Wheat Rust Advisory No. 4
8 September 2018

Wheat Rust Advisory – risk assessment of wheat rust outbreaks and spread in Ethiopia

Summary Period: 25 August – 8 September 2018

Summary:

- **Both Stripe and Stem rust are increasing rapidly. Urgent control is needed in several areas to stop further spread. Stripe rust is the immediate threat, but high incidence of stem rust in early stage crops in some areas is a big concern.**
- Surveys undertaken by OARI/Oromia Bureau of Agriculture and Natural Resource (26th Aug – 6th Sept) in Arsi, West Arsi and Bale indicated **heavy infections of stripe rust. Worst affected woredas were: Degeluna Tijo and Limu Bilbilo. Also affected were: Lude Hitosa, Hitosa and Gaseera (Bale zone)**. **Stem rust was reported at high incidence, but currently low severity in Dodola and Assasa**. Some farmers are spraying, but reports of ineffective control in some areas. Farmers in these areas were complaining of lack of access to fungicides and high prices. These areas in Arsi/West Arsi & Bale need urgent control.
- On-going surveys by Ambo PPRC are finding **high incidence of Stripe rust in West / South-West Shewa** and high severity of stem rust in a few fields.
- In Amhara, the current rust situation appears good. Reports from Gonder indicate early stage crops (tillering) were free of rusts. There was a single report of stripe rust on Triticale at Debre Tabor
- New Environmental/climate suitability forecasts for stripe rust infection (Cambridge Uni/UK Met Office) are now available. Forecast areas of highest suitability for stripe rust infection (5-12 Sept) are: **Bale (western part), West Arsi, Arsi (eastern part)**, Gurage/Selti/Hadiya, **South-West / West Shewa**, East Wellega, East+West Gojam, South Gonder, North Gonder and North Wollo. Areas in bold are already infected (control needed). Other areas are high priority for scouting and control if needed.
- Dispersal models indicate much wider dispersal for stem rust from known infected sites in Bale, with dispersal in a south-westerly direction into SNNPR. Dispersal models for stripe rust indicate widespread dispersal from infected sites in Arsi across the Rift valley into SNNPR highlands and South-West/West Shewa. Other infected sites indicate limited local dispersal patterns.
- Rainfall forecasts indicate continued rain in most wheat growing areas with most rainfall in north and west. Favourable conditions for rust development are likely to continue.

Recommendation:

- **Control should be undertaken in areas with emerging rust infections. Other at risk areas should be monitored closely and control undertaken if needed on susceptible varieties.**

- **Awareness should be raised amongst stakeholders at all levels, including farmers, to be vigilant for early appearance of rusts (both stripe and stem rust)**
- **Control should be considered if susceptible varieties are grown and disease is present (>10-20% of leaf / stem area infected). Early control to stop increased spread and further build-up of disease is very important.**
- Sampling of both stem and stripe rust should be undertaken to determine races present.

Overall Risk Level: Caution: **HIGH**

Field Surveys:

Oromia Agricultural Research Institute (OARI) and Oromia Bureau of Agriculture and Natural Resource) made a 10 days quick wheat rust survey in Bale, Arsi and West Arsi zones (26 Aug-6 Sept). They report: “yellow rust is developing at epidemic level. Even though some farmers are spraying fungicides - except for a few fields, they couldn't manage the rust. It is very serious concern for the region if the current rust epidemics is not well controlled. Farmers are complaining of lack and access to fungicides and high price of those available fungicides. Besides, stem rust is also appearing particularly in Assasa and Dodola Districts which is also another alarming situation ahead of us. The most affects districts for yellow rust are Lode Hixosa, Hitosa (some kebeles of this district), (Digelu and Tijo, Lemu Bilbilo-these two districts are severely affected), Gassera from Bale zone (two early planting kebeles- known hot spot areas of rust), Adaba and Dodola (high incidence with low severity, but potentially can result in huge loss if not sprayed). These are the districts which need close follow up and immediate fungicide spraying”.

Kulumsa (6 Sept). Initial yellow rust and stem rust starting to appear on station. Low incidence and severity Yellow rust + stem rust in farmer fields Kulumsa –Etaya. Farmers sprayed and got good control. Crops at stem elongation stage.

