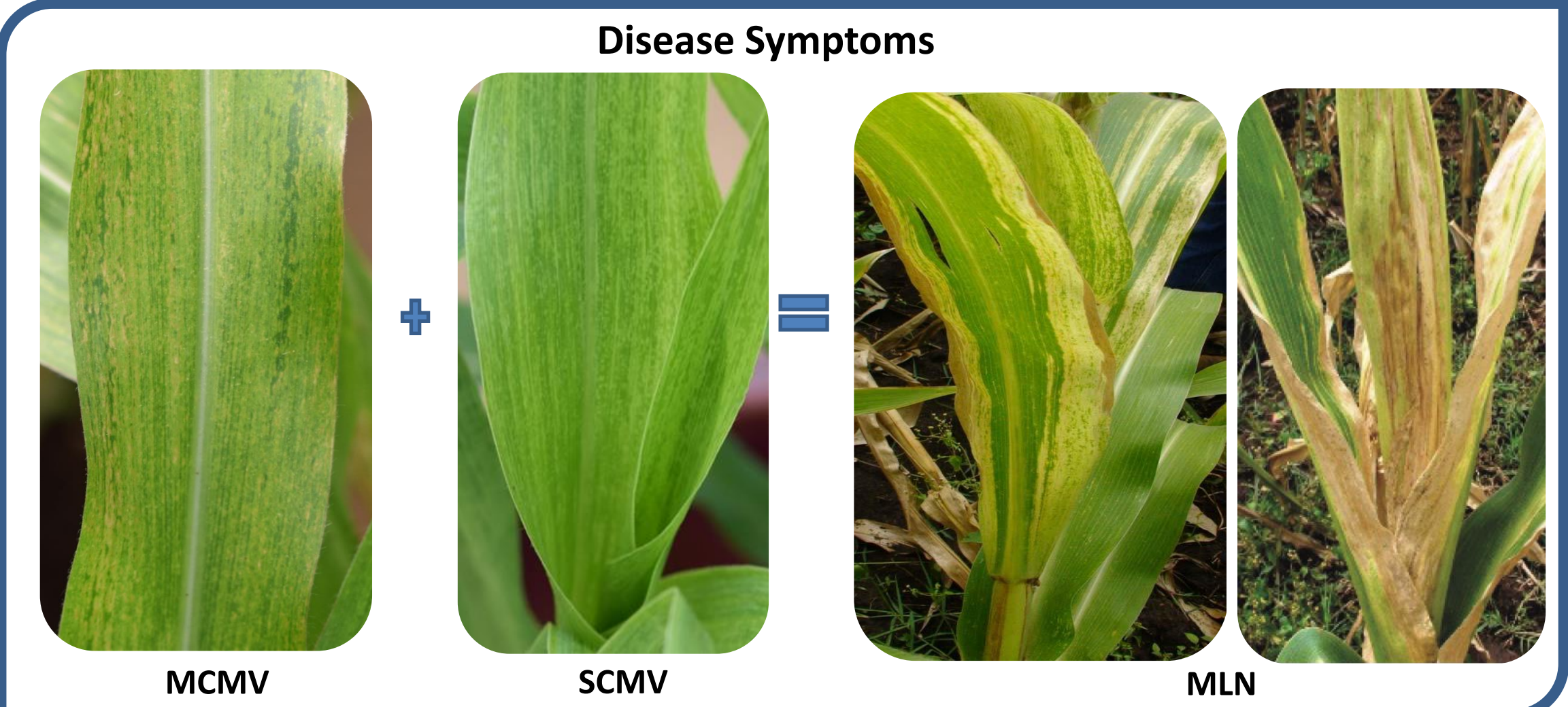


Maize Lethal Necrosis (MLN) – Prevention and Management

The Maize Lethal Necrosis (MLN) disease of maize emerged in eastern Africa in 2011-2012, affecting the food security and livelihoods of several million smallholder farmers. Intensive efforts by CGIAR, together with national and international partners, helped in implementing a modern surveillance and monitoring system, spread improved agricultural practices for the disease control, deploy MLN-tolerant/resistant varieties, and curb the spread of the disease through safe germplasm exchange and distribution. An MLN Phytosanitary Community of Practice was established among national plant protection organizations and commercial seed sector. MLN is still prevalent however in eastern Africa. Continued efforts are needed through the CGIAR Plant Health Initiative to implement MLN monitoring and management strategies to contain the disease in eastern Africa, and prevent its spread to other regions in sub-Saharan Africa.



