



Wheat rust advisory - risk assessment from surveys and forecasts in Pakistan

Summary period: 20 Mar - 26 Mar 2024

Overall risk level:

Low

Key messages

Surveys are now covering most of the main wheat areas. Disease pressure remains low. Leaf rust is virtually absent from Punjab and generally low levels elsewhere, with highest incidence / severity in Sindh. Low levels of stripe rust are being observed, with only isolated pockets in central and northern areas. Spore deposition forecasts indicate that for stripe rust forecast most deposition is occurring in Punjab and also northern Sindh. Stripe rust will also be observed in the wheat growing areas of the Khyber Pakhtunkhwa also. Forecast leaf rust spore deposition is occurring mainly in Sindh.

Forecasts for risk of infection, have increased for both leaf and stem rust. With moderate to high infection efficiency in Punjab and in the southern coastal areas close to Karachi. For stripe rust risk of infection is generally low, except for some areas in northern Punjab.

During the entire period 21 Mar – 6 April , rain is forecast for northern Pakistan and western areas. Other areas are forecast to be dry. Temperatures generally rising, with warmer than normal conditions forecast for 22- 29 Mar.

Monitoring for any appearance of stem rust in southern areas is advisable as temperatures increase.

Recommendations

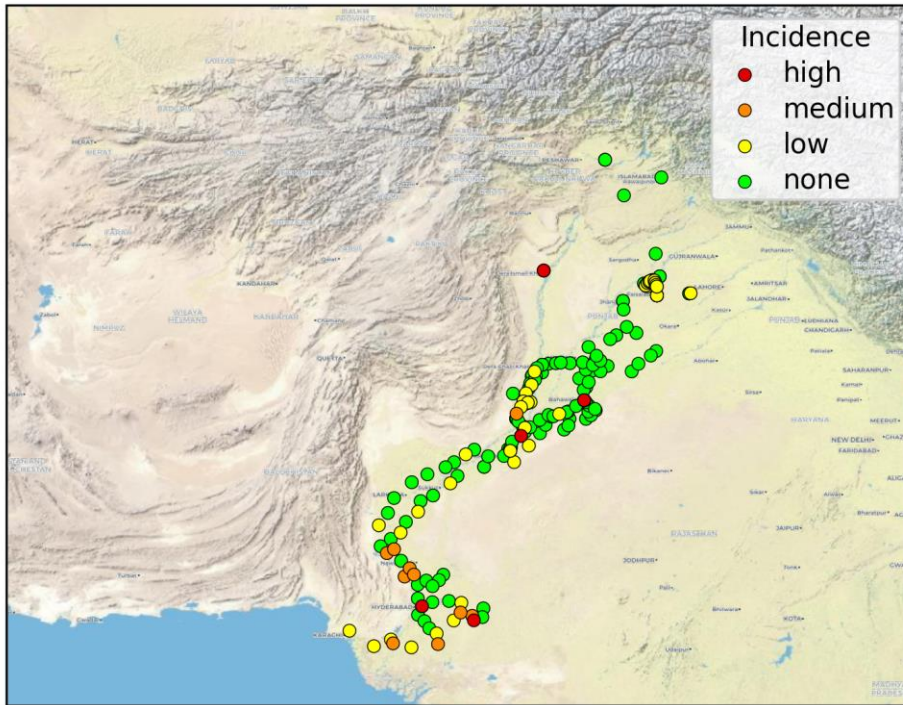
Disease pressure remains low, but scouting should be undertaken and farmers informed to be vigilant for the emergence of rust. If rust starts to appear on younger crops farmers should be advised to undertake control if susceptible cultivars are grown.

The risk however is based on susceptible wheat lines. Different levels of resistance will reduce the risk of the disease at the farmer field. Before the decision on the use of fungicide, pls consider advisory from expert in your area.

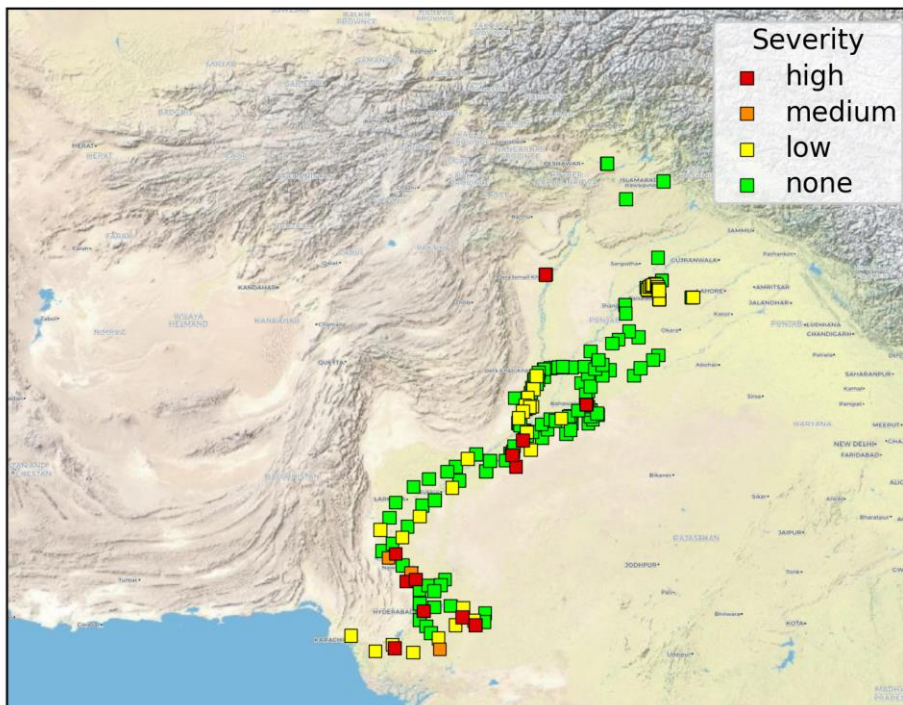
- Awareness should be raised amongst stakeholders at all levels, including farmers, to be vigilant for early appearance of rusts. **Early control to stop increased spread and further build-up of disease is very important.**
- Sampling should be undertaken to determine races of rust present.

