Locust Surveillance Using Geospatial Technology

No. 2020/11
Period: 01-15 Aug.

nrsc

Image courtesy: FAO

Contents

Locust Surveillance Using Geospatial Technology Bulletin is issued fortnightly by Regional Remote Sensing Centre (West), NRSC/ISRO – Jodhpur. The centre continuously monitors the weather and ecology to provide early warning based on survey and control results from Locust Warning Organisation (LWO), Jodhpur combined with remote sensing inputs.

Please send your feedback to
rrsc_w@nrsc.gov.in or ssrao@nrsc.gov.in

Locust Update

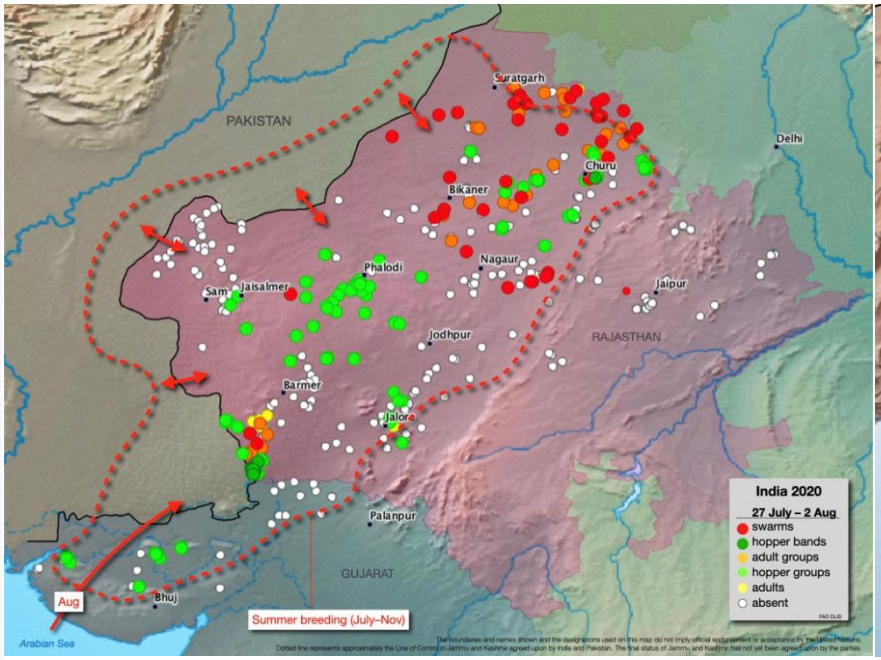
Situation and Forecast of Locust in India

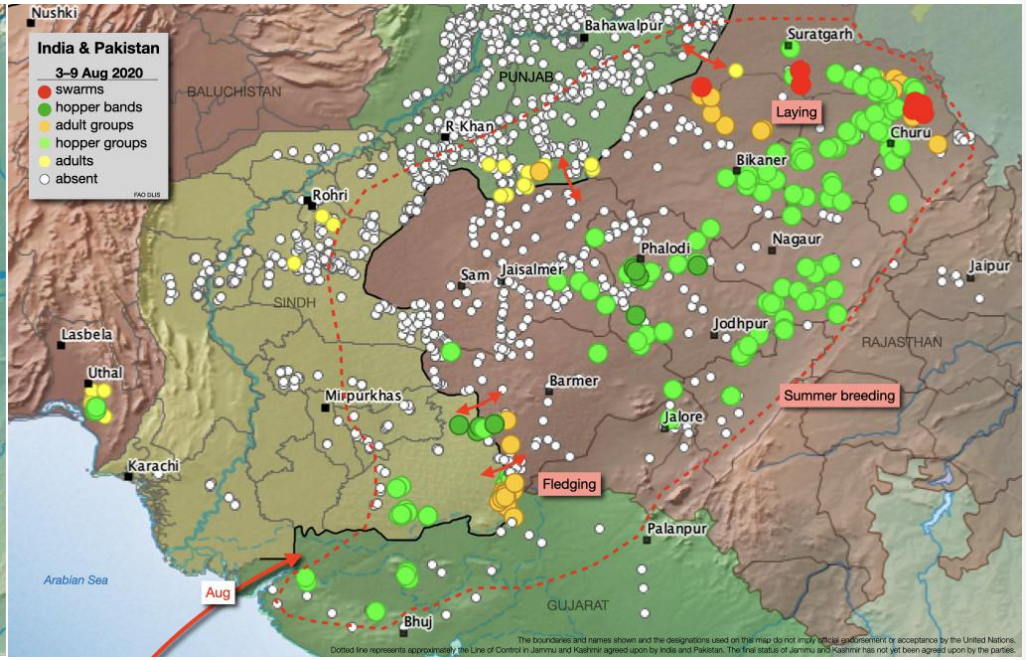
Situation

During July, immature group and swarms prevailed in the northern states of Madhya Pradesh and Uttar Pradesh but then return west with the onset of the monsoon to Rajasthan where they joined immature swarms that were already present. The swarms quickly matured and were seen copulating mainly between Jodhpur and Churu. Hopper groups and bands were already forming in some parts of Rajasthan from earlier breeding. In Gujarat, groups of immature and mature adults were present south of the Pakistan border in the Rann of Kutch.

Forecast

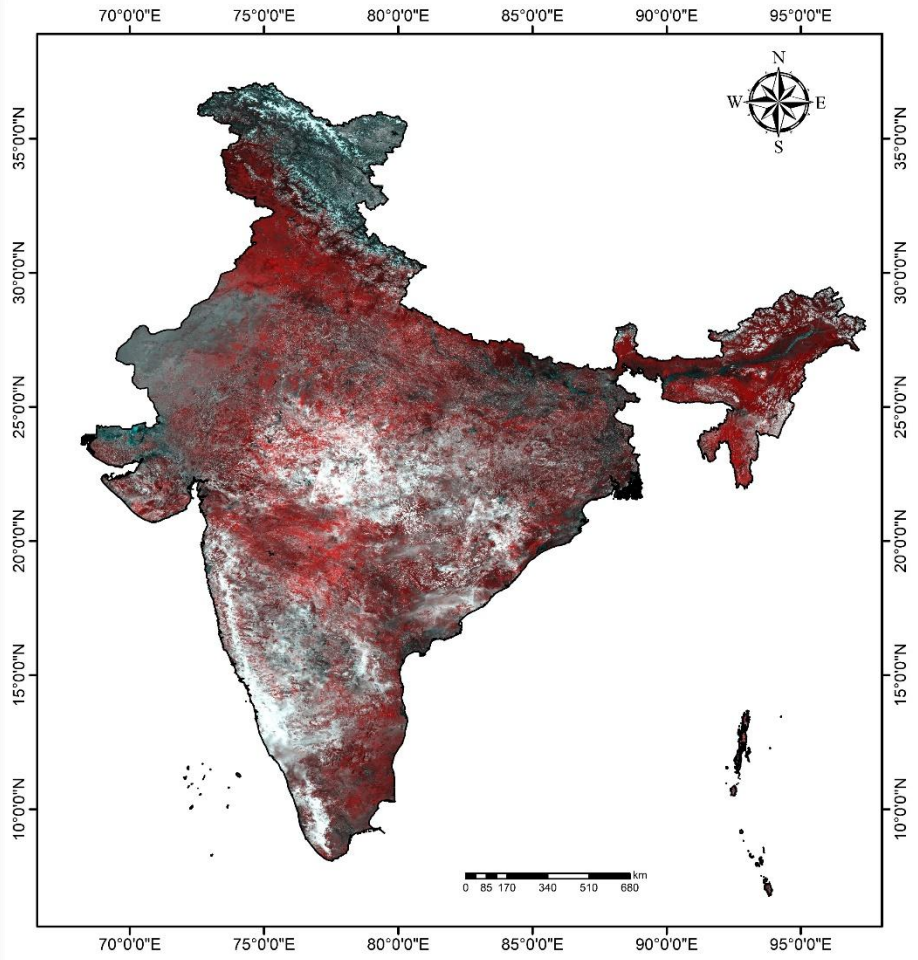
Locust number will increase in Rajasthan and northern Gujarat. Substantial first-generation hatching will continue into early August, causing numerous hopper bands to form until about mid-September while first-generation swarms are likely to start forming at the beginning of August. A second generation of eggs-laying is expected from early September onwards as above-normal rains are predicted during August. The risk of swarms arriving from the Horn of Africa will decline by mid-August.





Source: Desert Locust situation update 3rd August, 2020 by Food and Agriculture Organisation, UN.

