Wheat rust advisory - risk assessment from surveys and forecasts in Bhutan
Summary period: 21 Feb - 27 Feb 2025

Overall risk level:

Caution / Low

Key messages

Surveys have been undertaken in the southwest of Bhutan. No disease has been detected. Crops are still at an early stage (tillering) of development, but at flowering in some places.

Some disease (especially leaf rust) is starting to be detected in neighboring countries (Bangladesh and Nepal). Forecasts indicate some possibility for spore dispersal into Bhutan, especially the south west but risk is considered to be quite low.

Suitability forecast (21 - 26 Feb) for leaf, stripe and stem rust indicates moderate to high infection efficiency in southern areas. Some rain is forecast for Bhutan during the period 23 Feb – 3 Mar and this may increase and continue during 3 – 11 Mar. Temperatures are forecast to remain relatively cool.

Given the short term forecasts with some rain, conditions are likely to become suitable for disease development.

Recommendations

Very close monitoring of fields, particularly for susceptible varieties, is recommended. Forecast weather conditions indicate that disease development could be possible.

Scouting should be undertaken, especially in southern areas, and farmers informed to be vigilant for the emergence of rust.

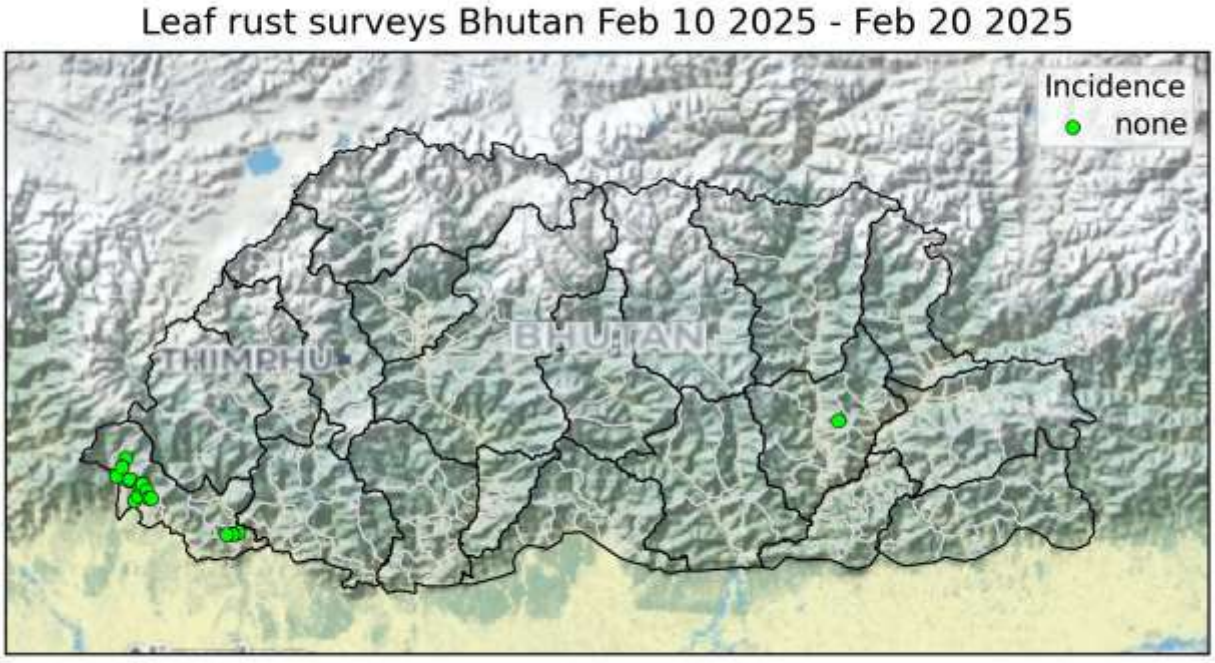
- Awareness should be raised amongst stakeholders at all levels, including farmers, to be vigilant for early appearance of rusts. **Early control to stop increased spread and further build-up of disease is very important.**
- Sampling should be undertaken to determine races of rust present.