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Leaf rust surveys Pakistan Jan 02 2024 - Mar 19 2024



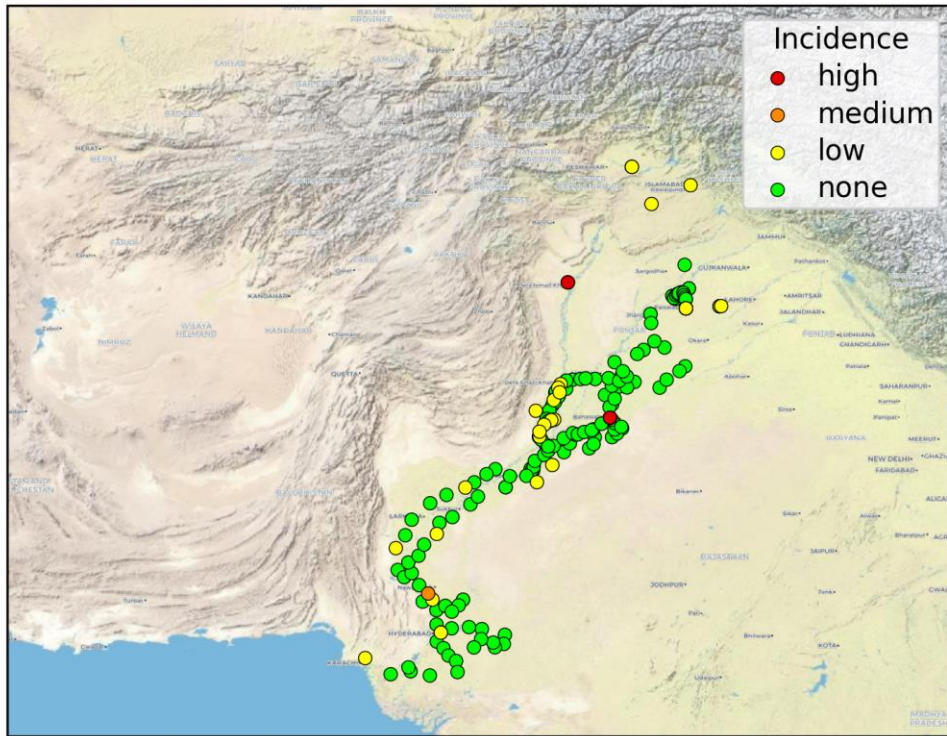
Leaf rust surveys Pakistan Jan 02 2024 - Mar 19 2024



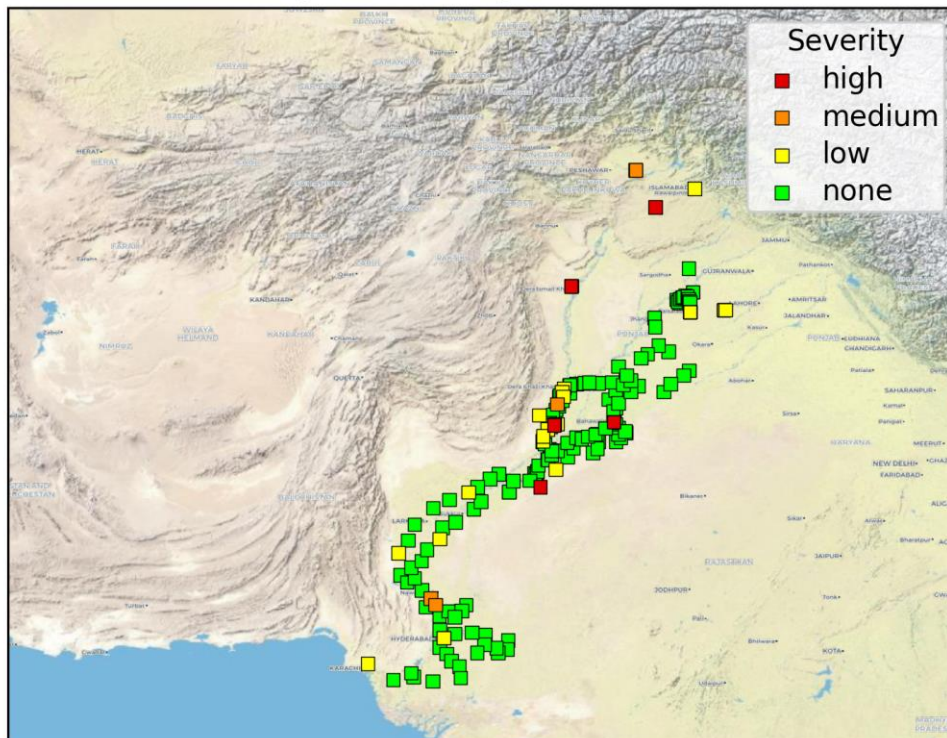
Map 1: Leaf Rust incidence (top) and severity (bottom) in Pakistan field surveys Jan 02 2024 - Mar 19 2024

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Yellow rust surveys Pakistan Jan 02 2024 - Mar 19 2024



Yellow rust surveys Pakistan Jan 02 2024 - Mar 19 2024



Map 2: Stripe Rust incidence (top) and severity (bottom) in Pakistan field surveys Jan 02 2024 - Mar 19 2024

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Spore dispersal forecasts

Spore dispersal forecasts run by the UK Met Office and Cambridge University are displayed for stem, stripe and leaf rusts for the forecasted period. Surveys in each district are gathered to provide a single source per administrative area for dispersal forecasts (red dots in figure).