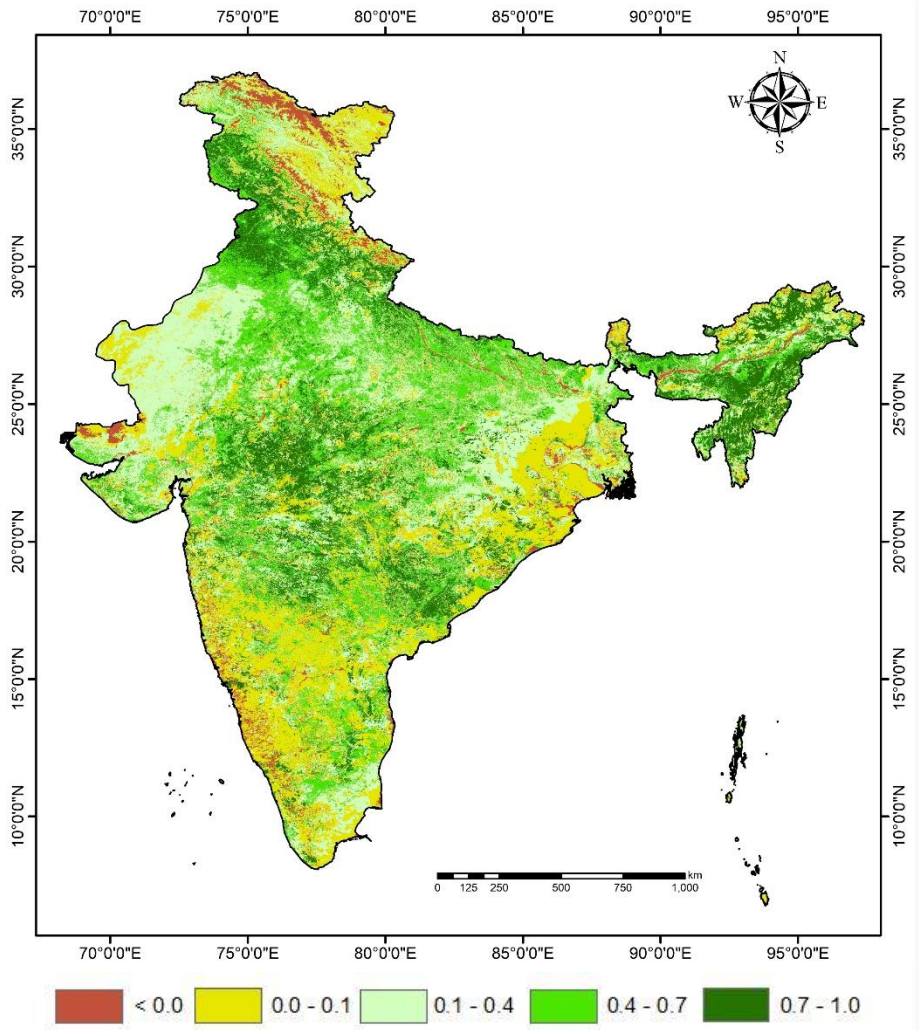
False Color Composite (FCC)



Source: MODIS 8 day Composite

4th - 12th Aug, 2020

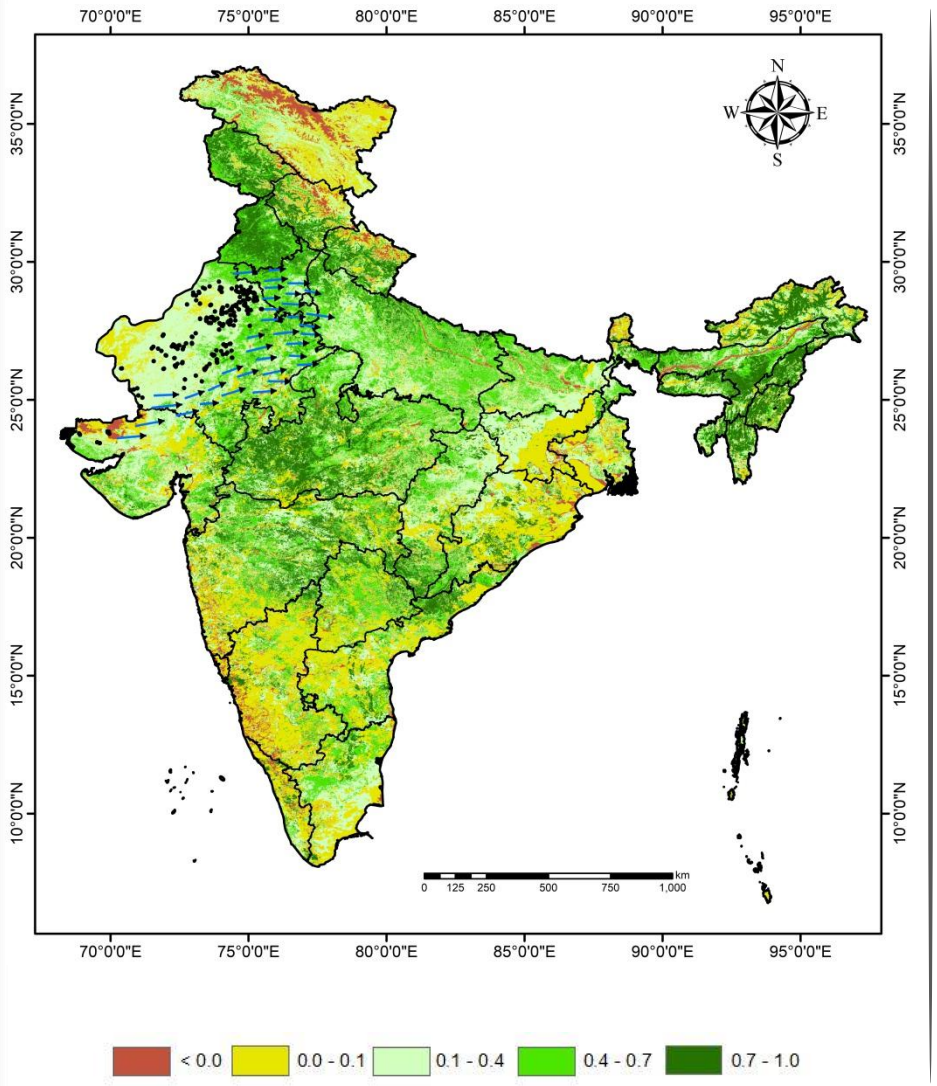
Normalized Difference Vegetation Index (NDVI)