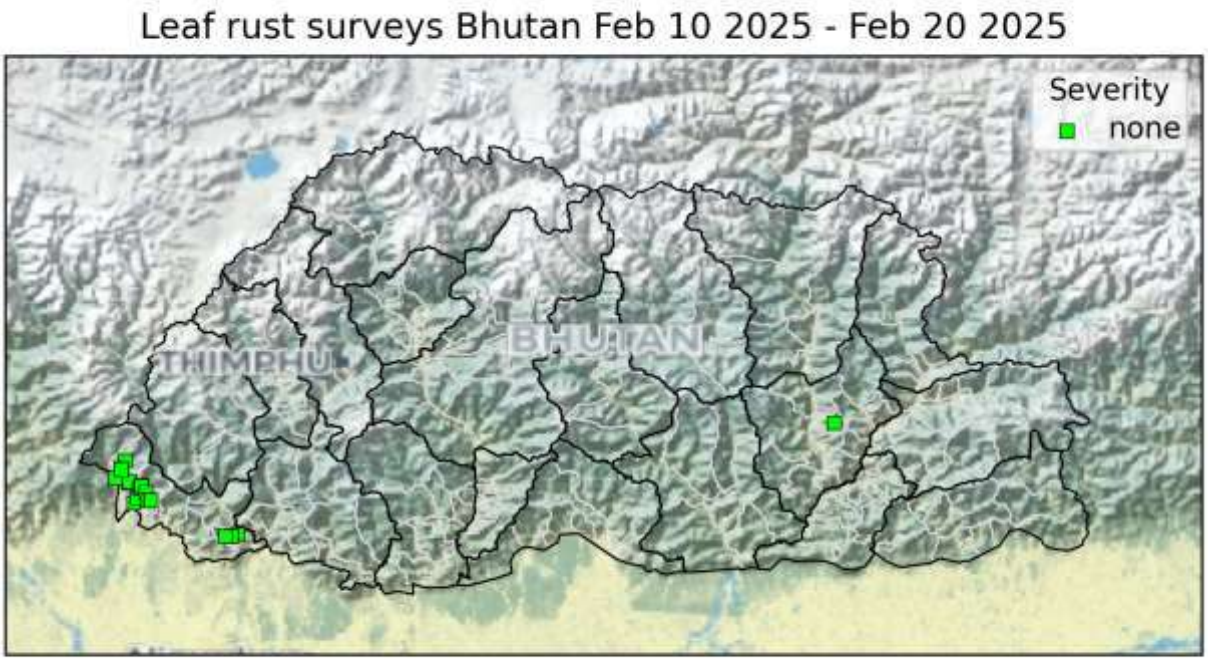
Field surveys

Surveys undertaken Feb 10 2025 - Feb 18 2025. A total of 23 fields surveyed. No leaf rust detected. No stripe rust detected. No stem rust detected. Legend for severity and incidence intensity: Low: less than 20%; moderate: 20-40%; high: more than 40%.

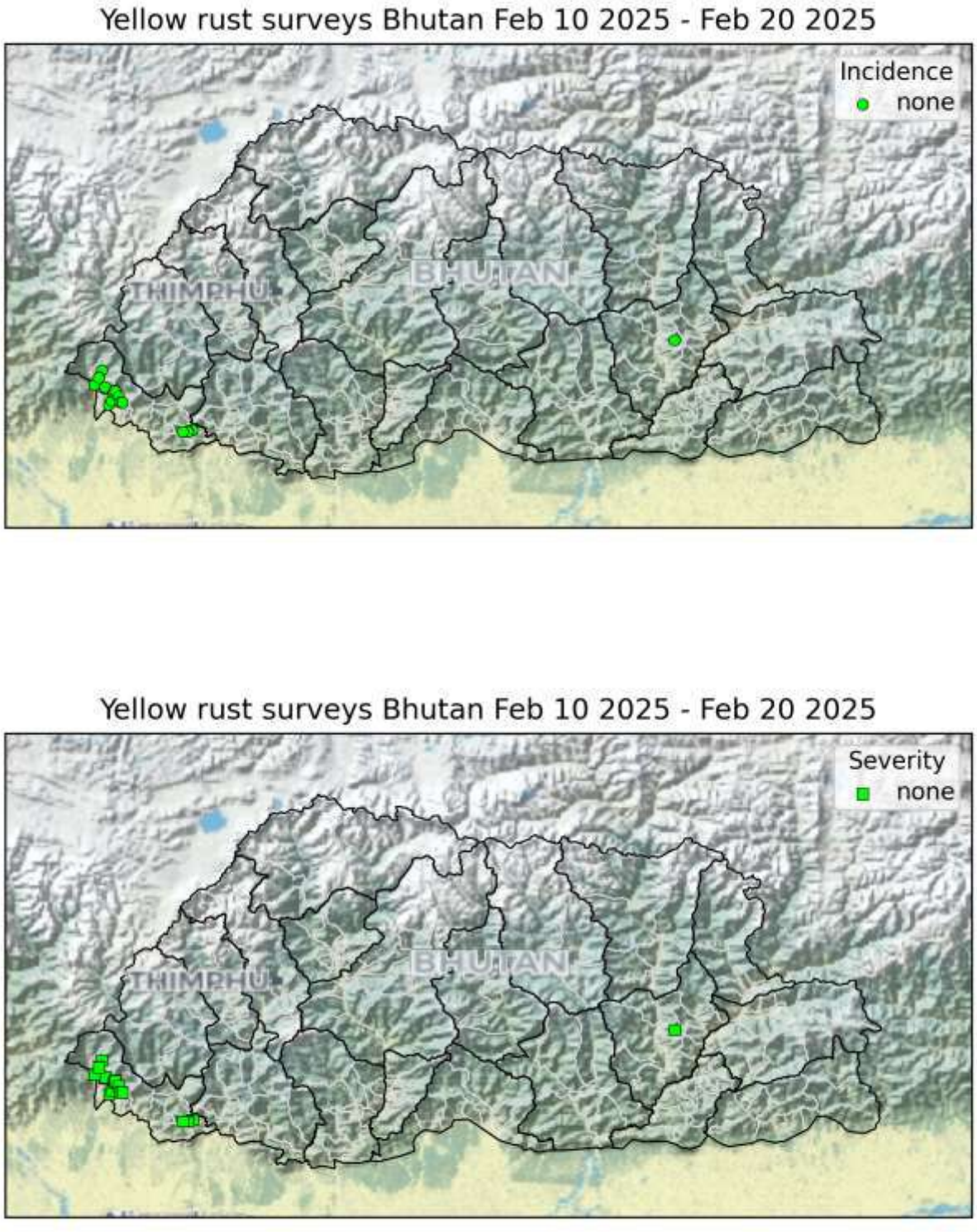
Table 2: Growth stage analysis of surveys conducted in the last week (since Feb 14 2025).