A team from Ambo PPRC are surveying in West / South-West Shewa (25 Aug – 8 Sept). A total of 29 fields surveyed. Crops mainly at flowering stage (range boot-dough). Varieties grown Kakaba (10), Kubsa (8), Kingbird (4). Stripe rust found in 23 fields (79%), most low incidence / severity but 6 fields with moderate/high incidence. Severity up to 40 MS. Stem rust found in 18 fields (62%). Mostly low incidence / severity but 3 fields with high incidence and severity (up to 70 MS on Kakaba).

Bako team surveyed 6 fields in Horro & Jima Geneti on 29th Aug. No rust observed in crops at tillering stage.

Gonder – 38 fields surveyed (around 20-25 Aug). No rust observed

Adet – South Gonder. 1 field of triticale infected with yellow rust. Crops at tillering stage.

Debre Birhan – Just about to start surveys in this area.

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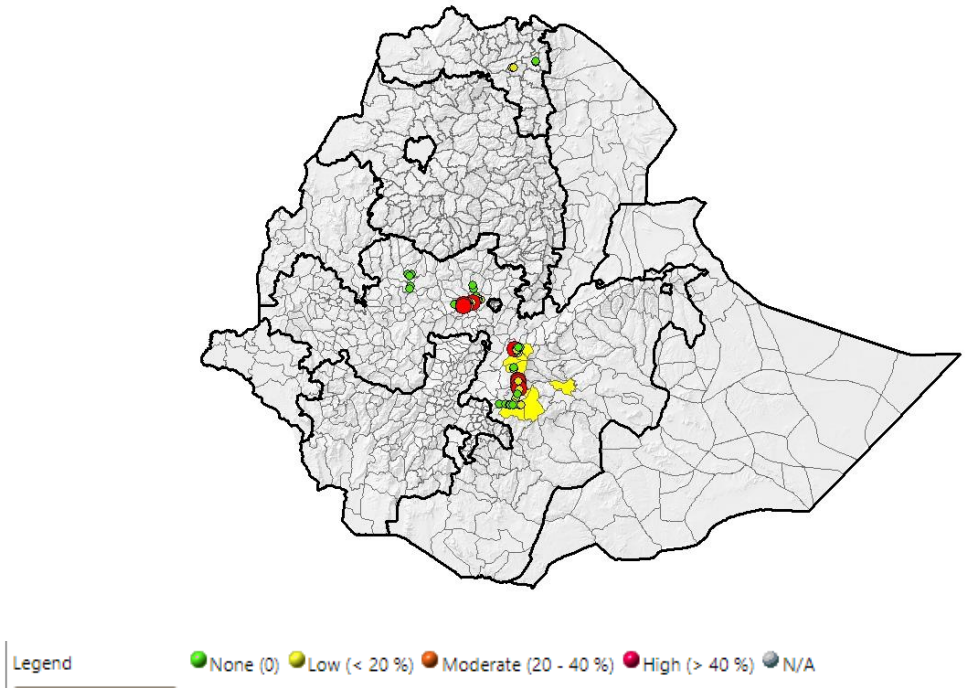
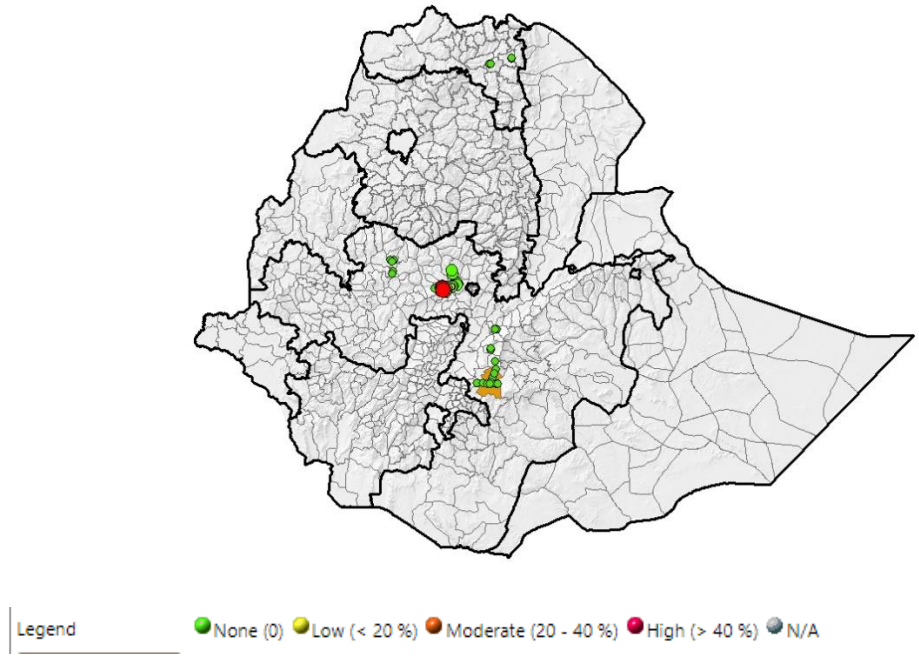
Map 1. Stripe Rust Incidence early Meher season surveys (to 7th Sept 2018)