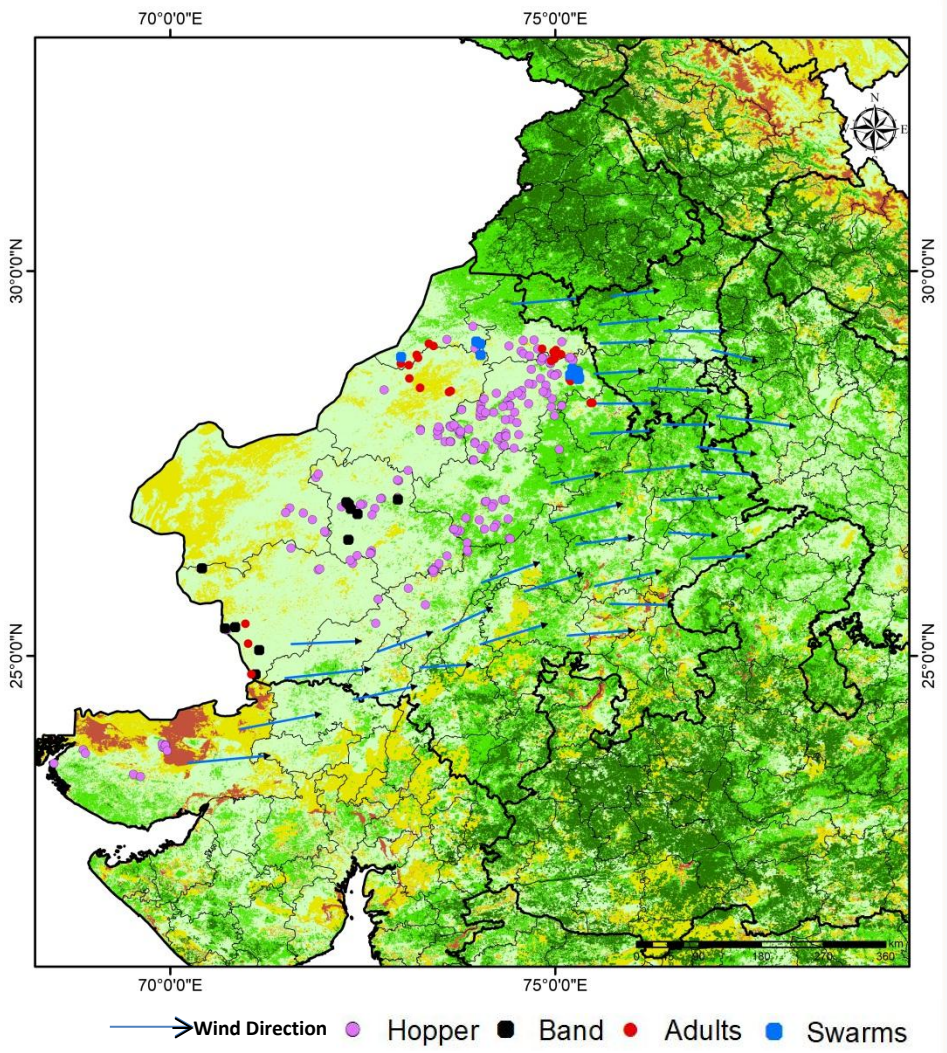


Source: eMODIS Ver. 6

26th July - 5th Aug, 2020

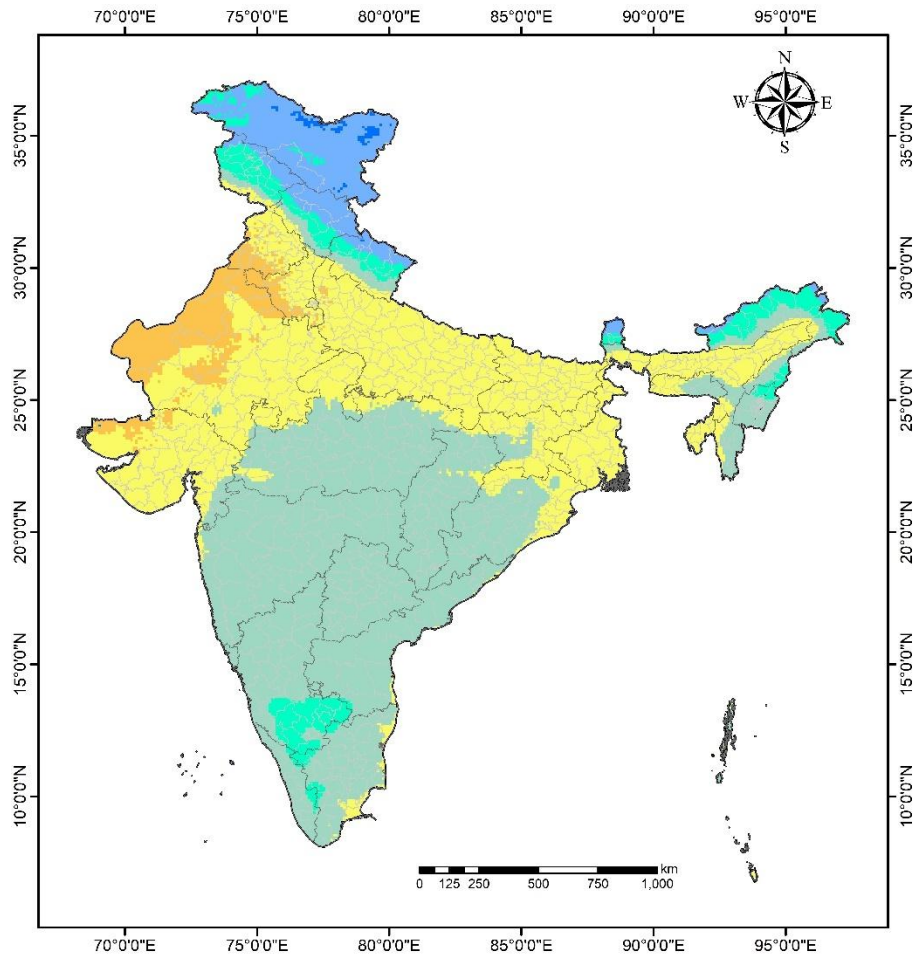
Location Map of Locust Hopper, Bands, Adults & Swarms with Wind Vectors and Vegetation Status



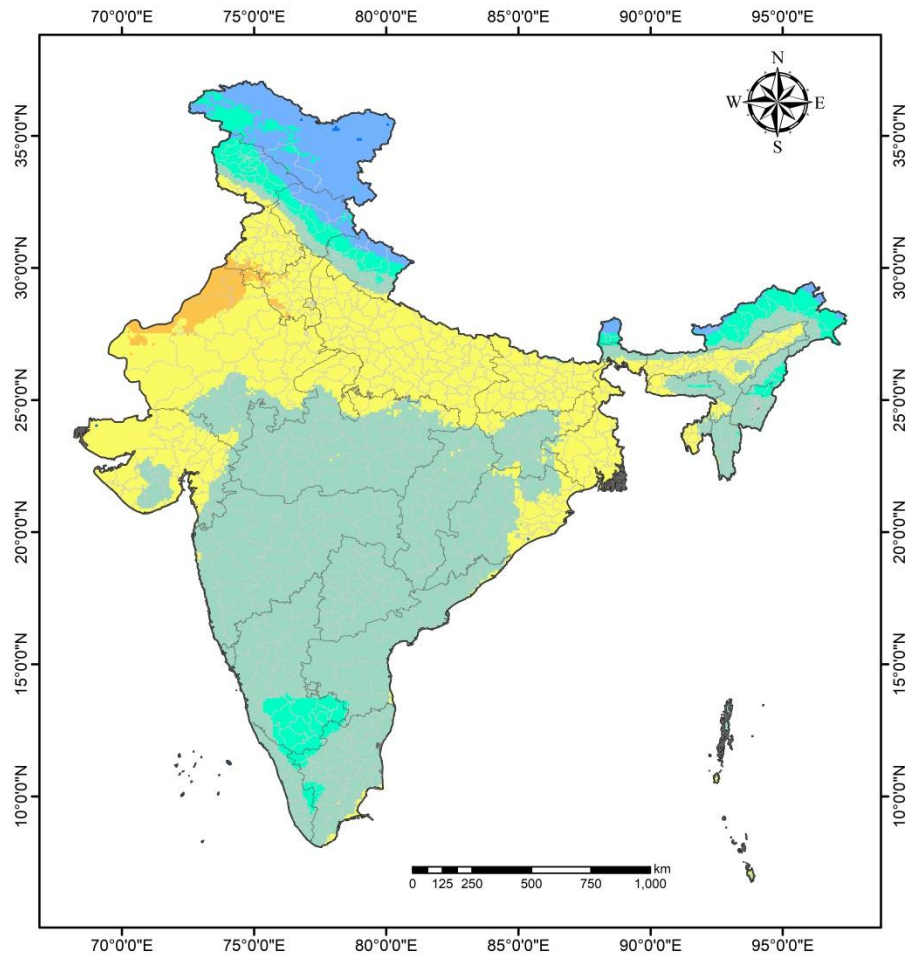


Source: Locust Infestation Point by LWO-Jodhpur, NDVI – EMODIS Ver. 6 and Wind Vectors - MOSDAC

Land Surface Temperature (⁰C)