Environmental / climatic suitability for infection forecasts

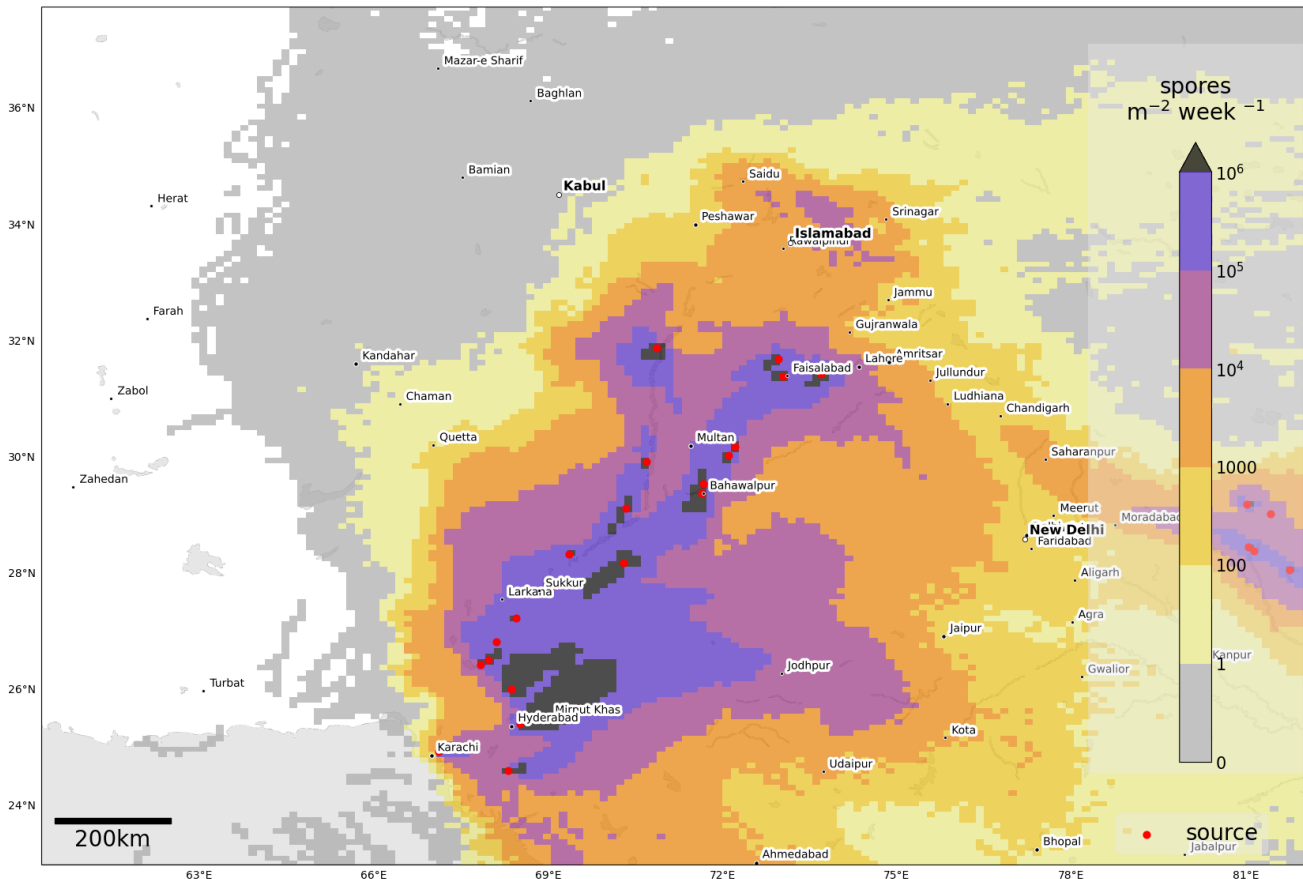
These forecasts give the probability of wheat rust infection occurring based on meteorological factors. The maximum infection efficiency that can occur is 100%. This means that 100% of the spores deposited on susceptible wheat plants could complete the infection process. Therefore, a forecast Infection Efficiency of 100% indicates the highest risk of wheat rust infection occurring in susceptible wheat varieties.

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Leaf rust

Dispersal: Current forecast (20 Mar - 26 Mar) indicates dispersal in an easterly direction, with most spore deposition forecast in Sindh.

NAME dispersion forecast for the number of wheat **Leaf rust** spores deposited
2024-03-20-03:00 - 2024-03-27-00:00 (UTC)



Issued 20 Mar 2024 with Met Office Unified Model meteorological input data



Map 3: Leaf rust spore deposition forecast Pakistan 20 Mar - 26 Mar 2024

The 20 most impacted districts (spore deposition) are presented in the table below.