Districts in yellow – high incidence of yellow rust reported

Map 2. Stem Rust Incidence early Meher season surveys (to 7th Sept 2018)



Districts in orange – high incidence of stem rust reported

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Stripe Rust Races:

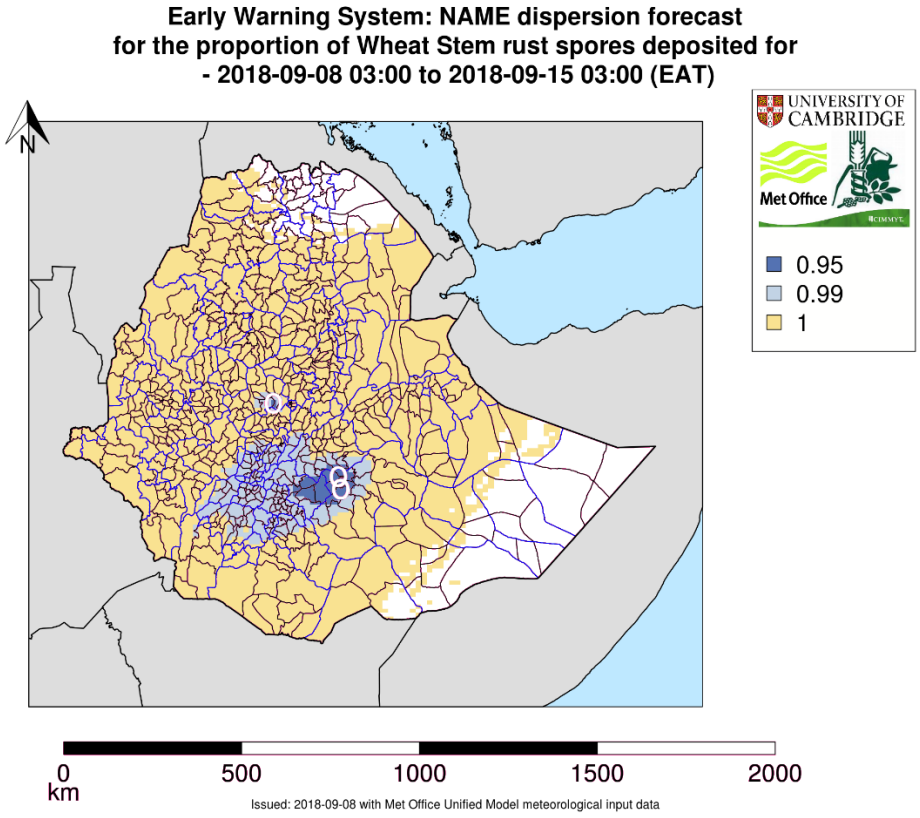
Rapid analysis using new MinION nanopore sequencing technology (John Innes Center, UK/EIAR Holeta/CIMMYT) confirmed race PstS11 (same race as prevalent in 2017) – sample from Asassa 15th August 2018.

Dispersal Forecast:

Most recent dispersal forecasts (8-15th Sept) run by the UK met Office and Cambridge University are displayed. For stem rust, sources in Bale and West Shewa are included. For Stripe rust, sources in Arsi, Bale, West Shewa and Tigray are included.

Stem rust: for the period 8 to 15 September (Map 3A) the dispersal pattern has increased from Bale sources. Dispersal is towards south-west / West with maximum spore deposition occurring in Bale / West Arsi. But there is a likelihood of spores dispersing across the Rift Valley and into SNNPR. Dispersal from the source in West Shewa (small source strength used in model) shows a limited local dispersal close to source.