19:30 Hrs. of 3rd Aug - 2020

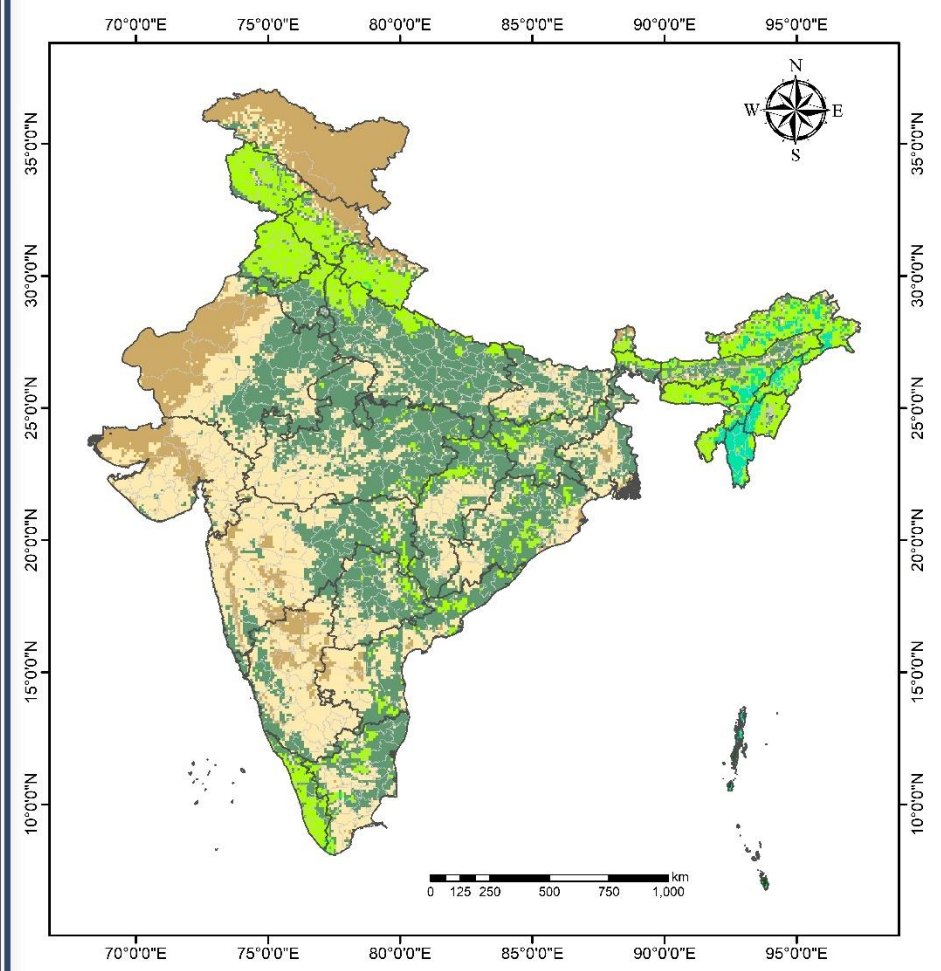


19:30 Hrs. of 9th Aug 2020.

< 0 | 0 - 10 | 10 - 20 | 20 - 25 | 25 - 30 | 30 - 35 | 35 - 40 | 40 - 45 | 45 - 50

Source: SMAP Enhanced L4 Global 3 Hourly 9 km Product

Leaf Area Index (LAI)



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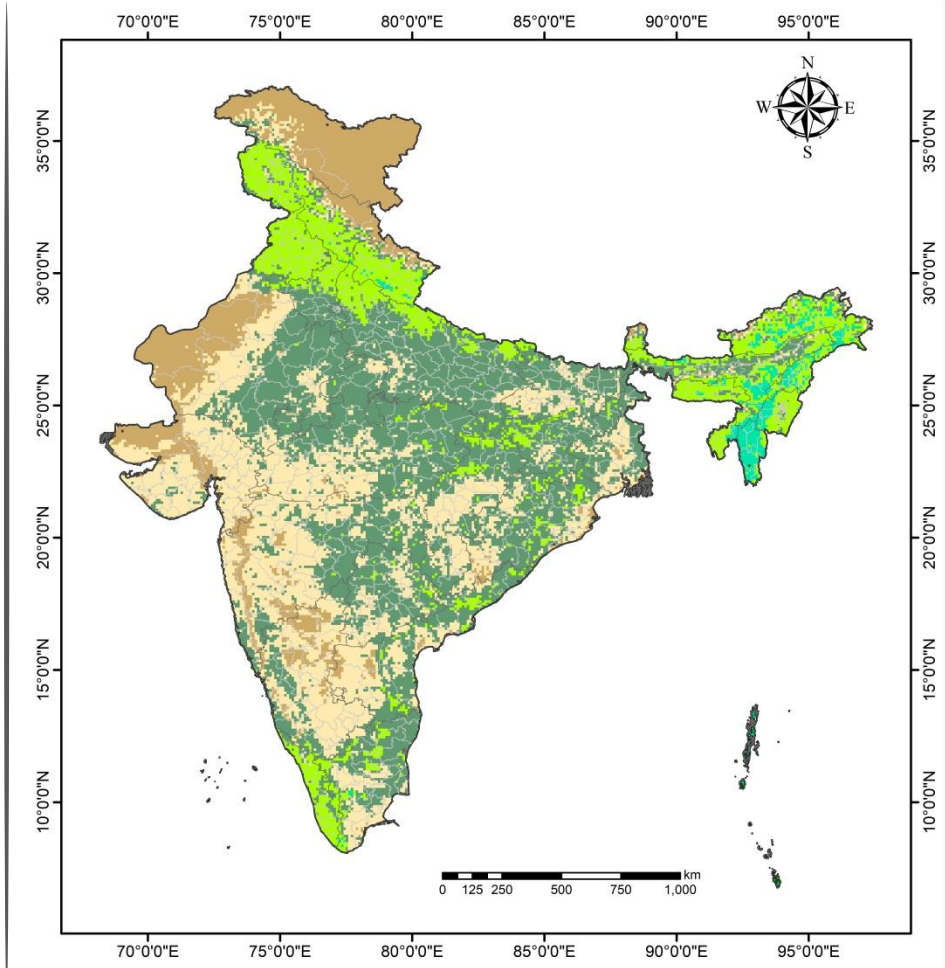
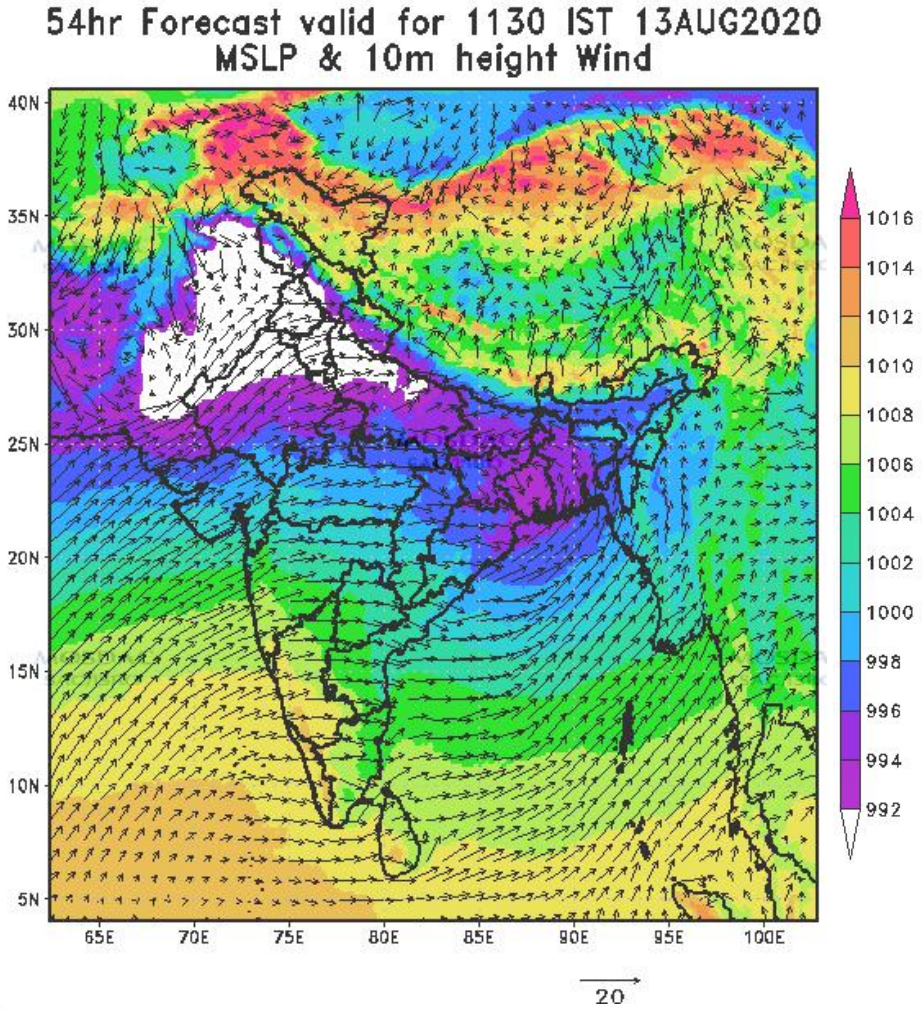