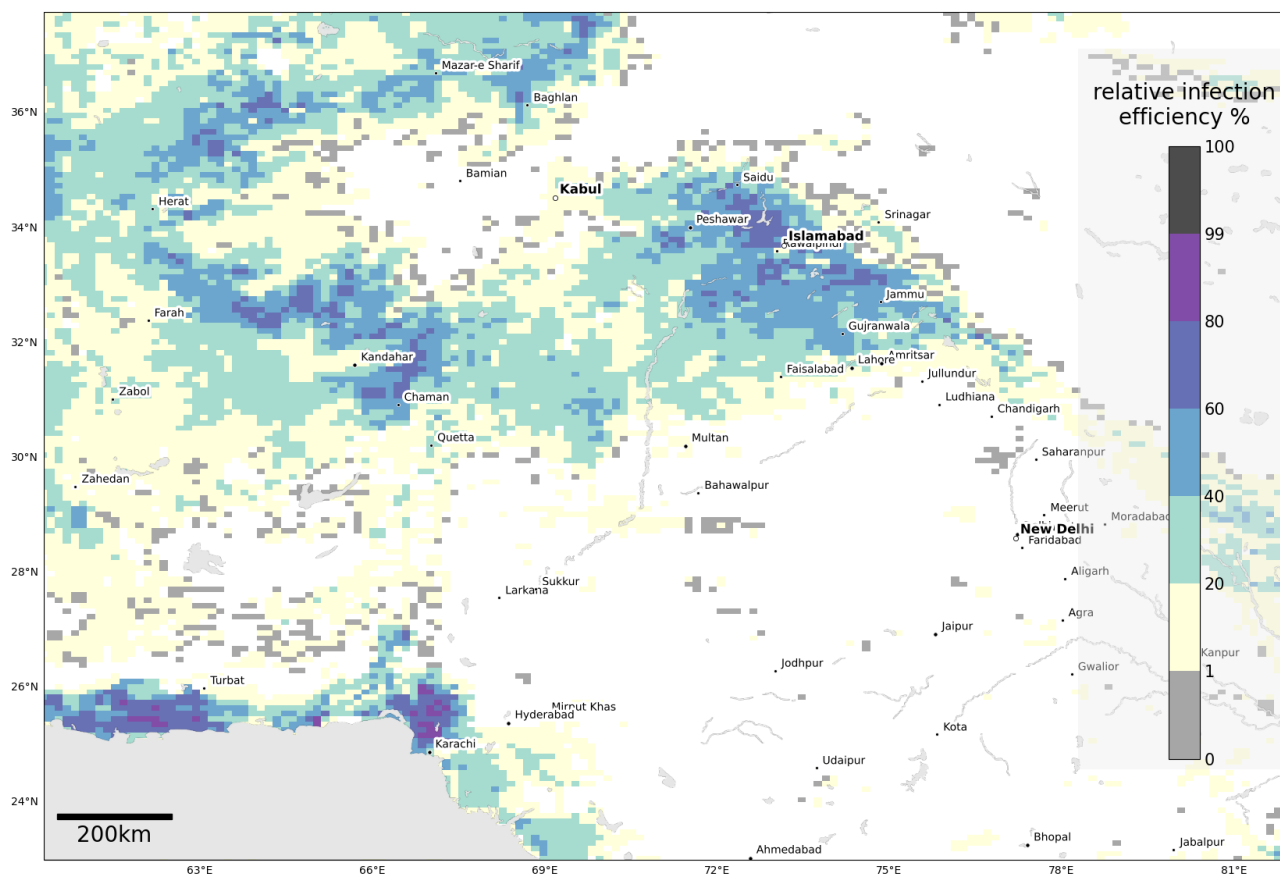
admin2Name	Leaf rust spores per m ² per week
Tando Allahyar	1200000
Matiari	920000
Hyderabad	680000
Mirpur Khas	350000
Sanghar	320000
Shaheed Benazir Abad	280000
Lodhran	160000
Rahim Yar Khan	120000
Khairpur	89000

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Nankana Sahib	880000
Ghotki	780000
Naushahro Feroze	710000
Faisalabad	620000
Chiniot	600000
Sukkur	570000
D. I. Khan	490000
Umer Kot	380000
Rajanpur	320000
Khanewal	310000
Bahawalpur	310000

Risk of infection: Current forecast (20 – 25 Mar) indicates some increase in risk of infection, with moderate to high infection efficiency in Punjab and close to Karachi.

Infection efficiency of Wheat **Leaf rust** spores 2024-03-20-00:00 - 2024-03-26-00:00 (UTC)



Issued 20 Mar 2024 with Met Office Unified Model meteorological input data



Map 4: Leaf rust suitability for infection forecast Pakistan 20 Mar - 25 Mar 2024

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The 20 most impacted districts (infection efficiency) are presented in the table below.