Country	Number of surveys in the last week that observed wheat growth stage:									
	tillering	boot	heading	flowering	milk	dough	maturity	NA	na	n/a
Bhutan	7	1	1	9	0	4	0	0	0	0

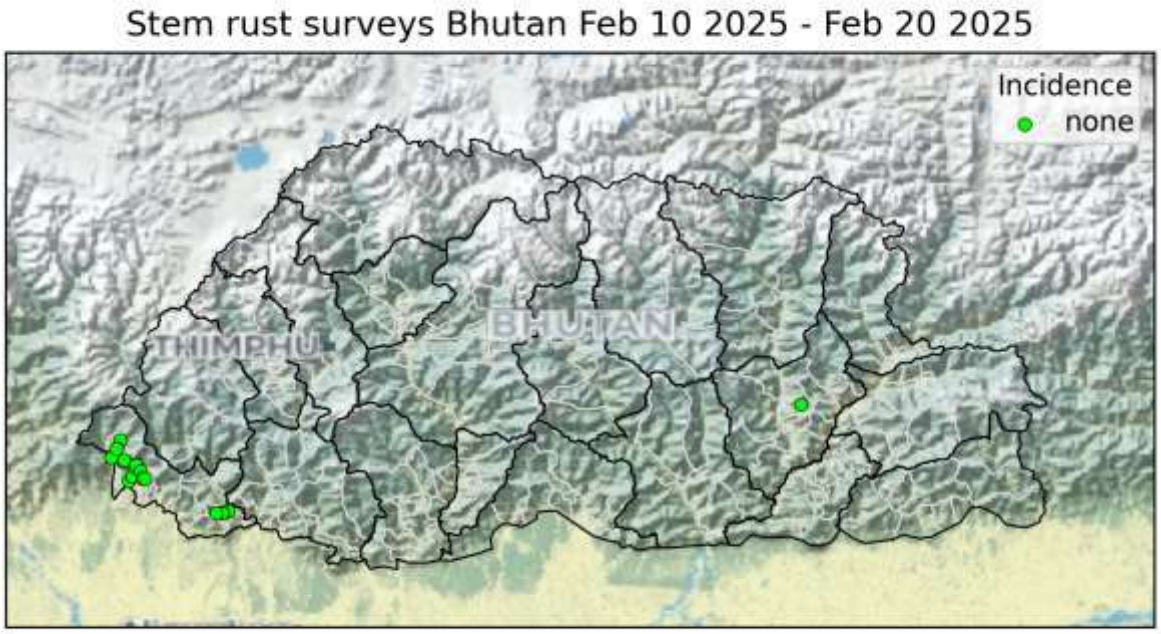


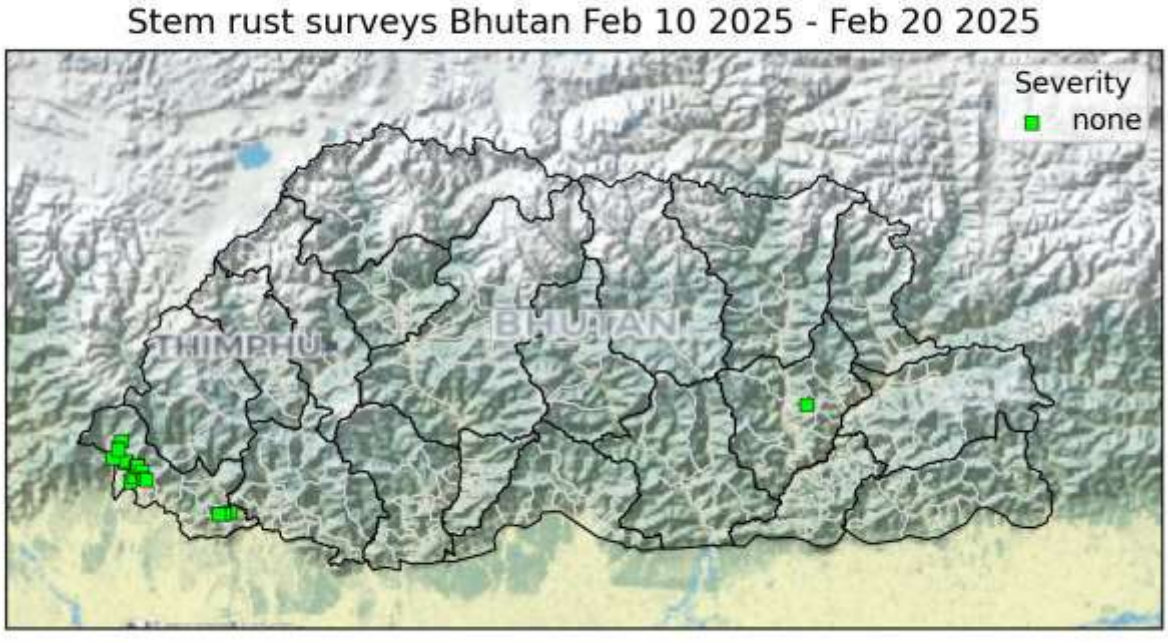


Map 1: Leaf Rust incidence (top) and severity (bottom) in Bhutan field surveys Feb 10 2025 - Feb 20 2025