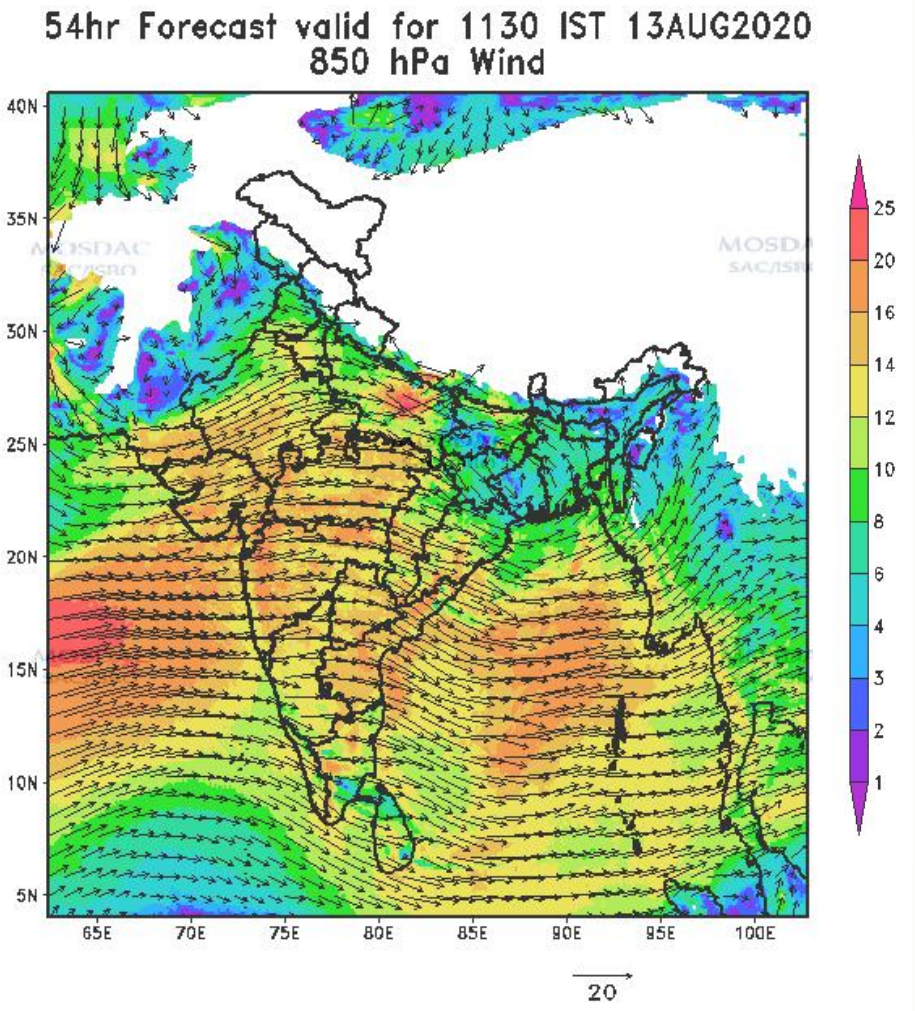
19:30 Hrs of 9th Aug 2020.

< 0 | 0 - 0.25 | 0.25 - 0.50 | 0.50 - 1.00 | 1.00 - 3.00 | 3.00 - 5.00 | 5.00 - 7.00

Source: SMAP Enhanced L4 Global 3 Hourly 9 km Product

Wind Vectors

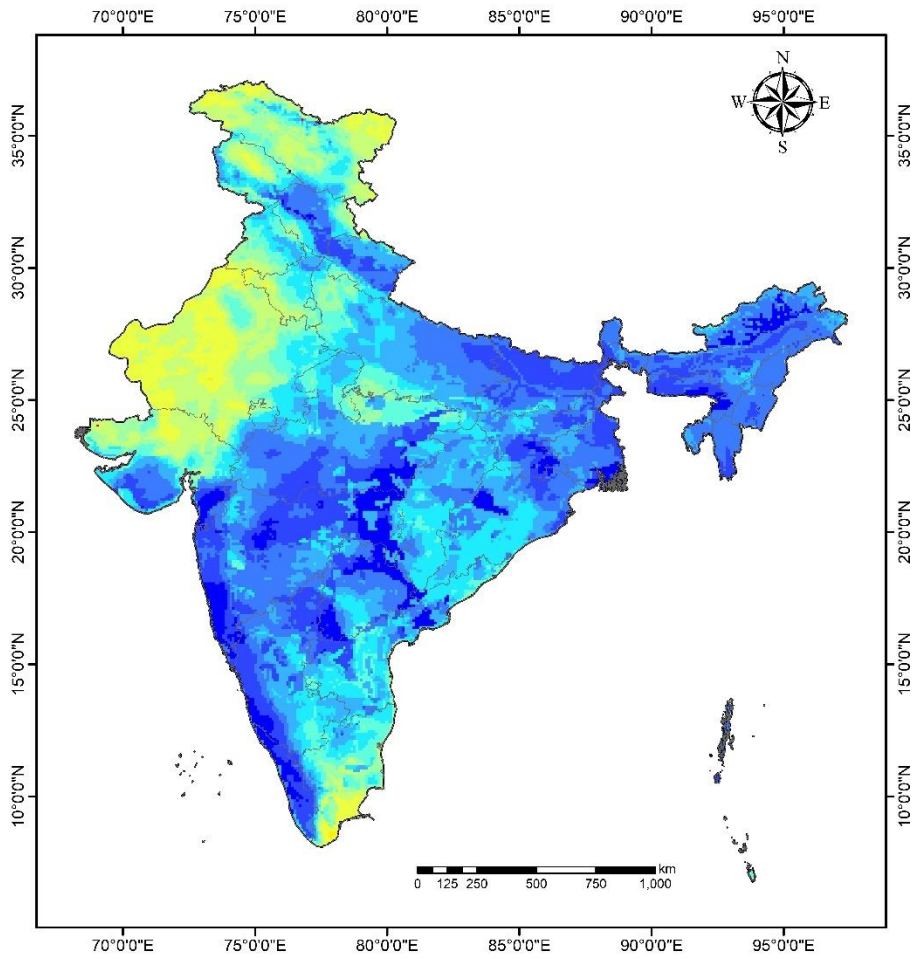




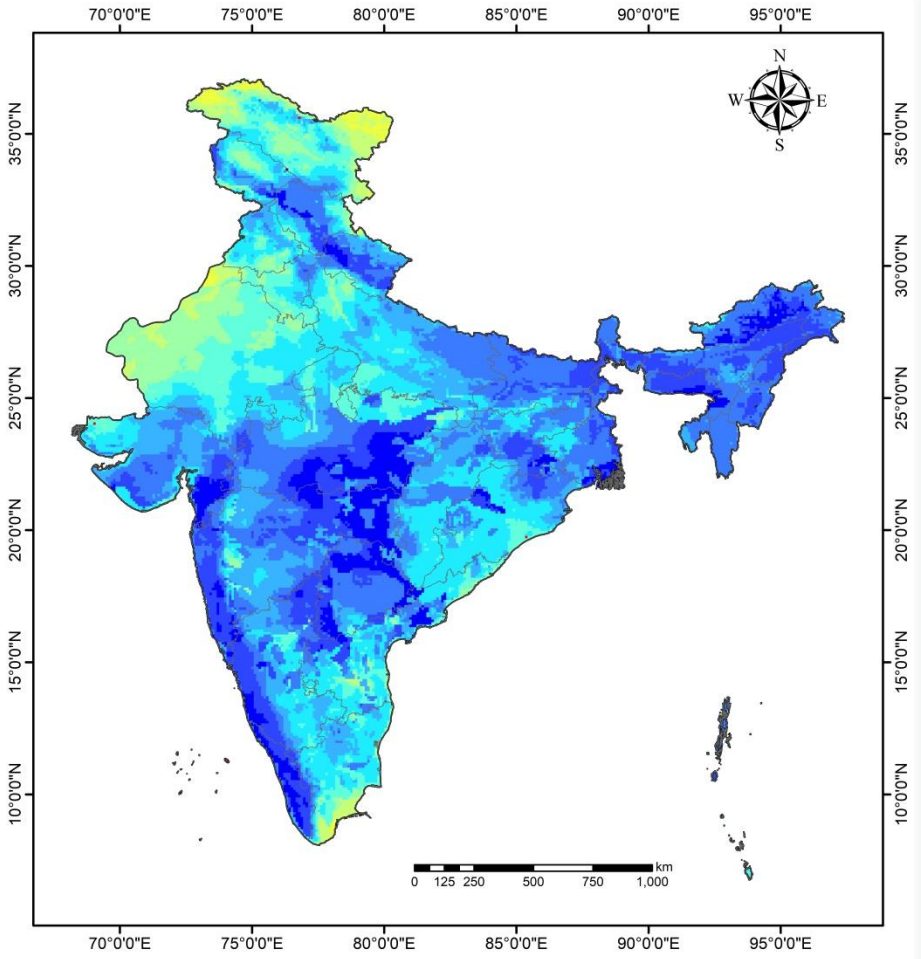
Source: MOSDAC web portal

Wind speed @ 1.46 km from msl.