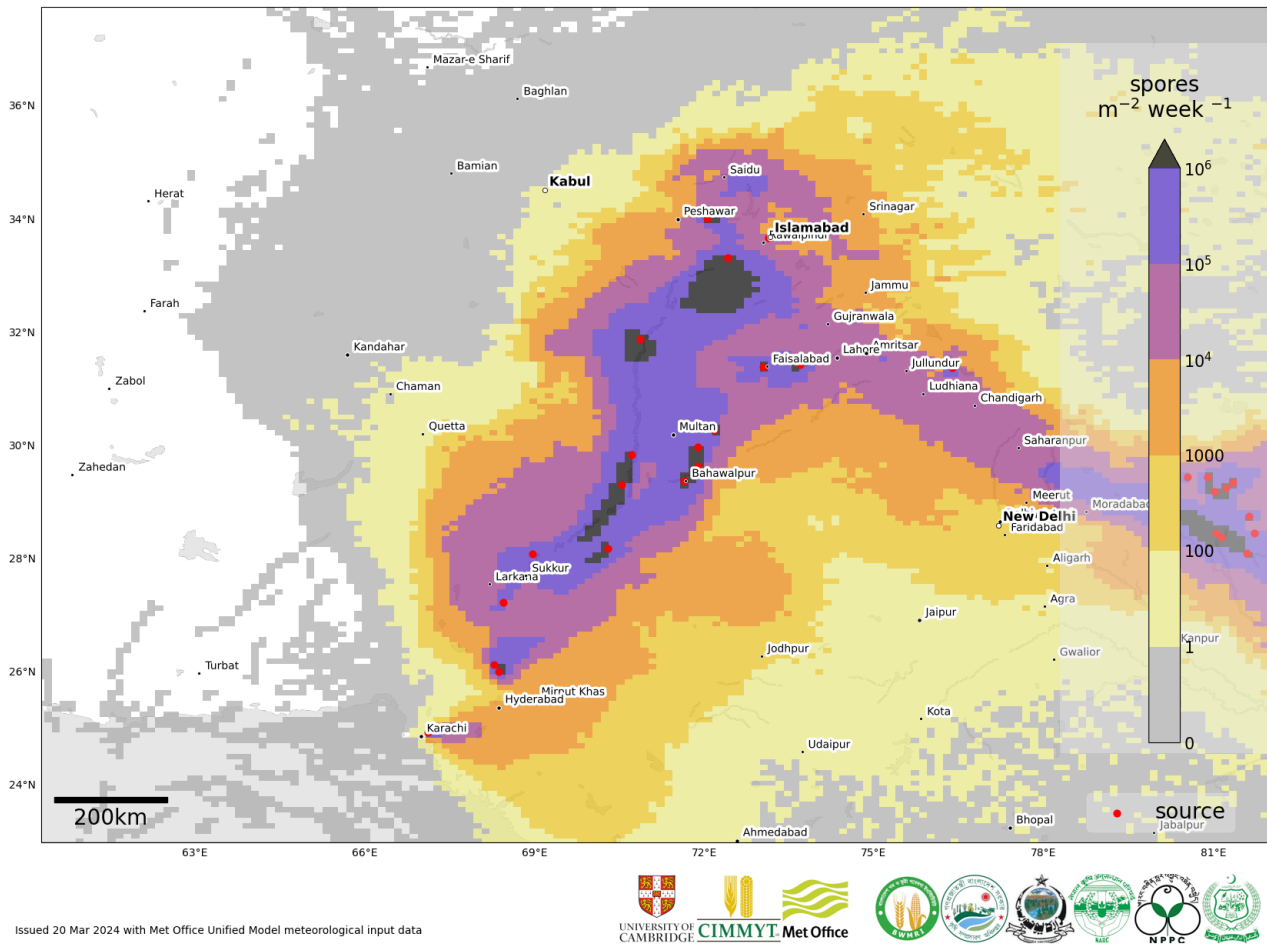
admin2Name	RIE_leaf_rust_%
Swabi	62
Haripur	62
Mardan	58
Buner	56
West Karachi	53
Bhimber	53
Rawalpindi	52
Abbottabad	52
Malir Karachi	51
Sudhnoti	50
Gwadar	50
Mandi Bahauddin	49
Chakwal	49
Attock	49
Lasbela	49
Tor Ghar	48
Islamabad	48
Nowshera	47
Gujrat	47
Jhelum	47

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Stripe rust

Dispersal: Current forecast (20 Mar - 26 Mar) indicates dispersal in a general easterly direction, with spores forecast to reach Nepal. Significant spore deposition forecast for most wheat areas in Punjab and Sindh.

NAME dispersion forecast for the number of wheat **Stripe rust** spores deposited
2024-03-20-03:00 - 2024-03-27-00:00 (UTC)



Map 5: Stripe rust spore deposition forecast Pakistan 20 Mar - 26 Mar 2024

The 20 most impacted districts (spore deposition) are presented in the table below.

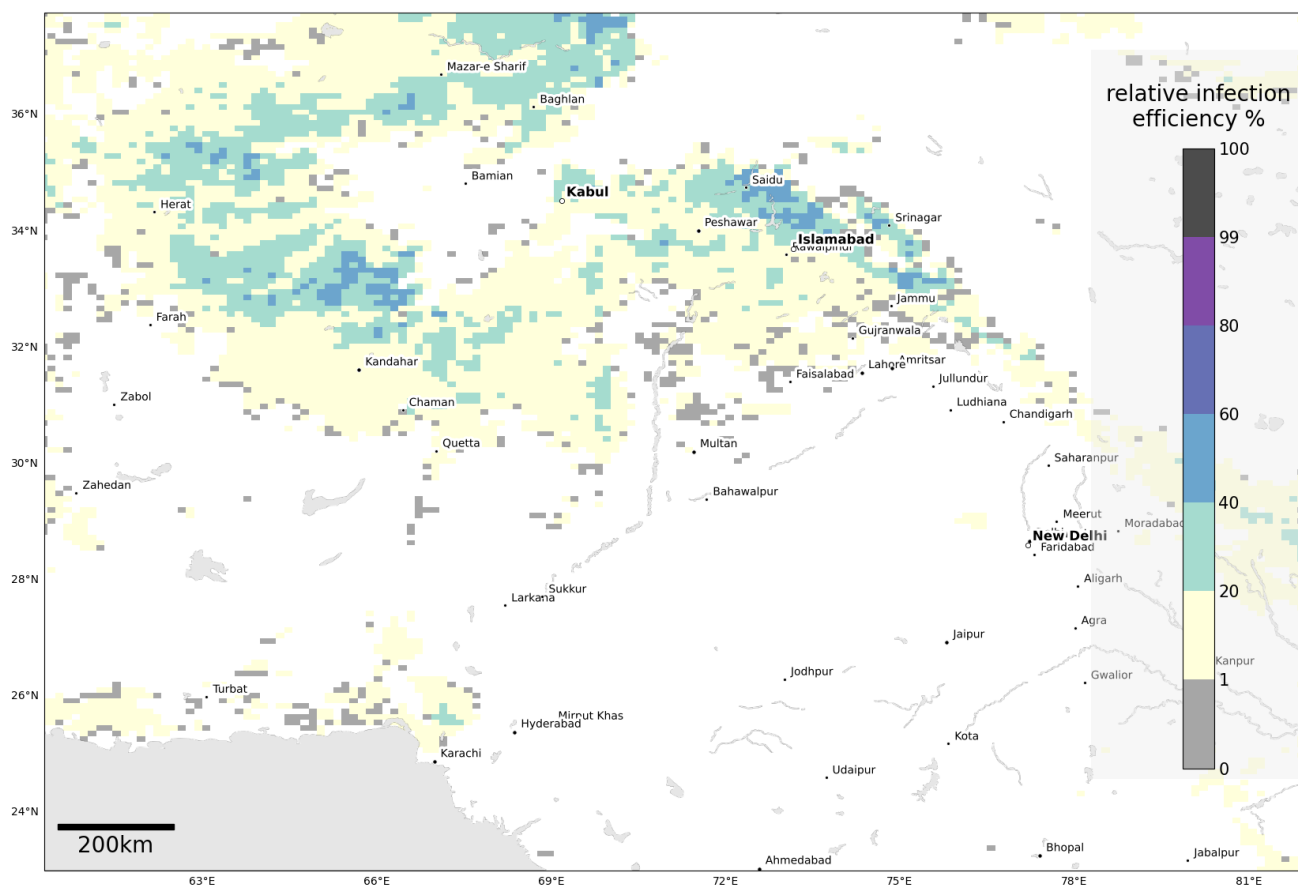
admin2Name	Stripe rust spores per m ² per week
Chakwal	5600000
Attock	5200000
D. I. Khan	1700000
Lodhran	1400000
Rajanpur	1300000
Khushab	1100000
Muzaffargarh	910000
Bhakkar	900000