Map 2: Stripe Rust incidence (top) and severity (bottom) in Bhutan field surveys Feb 10 2025 - Feb 20 2025





Map 3: Stem Rust incidence (top) and severity (bottom) in Bhutan field surveys Feb 10 2025 - Feb 20 2025

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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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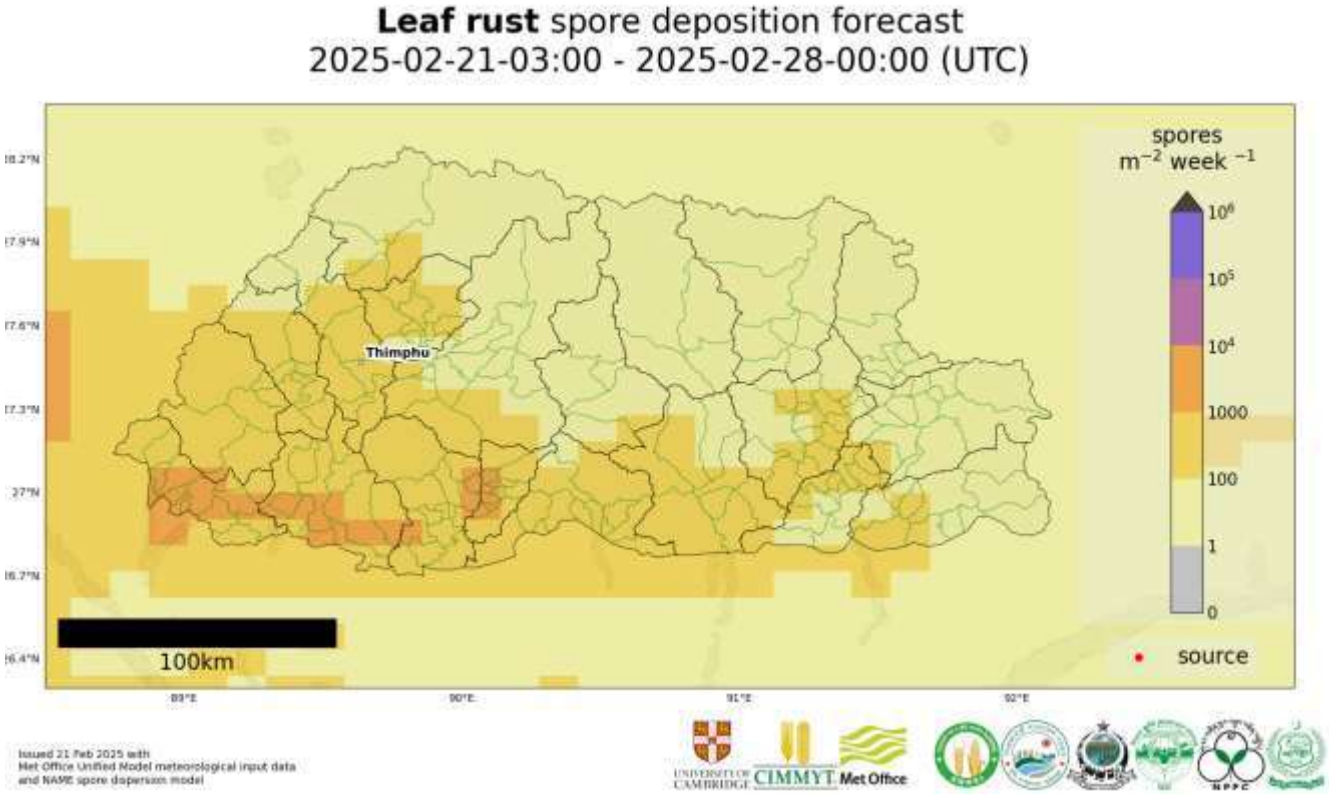
Leaf rust

Dispersal: Current forecast (21 Feb - 27 Feb) indicates some potential for spore dispersal into Bhutan from infected sites in Bangladesh and Nepal. Highest deposition forecast in south west.