Surface Soil Moisture Map (%)



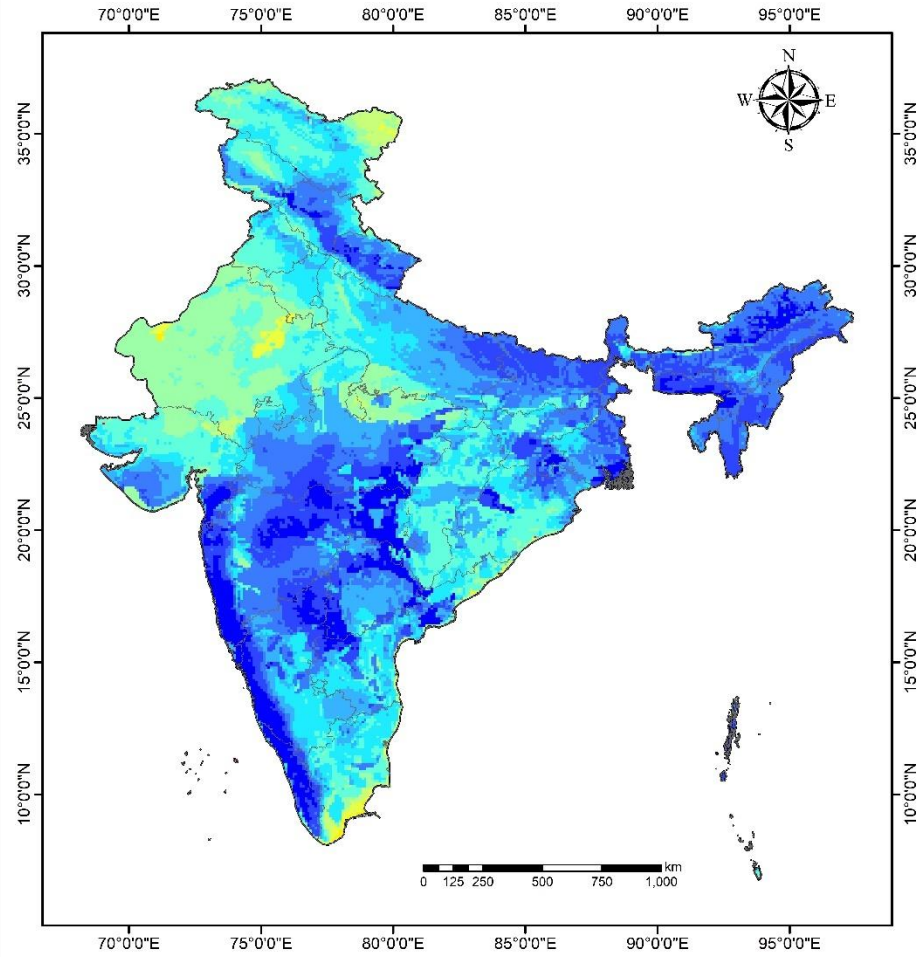
19:30 Hrs. of 3rd Aug 2020.



19:30 Hrs. of 9th Aug 2020.

Source: SMAP Enhanced L4 Global 3 Hourly 9 km Product

Root-Zone Soil Moisture Map (%)



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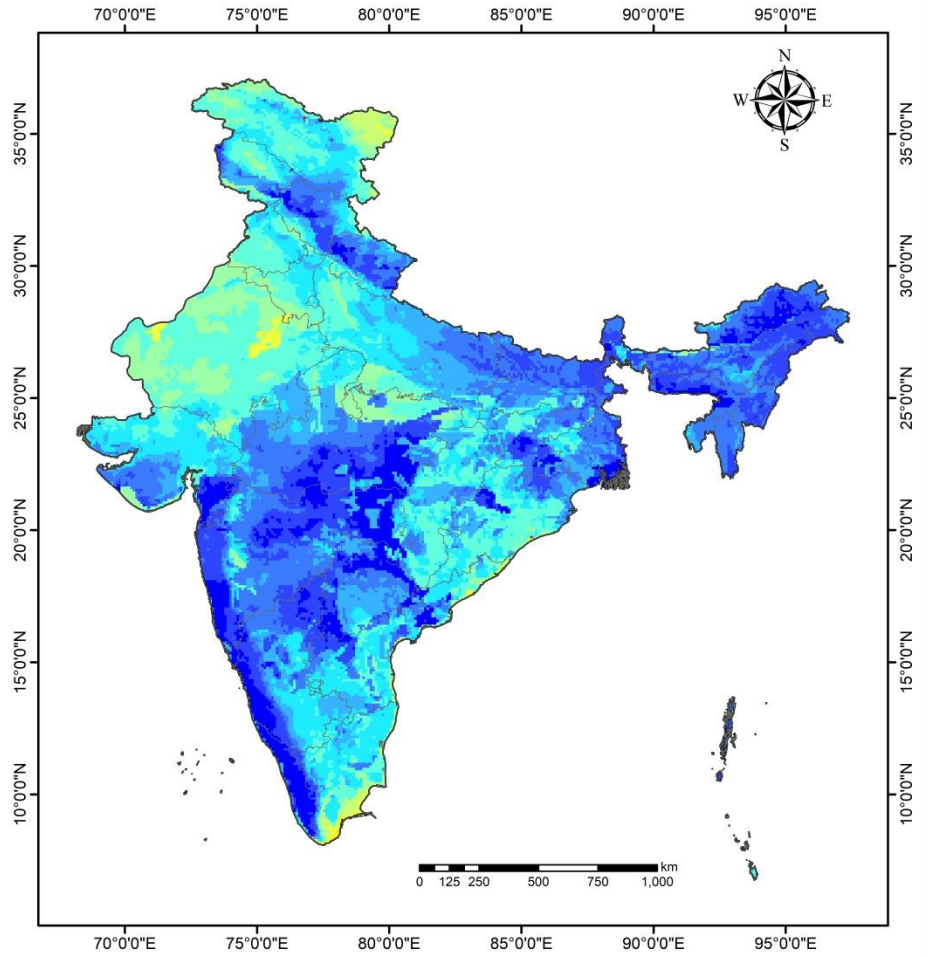
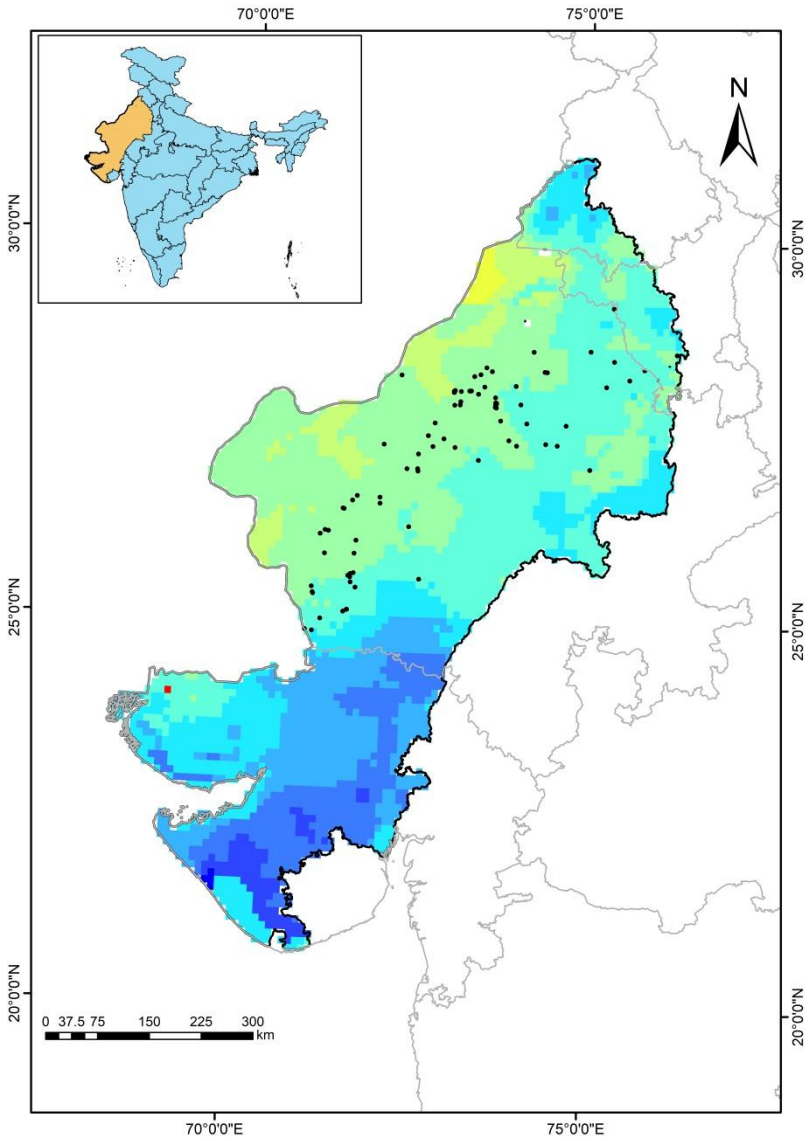