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Mianwali	770000
Rahim Yar Khan	600000
Vehari	390000
Nowshera	360000
Ghotki	350000
Nankana Sahib	340000
Leiah	330000
Jhelum	320000
Khanewal	310000
Dera Ghazi Khan	300000
Faisalabad	270000
Kashmore	250000

Risk of infection: Current forecast (20 – 25 Mar) indicates decreased risk of infection, with pockets of moderate infection efficiency only in northern Punjab (around Islamabad).

Infection efficiency of Wheat **Stripe rust** spores 2024-03-20-00:00 - 2024-03-26-00:00 (UTC)



Issued 20 Mar 2024 with Met Office Unified Model meteorological input data



Map 6: Stripe rust suitability for infection forecast Pakistan 20 Mar - 25 Mar 2024

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The 20 most impacted districts (infection efficiency) are presented in the table below.

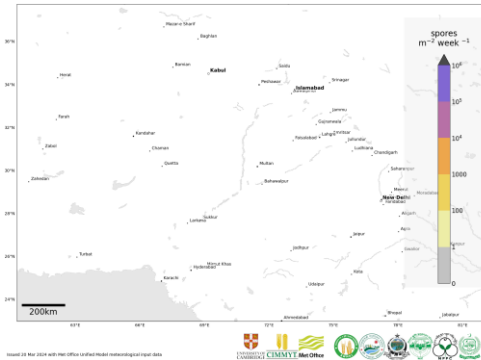
admin2Name	RIE_stripe_rust_%
Tor Ghar	44
Abbottabad	38
Shangla	35
Buner	35
Bagh	33
Swat	32
Mansehra	32
Batagram	32
Muzaffarabad	30
Lower Dir	30
Poonch	27
Haripur	26
Bajaur	26
Malakand	26
Mardan	24
Orakzai	23
Swabi	23
Jhelum Valley	22
Kolai Palas Kohistan	22
Haveli	21

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Stem rust

Dispersal: Current forecast (20 Mar - 26 Mar) indicates no dispersal as no reports of stem rust.

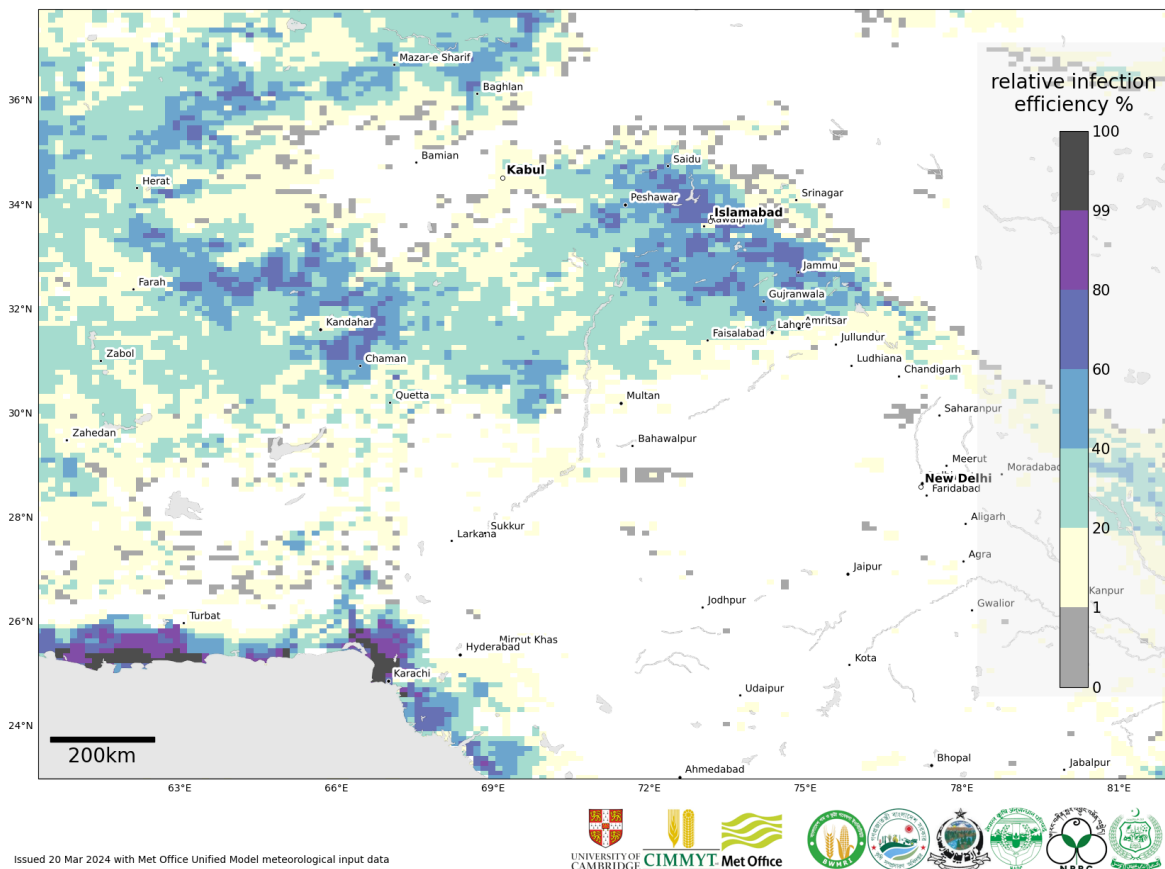
NAME dispersion forecast for the number of wheat **Stem rust** spores deposited
2024-03-20-03:00 - 2024-03-27-00:00 (UTC)