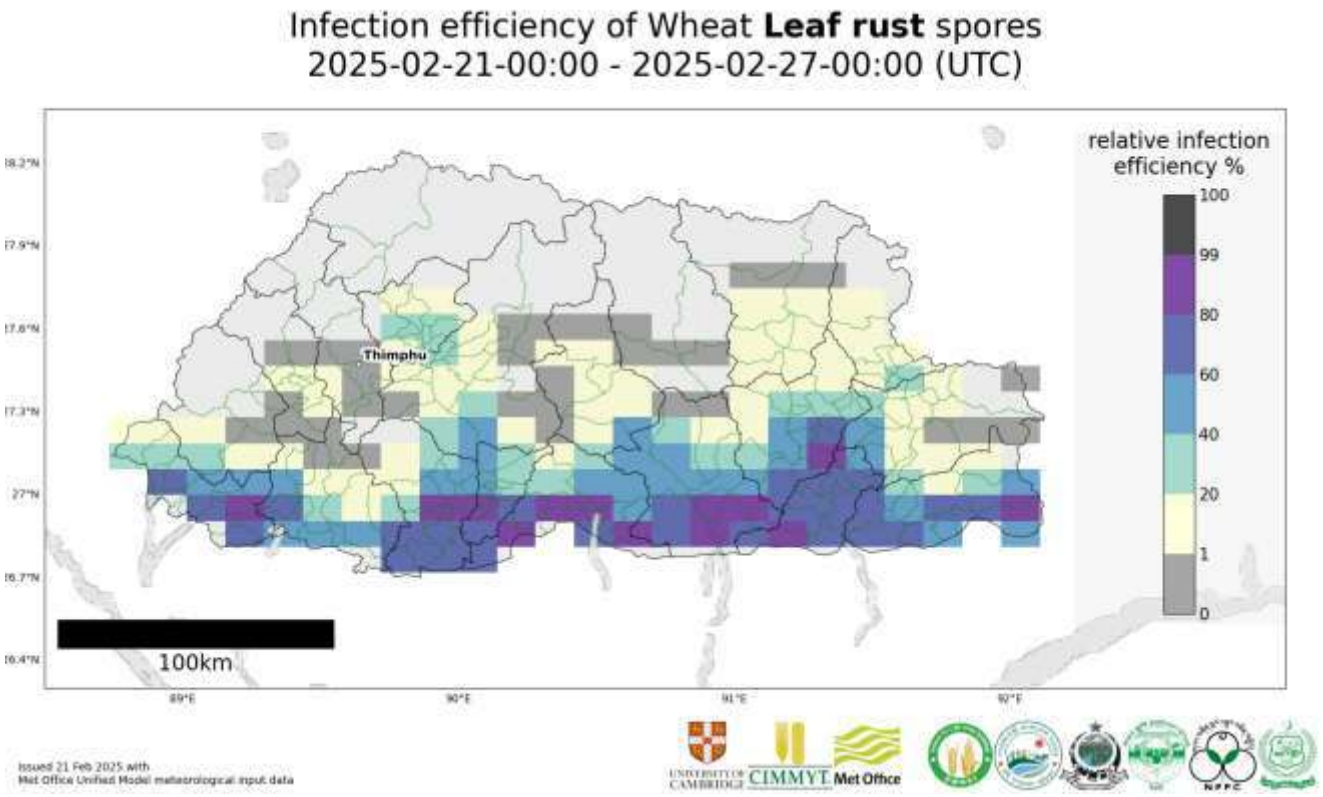
Map 4: Leaf rust spore deposition forecast Bhutan 21 Feb - 27 Feb 2025

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

admin2Name	admin1Name	Leaf rust spores per m^2 per week
Ugentse	Samtse	1300
Chengmari	Samtse	1300
Samtse	Samtse	1200
Phuentsholing	Chhukha	1200
Yoeseltse	Samtse	1200
Tading	Samtse	1200
Dorokha	Samtse	1200
Logchina	Chhukha	1200
Tsangkha	Dagana	1100
Chargharay	Samtse	1100
Denchhukha	Samtse	1100
Tsholingkhor	Tsirang	1100
Rangthangling	Tsirang	1000
Barzhong	Tsirang	1000
Namgyel Chhoeling	Samtse	980
Biru	Samtse	920

Mendrelgang	Tsirang	900
Sipsu	Samtse	890
Gozhi	Dagana	880
Dungtoe	Samtse	880

Risk of infection: Current forecast (21 – 26 Feb) indicates moderate to high infection efficiency in southern areas. Low or no suitability forecast in other areas.



Map 5: Leaf rust suitability for infection forecast Bhutan 21 Feb - 26 Feb 2025

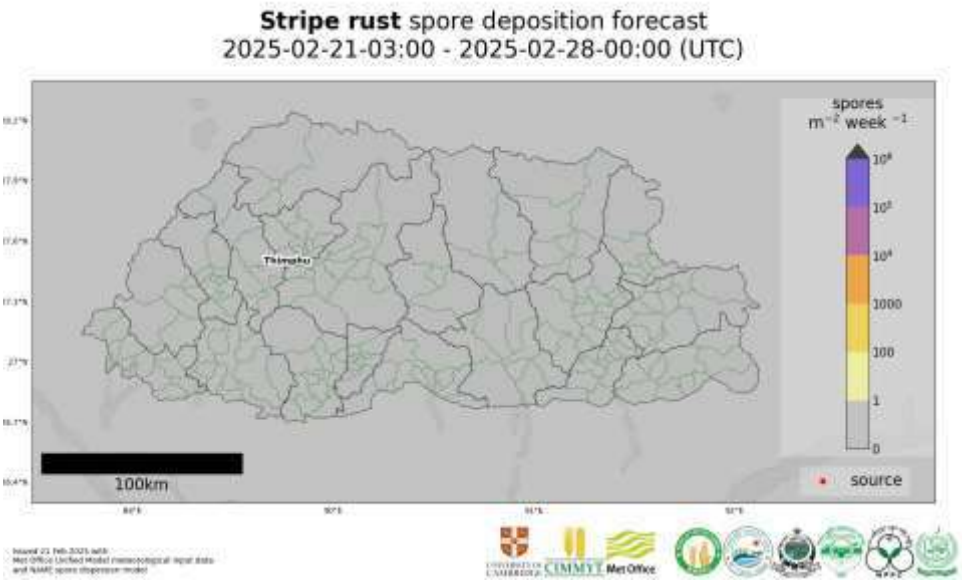
The 20 most impacted districts (infection efficiency) per country are presented in the table below.

admin2Name	admin1Name	RIE_leaf_rust_%
Barzhong	Tsirang	84
Gozhi	Dagana	83
Shompangkha	Sarpang	82
Trashiding	Dagana	82
Tsendagang	Dagana	78
Beteni	Tsirang	77
Bhur	Sarpang	77
Dechhenling	Pemagatshel	76
Gelephu	Sarpang	75
Chhuzagang	Sarpang	75
Chokhorling	Pemagatshel	75
Gozhing	Zhemgang	75