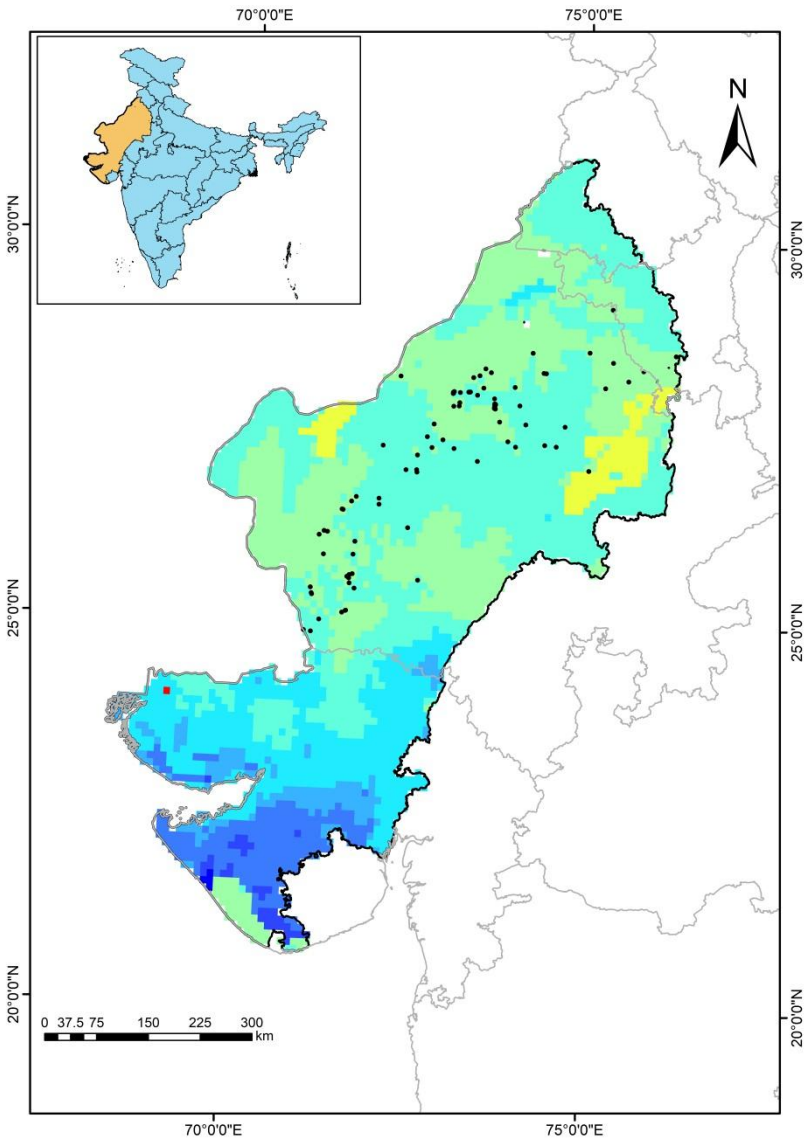
19:30 Hrs. of 9th Aug 2020.

