



Maize Seed Tracker – A digital decision support tool to enable MLN-free commercial maize seed production



The spread of devastating transboundary pests and diseases has increased in recent years, particularly in sub-Saharan Africa, due to various reasons, including changing climates and global trade. Among several transboundary diseases, Maize Lethal Necrosis (MLN) is one of the major diseases in eastern Africa. The disease was first reported in the southern Rift Valley of Kenya and rapidly spread to several other eastern African countries during 2012–2014. A multipronged approach was adapted to tackle the MLN. One of the key factors for spreading MLN in the East African region is due to the movement of the virus-contaminated seeds, in addition to insect vector transmission. The production of virus-free seed is an important requirement to prevent the introduction of contaminated seed into farmers' fields and the secondary spread of insect vectors. The regulators implemented various measures to ensure the production of MLN-free seed as part of the seed certification requirements.

We have adopted the Maize Seed Tracker (MST) for real-time seed field monitoring, preventing MLN risk and ensuring compliance with regulatory quality assurance requirements. This document introduces a Maize Seed Tracker as a digital decision support tool developed under the CGIAR Plant Health Initiative for effective MLN surveillance of maize seed production fields.

What is Maize Seed Tracker: It is an ODK-based web app that supports data management and decisions for conducting MLN surveillance in a time series and implementing SOPs for MLN pathogen-free commercial maize seed production.

Implementation model: The Kenya Plant Health Inspectorate Service (KEPHIS) will be the nodal partner to drive the seed field surveillance using MST, including deployment of on-spot MLN diagnosis with immunostrips in the seed grower field at critical crop growth stages.

Piloting with a few seed producers, such as Kenya Seed Company and the KALRO Seed Unit, for testing and validation of MST.

CIMMYT and IITA design and deploy the tool, provide technical assistance and adjust it as necessary based on user feedback.

MST Features

1) Data Collection:

- a) Surveillance data collection by the seed producer:
 - i) Farmer's information
 - ii) Plot history
 - iii) Plot disease survey
 - iv) Post-harvest information at the plot level
 - v) Post-harvest information at the farmer level.

The data will be collected at several intervals during the crop season with the updated version of MLN surveillance and diagnostic protocol (<https://mln.cimmyt.org/mln-status/protocols-survey-forms/>).

2) Data Management:

- a) To trace, track, and test the possible presence of MLN pathogens in the seed production field.
- b) Develop an alert mechanism on the MLN status in the seed production field.

- c) Implement effective MLN disease-free seed production steps in all the seed production areas.
- d) Track the seed production and analyze the data for MLN seed rejections and associated factors in the seed production fields.
- e) Notify the (relatively) MLN-free areas based on the data collected over the years.
- f) Develop a report based on data collected from the seed producers and seed growers, area-wise, county-wise, season-wise, and year-wise.

Benefits to the Stakeholders

1) Seed Producers

- a) Seed producer (i.e., seed company) can establish the seed grower details, including:
 - i) Location (GPS coordinates)
 - ii) Farm details
 - iii) Crop details
 - iv) Disease data
 - v) Seed production (estimate/actual/approval/rejection due to MLN)
- b) Seed producers can have access to information on the seed production farms growing their maize varieties and monitor their progress dynamically.
- c) Seed producers can monitor the implementation of the MLN-free seed production checklist to ensure that all the critical steps are followed.
- d) Implement MLN management practices based on surveillance.
- e) Can get the seed production forecast besides estimated seed yield.
- f) Can keep track of the locality, farmers, and the county for MLN incidence, if any, and plan for commercial seed production in MLN-free areas.

2) Regulatory Agencies

- a) The NPPO will undertake timely surveillance of the commercial maize seed production fields and inter-link the surveillance data with MLN management strategy.

- b) MST helps to collect information on seed producers and growers, disease survey data, and seed production plot-wise and farmer-wise with the GPS coordinates and link the NPPO's seed producer ID and the seed producer plot ID, so that linking all the data can be linked to the central database.
- c) Enhanced MLN surveillance in collaboration with the maize seed producers in the country.
- d) Provide a dynamic alert mechanism on MLN spread in the maize seed production areas, and effectively liaise with the seed and grain producers on MLN management practices.
- e) Monitor centrally the maize seed production areas in the country over the years for the presence/absence of MLN and enable identification of maize commercial seed growers with good farm practices and producing MLN pathogen-free seeds.
- f) Get accurate details on all the seed producers and growers and categorize the seed growing areas based on the risk of MLN incidence (high, medium, and low).
- g) Shall keep track of seeds produced with clean seeds and rejected seeds due to MLN.
- h) Collate the data on commercial maize seed production and disease status on a company-wise, county-wise, and seasonal basis.

3) CIMMYT/CGIAR

- a) Enable dynamic MLN surveillance and disease-free commercial seed production through the App and provide meta-data on the MLN Information Portal (<https://mln.cimmyt.org>)
- b) Technical backstopping of the partners, especially the commercial seed companies, on how to contain and/or prevent MLN incidence in the seed production areas in the country.
- c) Liaise with the seed producers, and seed growers, together with the regulatory agencies, on monitoring and tracking MLN disease-free commercial seed production, and MLN management practices to support MLN-free seed production.
- d) Establish an MLN alert mechanism, in partnership with the regulatory agencies.



contact:

Dr. B.M. Prasanna (email: b.m.prasanna@cgiar.org)

Dr. L.M. Suresh (email: l.m.suresh@cgiar.org)