Chhimung	Pemagatshel	75
Norbugang	Pemagatshel	75
Mendrelgang	Tsirang	75
Dungmin	Pemagatshel	75
Sherzhong	Sarpang	73
Thangrong	Monggar	72
Taklai	Sarpang	72
Chongshing	Pemagatshel	72

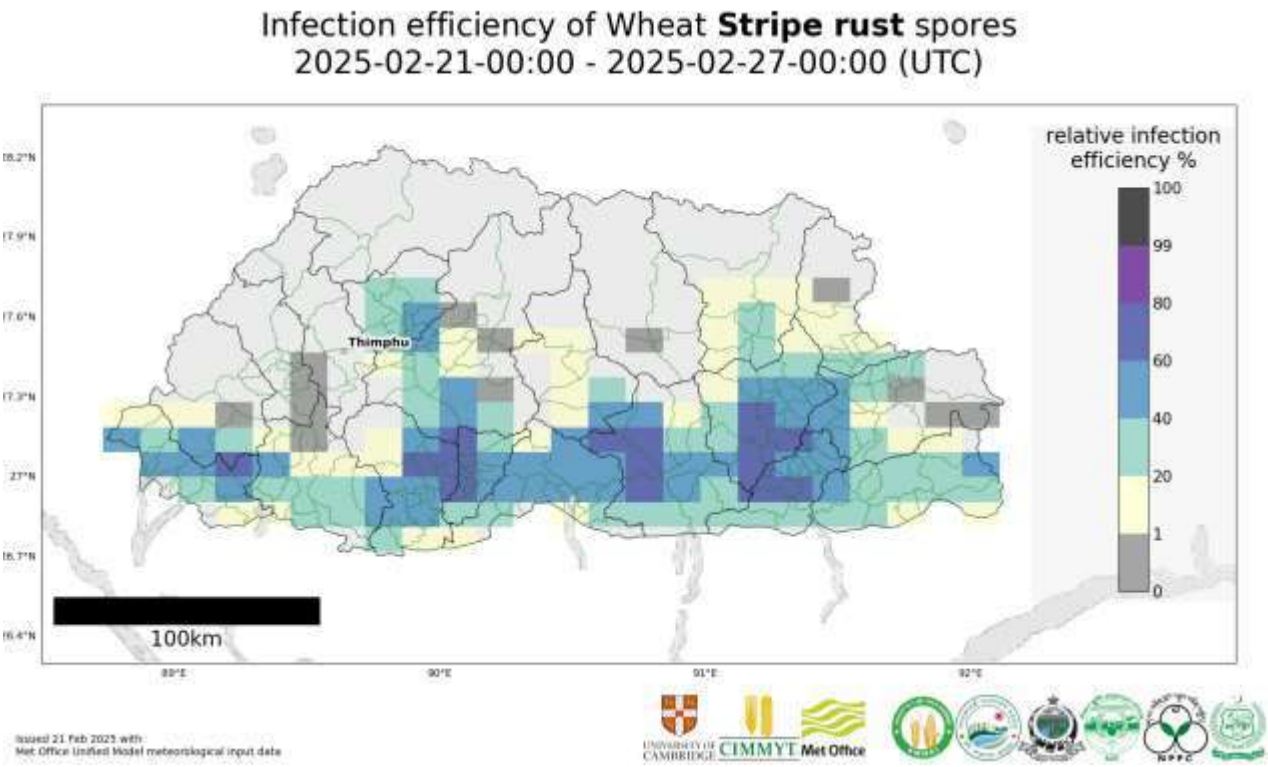
Stripe rust

Dispersal: Current forecast (21 Feb - 27 Feb) indicates no dispersal as no reports of stripe rust in Bhutan.



Map 6: Stripe rust spore deposition forecast Bhutan 21 Feb - 27 Feb 2025

Risk of infection: Current forecast (21 – 26 Feb) indicates moderate to high infection efficiency across southern areas, some infection efficiency in the main valleys. Little or no suitability forecast in other areas.



Map 7: Stripe rust suitability for infection forecast Bhutan 21 Feb - 26 Feb 2025

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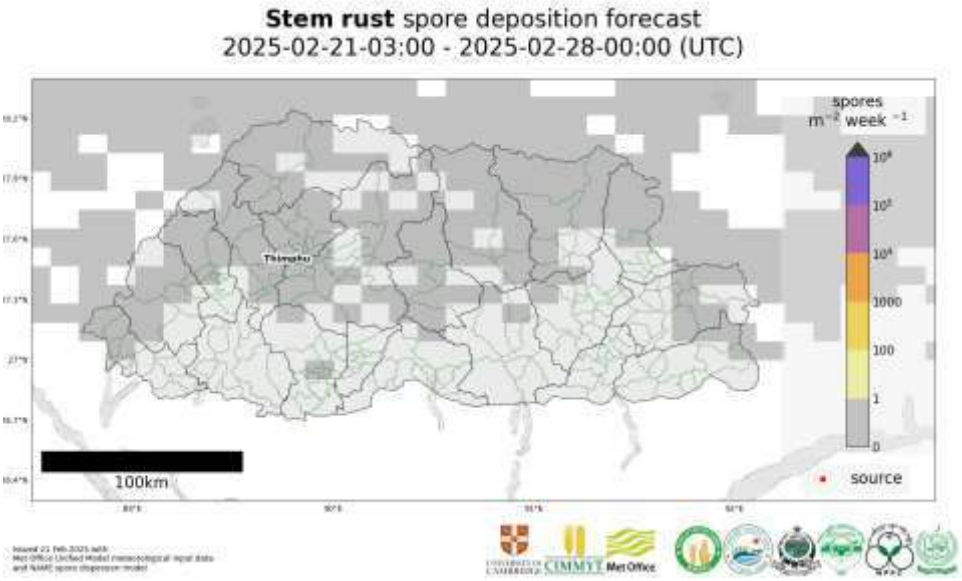
The 20 most impacted districts (infection efficiency) per country are presented in the table below.