Source: SMAP Enhanced L4 Global 3 Hourly 9 km Product

Locust Breeding Sites in Thar Desert Region



Surface Soil moisture map 19:30 Hrs. of 9th Aug 2020

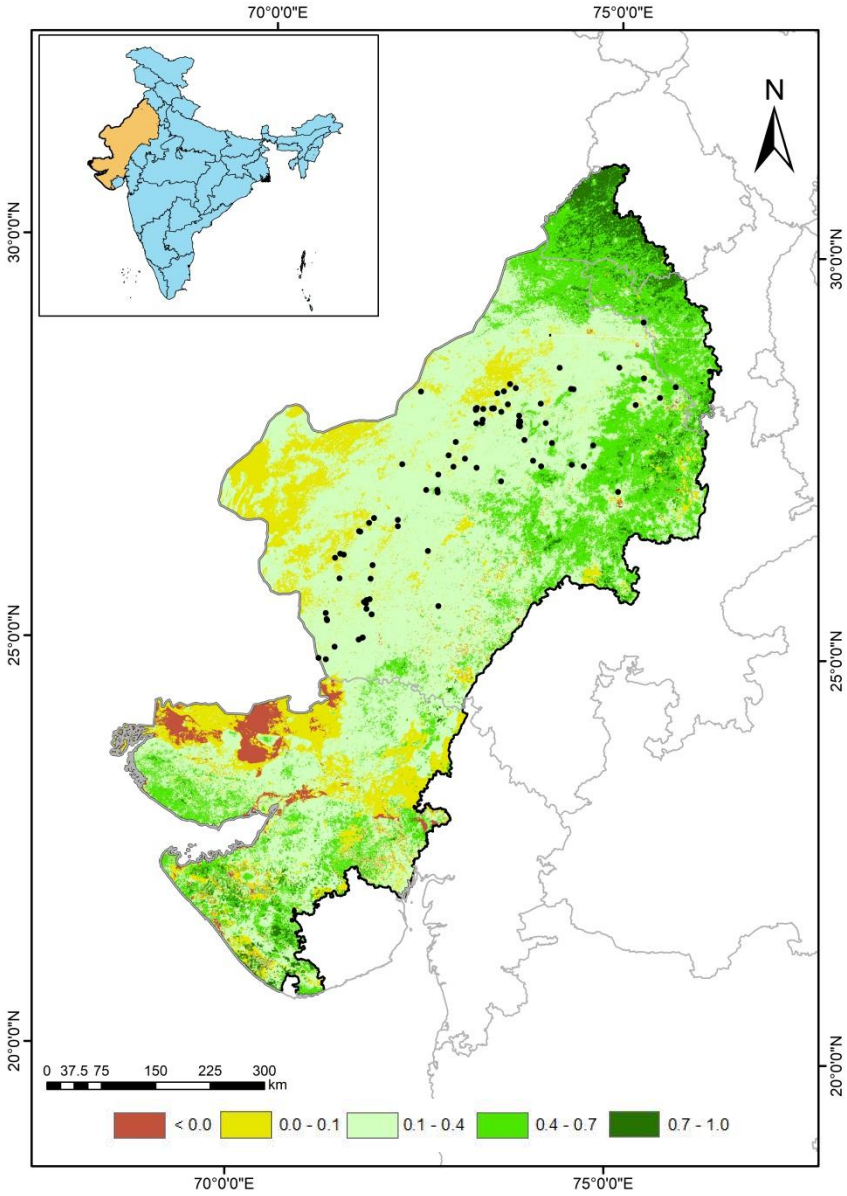


Root-zone soil moisture map 19:30 Hrs. of 9th Aug 2020

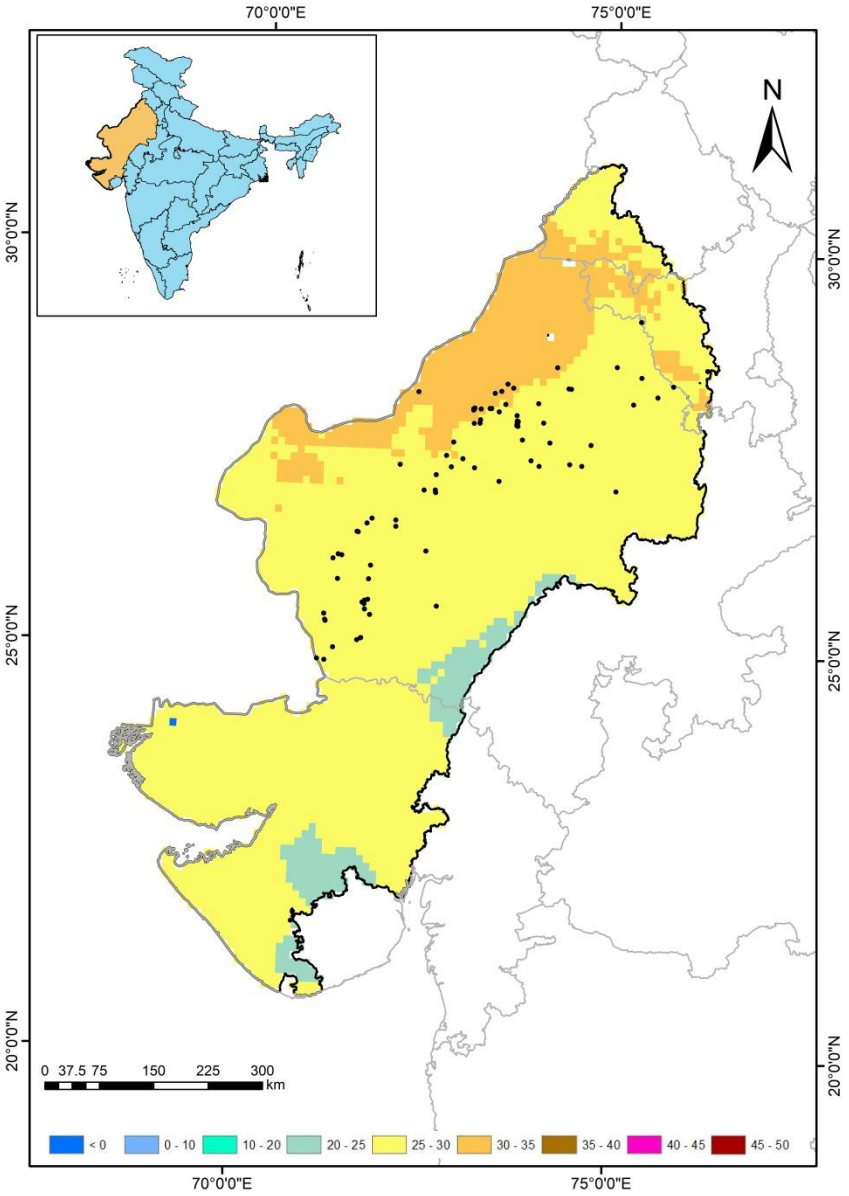
0-1 | 1 - 2 | 2 - 3 | 3 - 4 | 4 - 5 | 5 - 10 | 10 - 15 | 15 - 20 | 20 - 25 | 25 - 30 | 30 - 35 | 35 - 40 | 40 - 45 | 45 - 50

Source: Locust Incidents - LWO-Jodhpur; Surface/Root-zone Soil Moisture - SMAP Enhanced L4 Global 3 Hourly 9 km Product

Locust Breeding Sites in Thar Desert Region



Normalized Difference Vegetation Index



Land Surface Temperature map

19:30 Hrs. of 9th Aug 2020

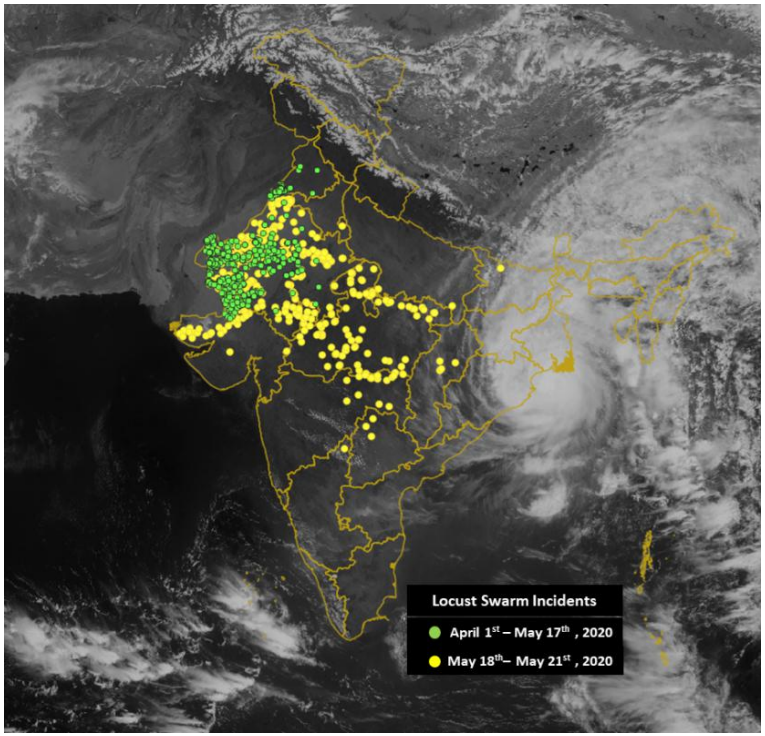
Source: Locust Incidents - LWO-Jodhpur; NDVI – EMODIV Ver. 6; Land Surface Temperature - SMAP Enhanced L4 Global 3 Hourly 9 km Product

Influence of Cyclonic Winds on Swarm Trajectory: A Case Study of Amphan

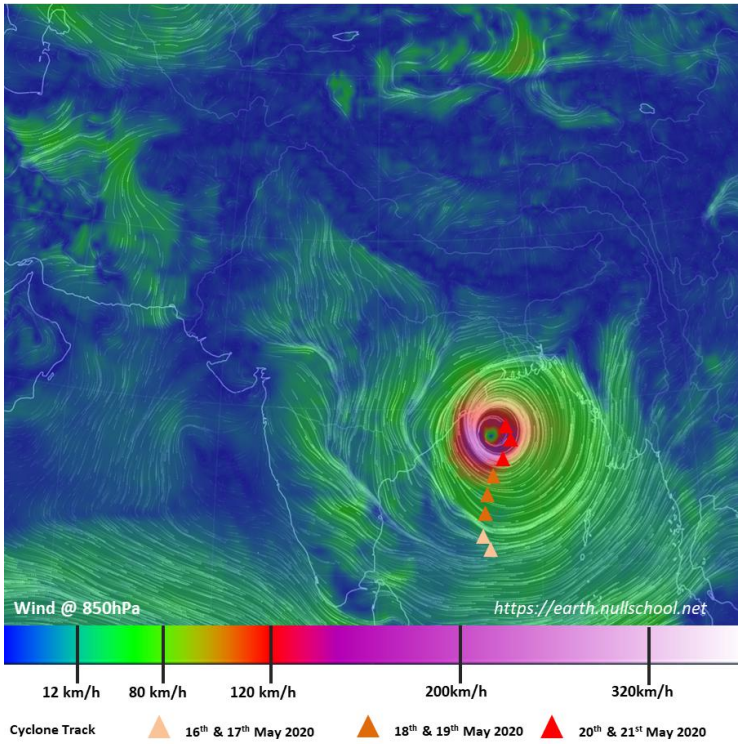
Starting May 2020, Locust swarms with mature gregarious adult groups have infested in many parts of Rajasthan, Gujarat, Haryana and Punjab. Usually, favourable conditions with respect to temperature, soil moisture, and wind trails restricts the Locust swarms within these scheduled desert region.

During the period of 16th-22nd May 2020, Locust swarms have been seen in many parts of Madhya Pradesh and Uttar Pradesh. Also, Post Amphan cylcone, swarms were sighted in the states of Maharashtra, Uttar Pradesh, Chhattisgarh and Telangana, which is very unusual. The reasons for the spread of Locust swarms to these states have been investigated and attributed to the circular winds prevailed at the periphery of Amphan that has originated in the Bay of Bengal.

By 17th May ,Amphan has intensified as a Very Severe Cyclonic Storm and exhibited the characteristics of Super Cyclone Storm by 18th May evening. By the afternoon of 20th May with a maximum sustained wind speed of 155–165 kmph gusting to 185 kmph it lay over West Bengal as a VSCS, gradually moving North-Northeastwards during late evening to night of 20th May. It moved very close to Kolkata during this period.
The total track length of the cyclonic system was approximately 1765 km. During these five days of period, circular winds of speed ranging around 80 kmph spanned in the states like Uttar Pradesh, Madhya Pradesh, Maharashtra, Telangana and towards Eastern coast. The outward cyclonic system has dragged further winds from the states of Punjab, Haryana, Rajasthan and Gujarat. These winds have propelled the existing Locust swarms to the states like Uttar Pradesh, Madhya Pradesh and Maharashtra.



INSAT 3D Visible band (1200 Hrs.) on 20th May overlaid with the Locust Swarms



Wind Speed and direction along with the track of Tropical Cyclone Amphan