Map 3A: Stem rust weekly dispersal pattern 8-15th September 2018



NB. Dark Blue is where 95% of the spores are deposited and the dark blue and light Blue together indicate where 99% of the spores deposited (blue = main risk Zone). Yellow Indicate the remaining 1 %

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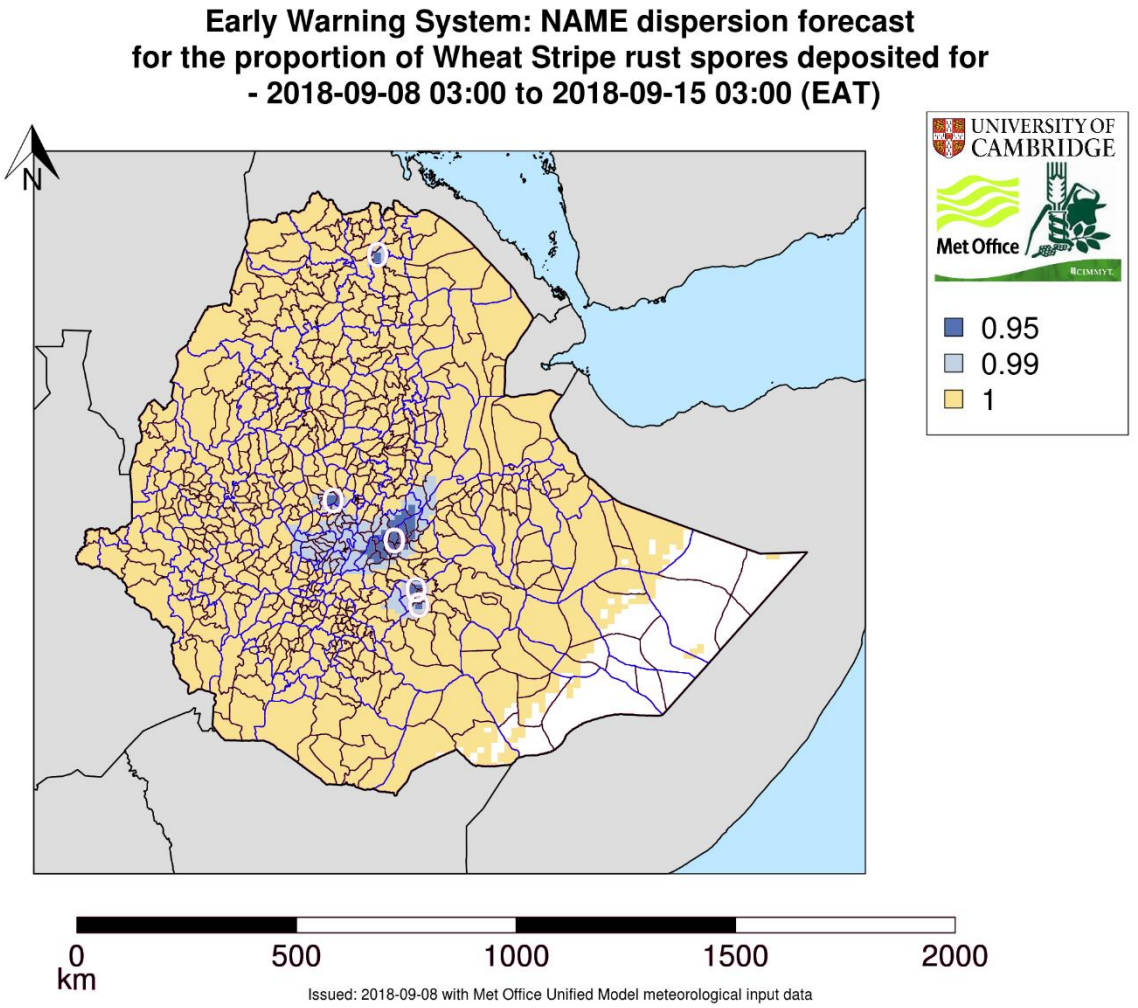
Stripe Rust: for the period 8 to 15 September (Map 3B) the source location in Arsi showed a westerly and north-easterly dispersal pattern, with most spore deposition in Arsi zone but there is also the likelihood of spores dispersing across the Rift valley into northern SNNPR and south-west /west Shewa. Sources in Bale, West Shewa and Tigray all showed a limited dispersal pattern with most spore deposition close to sources.