admin2Name	admin1Name	RIE_stripe_rust_%
Barzhong	Tsirang	70
Chhimung	Pemagatshel	66
Dungmin	Pemagatshel	66
Tsholingkhor	Tsirang	66
Tsangkha	Dagana	66
Jurmey	Monggar	64
Chongshing	Pemagatshel	62
Mendrelgang	Tsirang	62
Drepung	Monggar	62
Drugyelgang	Dagana	62
Rangthangling	Tsirang	62
Kikorthang	Tsirang	61
Kengkhar	Monggar	61
Tsirangtoe	Tsirang	60
Shemjong	Tsirang	60
Gosarling	Tsirang	60
Dungtoe	Samtse	59
Thangrong	Monggar	59
Yurung	Pemagatshel	58
Shumer	Pemagatshel	57

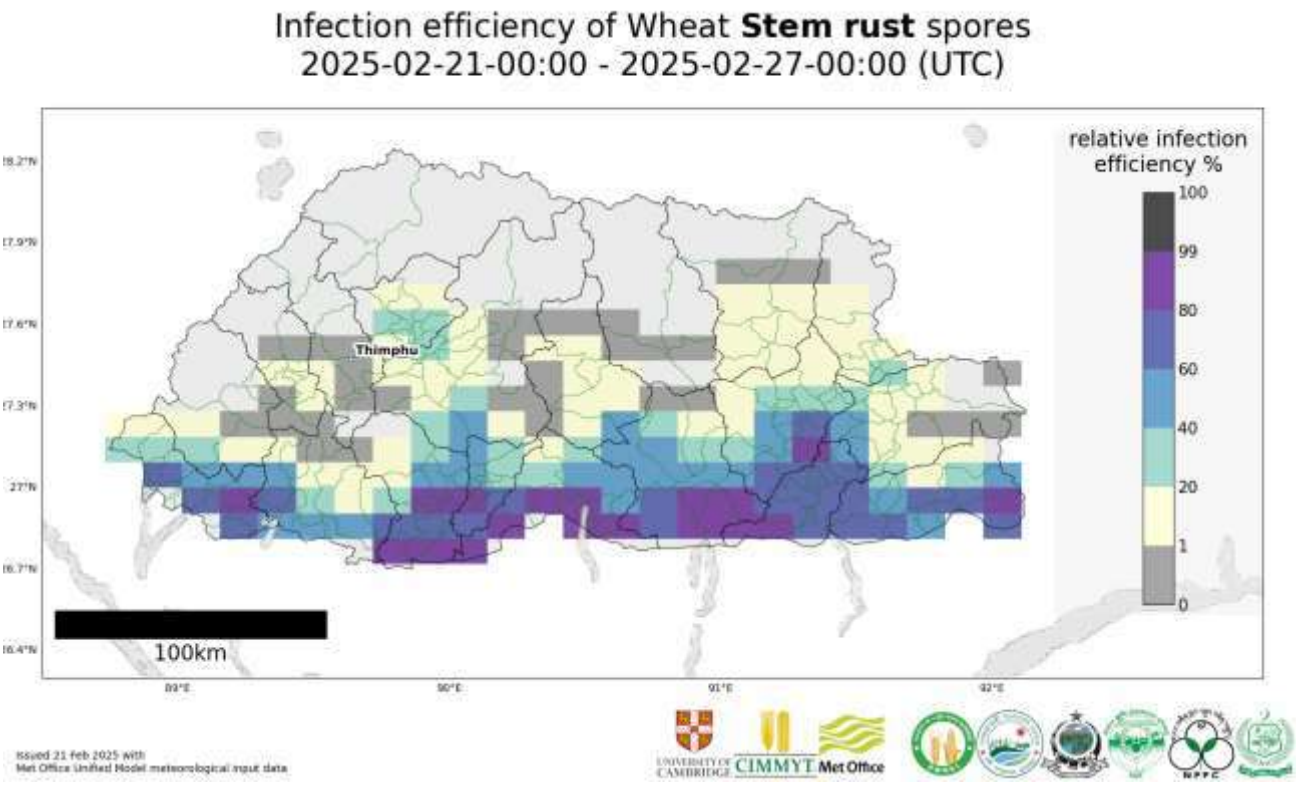
Stem rust

Dispersal: Current forecast (21 Feb - 27 Feb) indicates no dispersal as no reports of stem rust.



Map 8: Stem rust spore deposition forecast Bhutan 21 Feb - 27 Feb 2025

Risk of infection: Current forecast (21 – 26 Feb) indicates moderate to high infection efficiency in southern areas. Low or no suitability forecast in other areas.