Map 7: Stem rust spore deposition forecast Pakistan 20 Mar - 26 Mar 2024

Risk of infection: Current forecast (20 – 25 Mar) indicates some increase in risk of infection, with moderate to high infection efficiency in Punjab and in the southern coastal areas close to Karachi.

Infection efficiency of Wheat **Stem rust** spores
2024-03-20-00:00 - 2024-03-26-00:00 (UTC)



Map 8: Stem rust suitability for infection forecast Pakistan 20 Mar - 25 Mar 2024

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The 20 most impacted districts (infection efficiency) are presented in the table below.

admin2Name	RIE_stem_rust_%
West Karachi	75
Mardan	62
Swabi	61
Haripur	61
South Karachi	60
Mandi Bahauddin	56
Jhelum	56
Bhimber	56
Malir Karachi	55
Buner	55
Central Karachi	54
Gwadar	54
Abbottabad	52
Rawalpindi	52
Sialkot	51
Gujrat	51
Chakwal	50
Lasbela	50
Hafizabad	50
Sargodha	50

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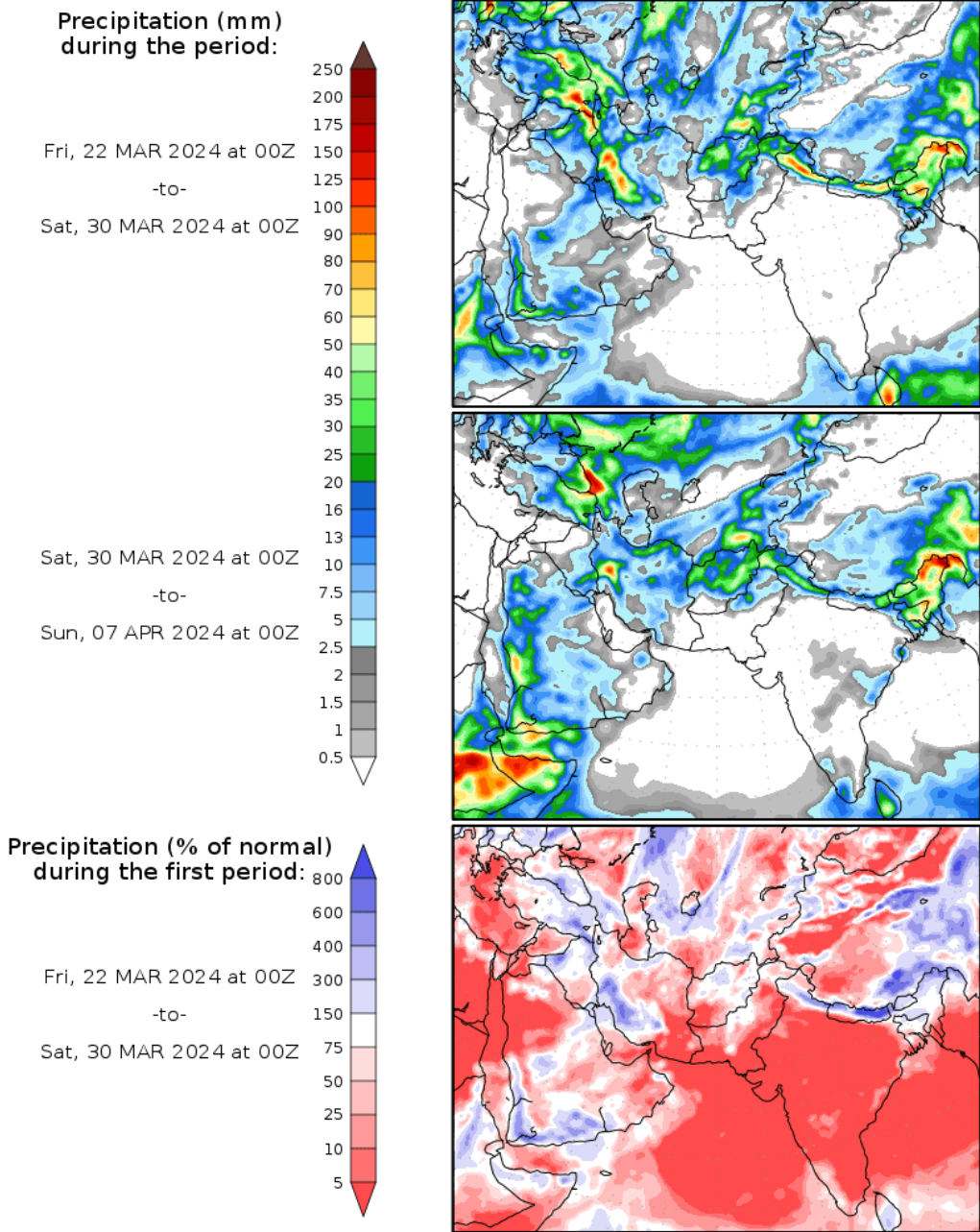
Regional Forecasts – Precipitation & Temperature