Map 3B: Stripe rust weekly dispersal pattern 8-15th September 2018



NB. Dark Blue is where 95% of the spores are deposited and the dark blue and light Blue together indicate where 99% of the spores deposited (blue = main risk Zone). Yellow Indicate the remaining 1 %

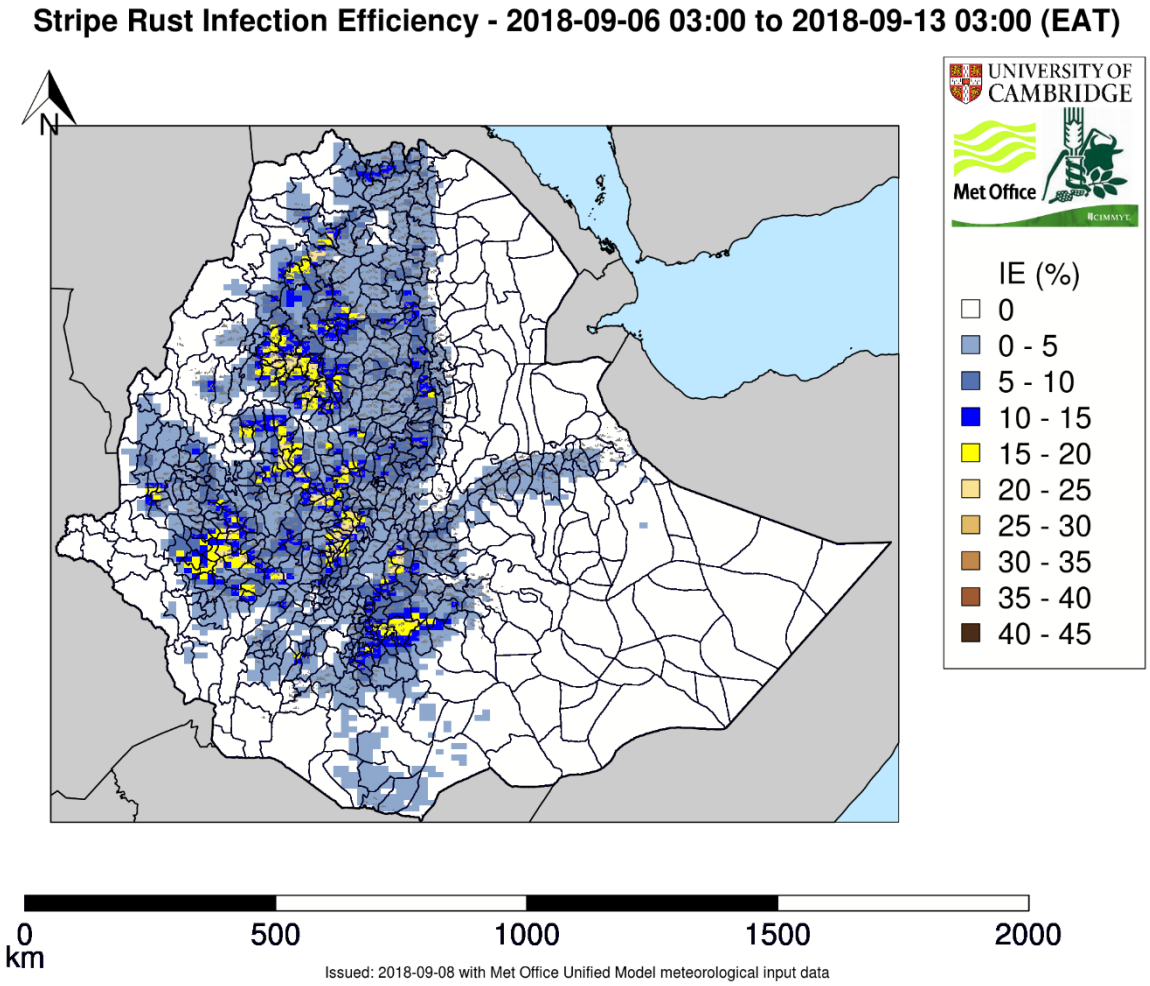
NB: It cannot be discounted that additional rust sources are present in other parts of Ethiopia, but have not been reported

Wheat Rust Advisory No. 3
24 August 2018

Environmental / Climatic Suitability – Risk of Infection Forecast

Risk of Infection Forecast Stripe Rust (6-13th September 2018)

These forecasts give the probability of stripe rust infection occurring based on meteorological factors. The maximum infection efficiency that can occur is 45%. This means that 45% of the spores deposited on susceptible wheat plants could complete the infection process. Therefore, a forecast Infection Efficiency of 45% indicates a very high risk of stripe rust infection occurring in susceptible wheat varieties.