Map 9: Stem rust suitability for infection forecast Bhutan 21 Feb - 26 Feb 2025

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

admin2Name	admin1Name	RIE_stem_rust_%
Barzhong	Tsirang	84
Gelephu	Sarpang	83
Gozhi	Dagana	83
Chhuzagang	Sarpang	83
Bhur	Sarpang	83
Shompangkha	Sarpang	83
Tsendagang	Dagana	82
Trashiding	Dagana	82
Nichula	Dagana	79
Senge	Sarpang	78
Beteni	Tsirang	78
Langchhenphu	Samdrupjongkhar	76
Chokhorling	Pemagatshel	76
Dechhenling	Pemagatshel	76
Norbugang	Pemagatshel	75
Chhimung	Pemagatshel	75
Mendrelgang	Tsirang	75
Gozhing	Zhemgang	75
Deorali	Dagana	75
Dungmin	Pemagatshel	75

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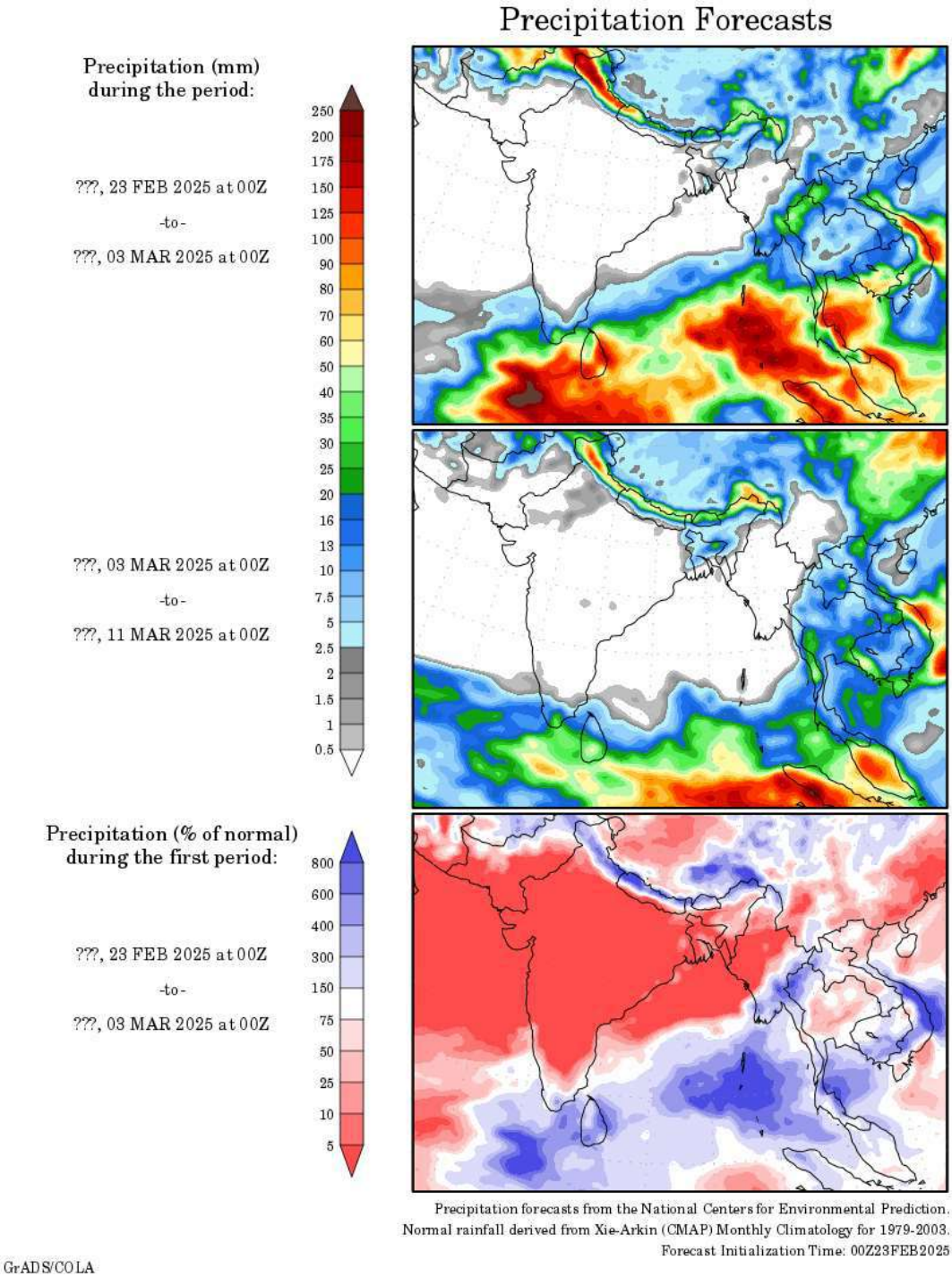
Region-wide Forecasts

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.

Precipitation: During the period 28 Feb -3 Mar, generally forecast to be dry across Bangladesh, some rain is forecast for Bhutan, north west India, Nepal (except Terai) and northern Pakistan. Increased chance of rain forecast for 3 – 11 Mar, with light rain across Bangladesh.



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Temperature: During the period 23 Feb – 3 Mar temperatures are generally slightly warmer than normal across the region, except for northern Pakistan, north west India, high hills of Nepal and most of Bhutan.