Forecasts from the National Centers for Environmental Prediction (NCEP) [<http://wxmaps.org/pix/clim>]
These indicate possible general conditions across South Asia, with likely decreasing prediction accuracy in the second forecast period.

During the period 21– 29 Mar, rain is forecast for northern/western Pakistan, northwest India, Nepal (especially central /eastern areas), Bhutan and Bangladesh. During the period 29 Mar – 6 Apr, continued rain in these areas is forecast.

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Precipitation Forecasts



Precipitation forecasts from the National Centers for Environmental Prediction.
Normal rainfall derived from Xie-Arkin (CMAP) Monthly Climatology for 1979-2003.
Forecast Initialization Time: 00Z22MAR2024

GrADS/COLA

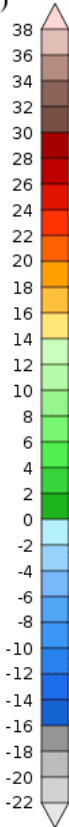
Temperature: During the period 21 - 29 Mar, very warm temperatures across peninsula India and southern / eastern parts of Pakistan. Warmer than normal in the Terai of Nepal. Cooler than normal across Bhutan, Bangladesh and north west India. Similar conditions for 29 Mar – 6 Apr, but increasing, and warmer temperatures for Terai of Nepal and Bangladesh.

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Temperature Forecasts

Mean Surface Temperature (°C)
during the period:

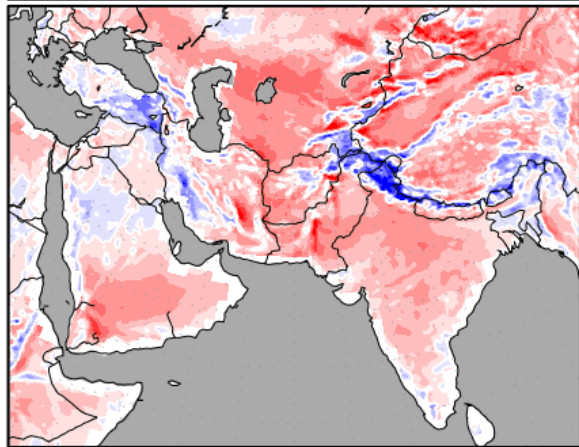
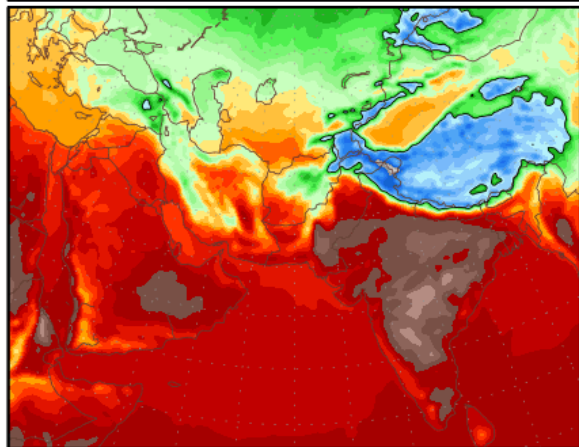
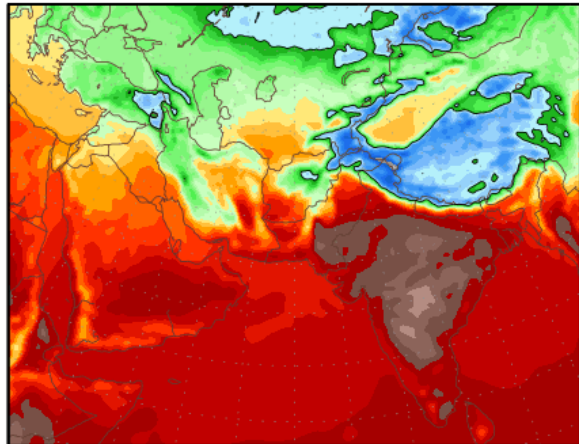
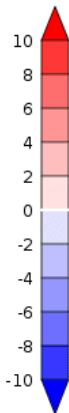
Fri, 22 MAR 2024 at 00Z
-to-
Sat, 30 MAR 2024 at 00Z



Sat, 30 MAR 2024 at 00Z
-to-
Sun, 07 APR 2024 at 00Z

Temperature Anomaly
during the first period:

Fri, 22 MAR 2024 at 00Z
-to-
Sat, 30 MAR 2024 at 00Z



Temperature forecasts from the National Centers for Environmental Prediction.
Normal Temperature derived from CRU monthly climatology for 1901-2000
Forecast Initialization Time: 00Z22MAR2024