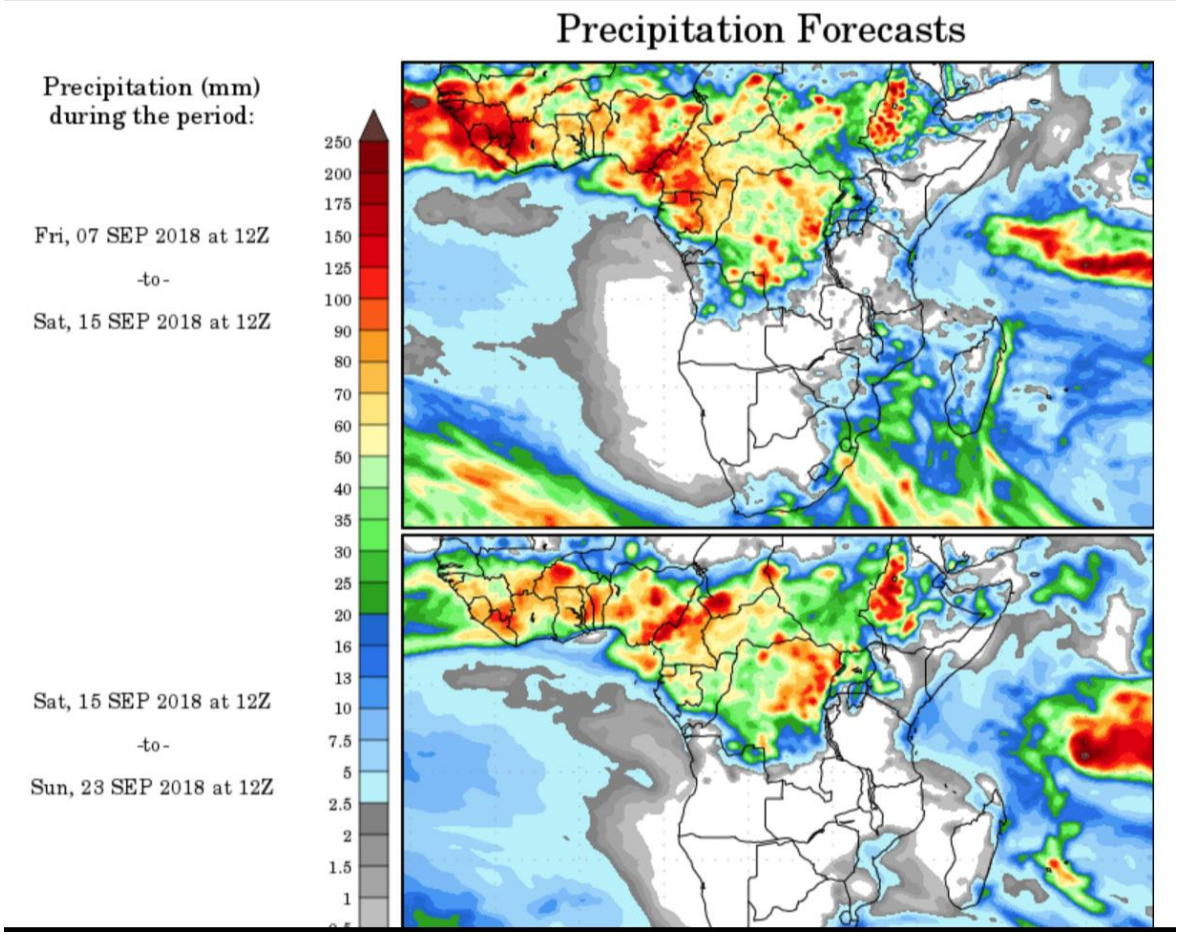


Areas with highest relative risk of infection include: Bale, Arsi (eastern part), Gurage/Selti/Hadiya, West / South-West Shewa / East Wellega, East+West Gojam, South Gonder, North Gonder (and possibly some parts of North+South Wollo).

Wheat Rust Advisory No. 2
8 August 2018

Weather Conditions / Forecast:

Short term forecasts indicate continued rain over most wheat growing areas. This will be heaviest in the north and west of the country. Conditions are likely to remain favourable for rust development in most areas.



Precipitation forecast from the National Centers for Environmental Prediction (http://wxmaps.org/pix/prec10)