impacted stored crops, used for food and income, with negative impacts on food consumption. In addition, because farmers typically store inputs in their households and given the current monsoon season, seeds, fertilizer and light machinery (such as pumps) are likely to have been washed away.

Other land exposure

Based on the findings, over 110 000 ha of tree cover and over 55 000 ha of mangroves were affected by the floods.

Land cover code	Land cover	Flooded area (ha)
10	Tree cover	117 299
20	Shrubland	55
30	Grassland	12 233
40	Cropland	403 474
50	Built-up	3 271
60	Bare / sparse vegetation	8 931
90	Herbaceous wetland	34 577
95	Mangroves	55 666

	Total area (ha)	Flooded area (ha)	Flooded area (%)
Khulna Range	170679	14 819	9
Chandpai Range	97520	3 925	4
Sarankhola Range	145659	7 291	5
Satkhira Range	186803	19 844	11
Total	600662	45 879	8

The impact of the floods on the Sunderbans reserve in particular was assessed, as shown in the table on the left side and the map below. The overall flooded area was over 45 000 ha. The Satkhira and Khulna ranges, in order, were the most affected from the floods.
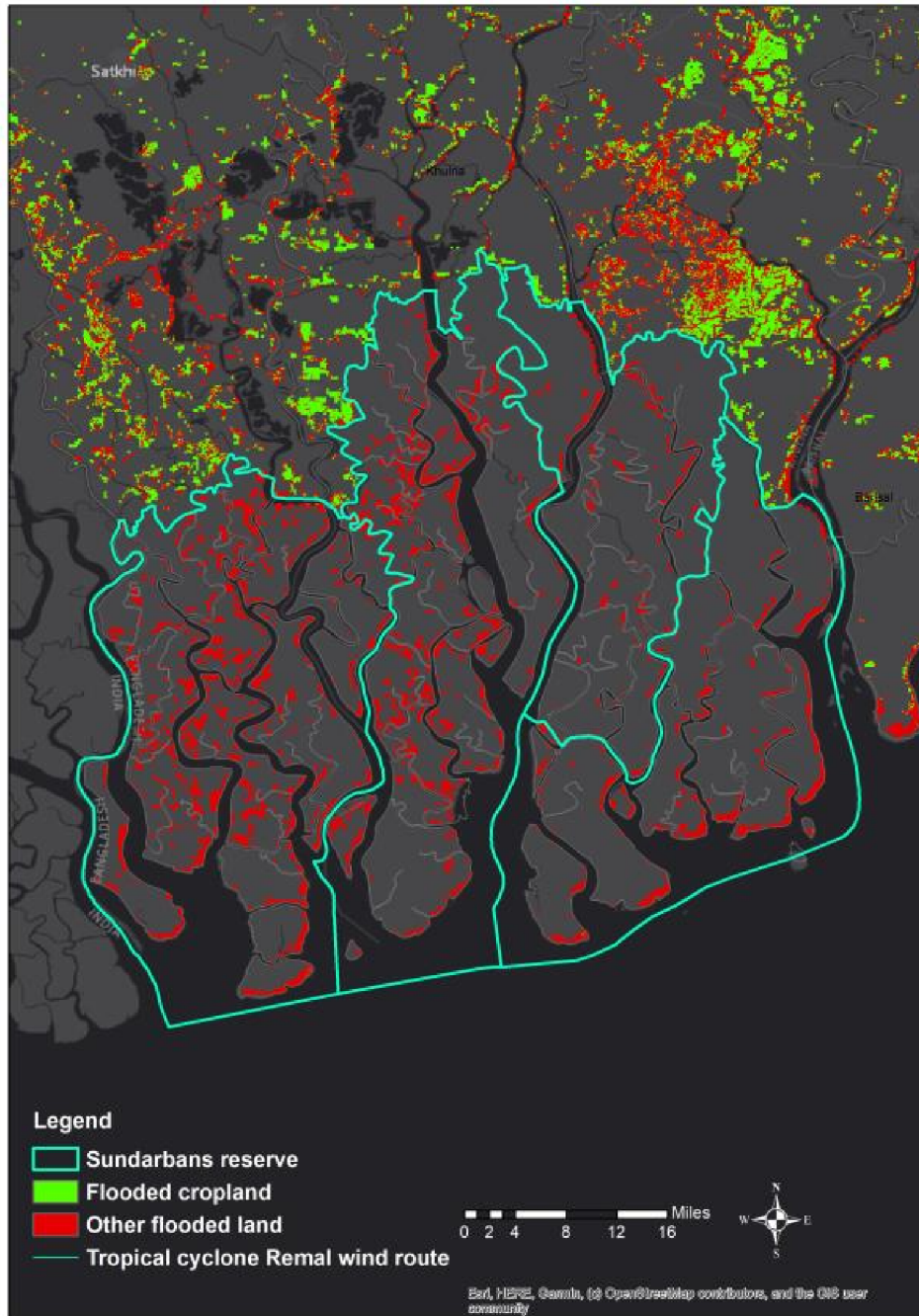
Flooded areas in Sunderbans reserve. Sources: WFP, 2024. ESA Worldcover, 2022.

Recommendations

- Immediate emergency agricultural support is needed before the continuation of the monsoon season, particularly in the Bagerhat Sadar, Bakalia, Bijoynagar, Fenchuganj, Gendaria, Kanthalia, Kutubdia, Lakhai, Morrelganj, Nabiganj and Tungi Para *upazilas*.
- Rehabilitate irrigation infrastructure and facilitate the restocking of farming assets lost due to the floods, such as seeds and other inputs.
- Monitor the situation in the affected areas. Monitoring should also be conducted in other areas to ensure preparedness for eventual hazards during the continuation of the monsoon season.

References

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