Breeding and Deploying MLN-Resistant Varieties

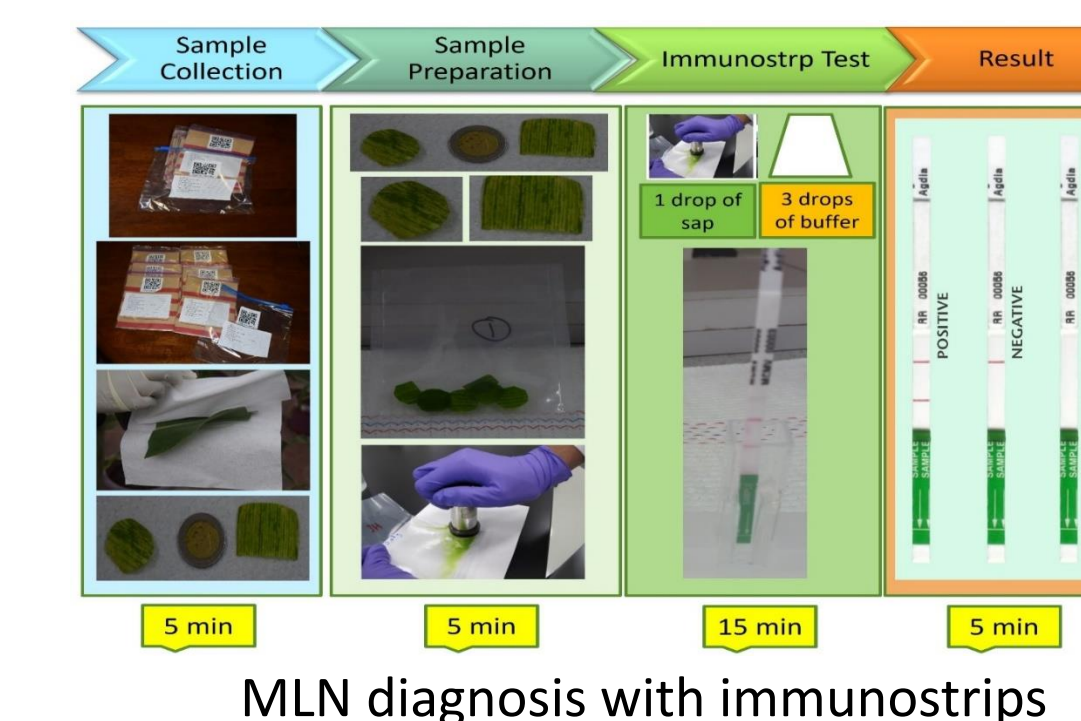
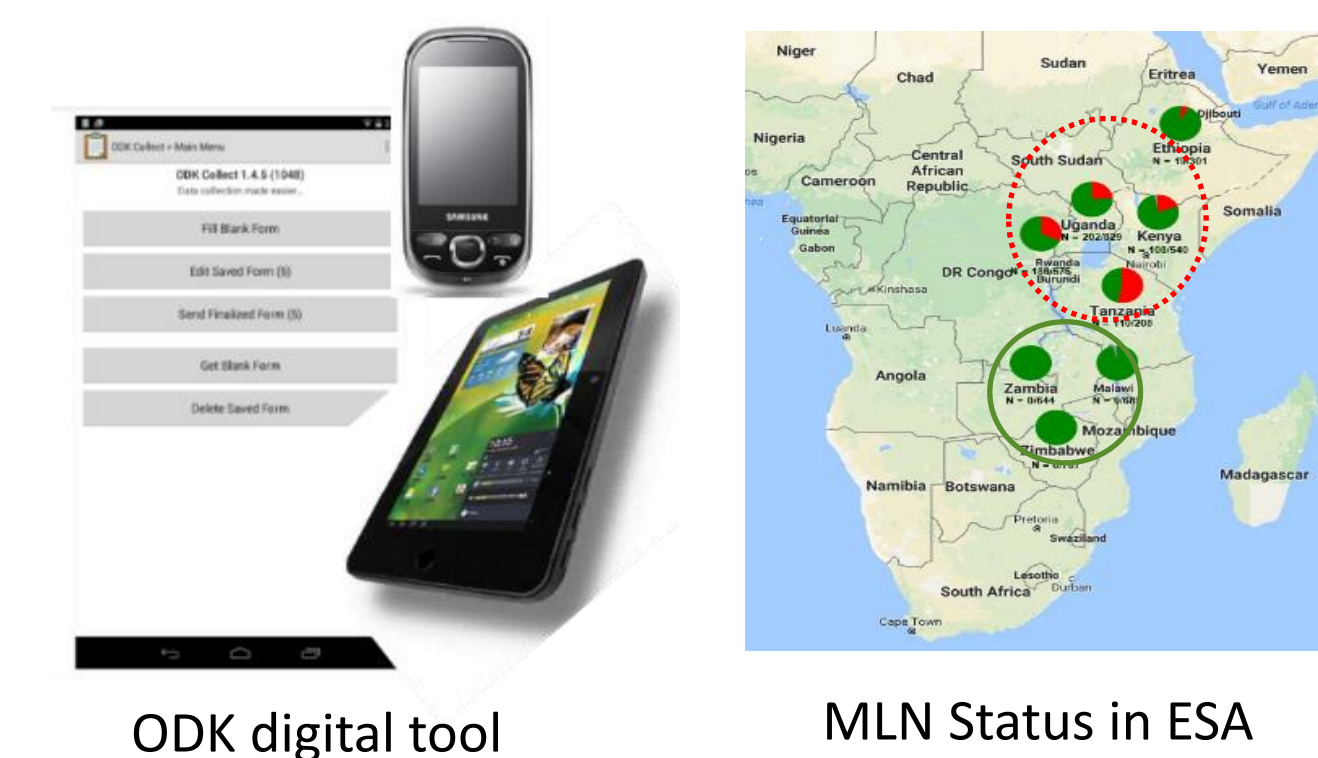
- “MLN Screening Facility” established by CIMMYT and Kenya Agricultural and livestock Research Organization (KALRO) in 2013. Over 230,000 row of maize germplasm, including breeding lines and populations, have been screened so far.
- 19 CIMMYT-derived MLN-tolerant/resistant maize hybrids have been released by partners in eastern Africa.
- Around 53 parents of present commercial hybrids were improved for MLN resistance by trait introgression.



MLN Screening Facility, Naivasha, Kenya

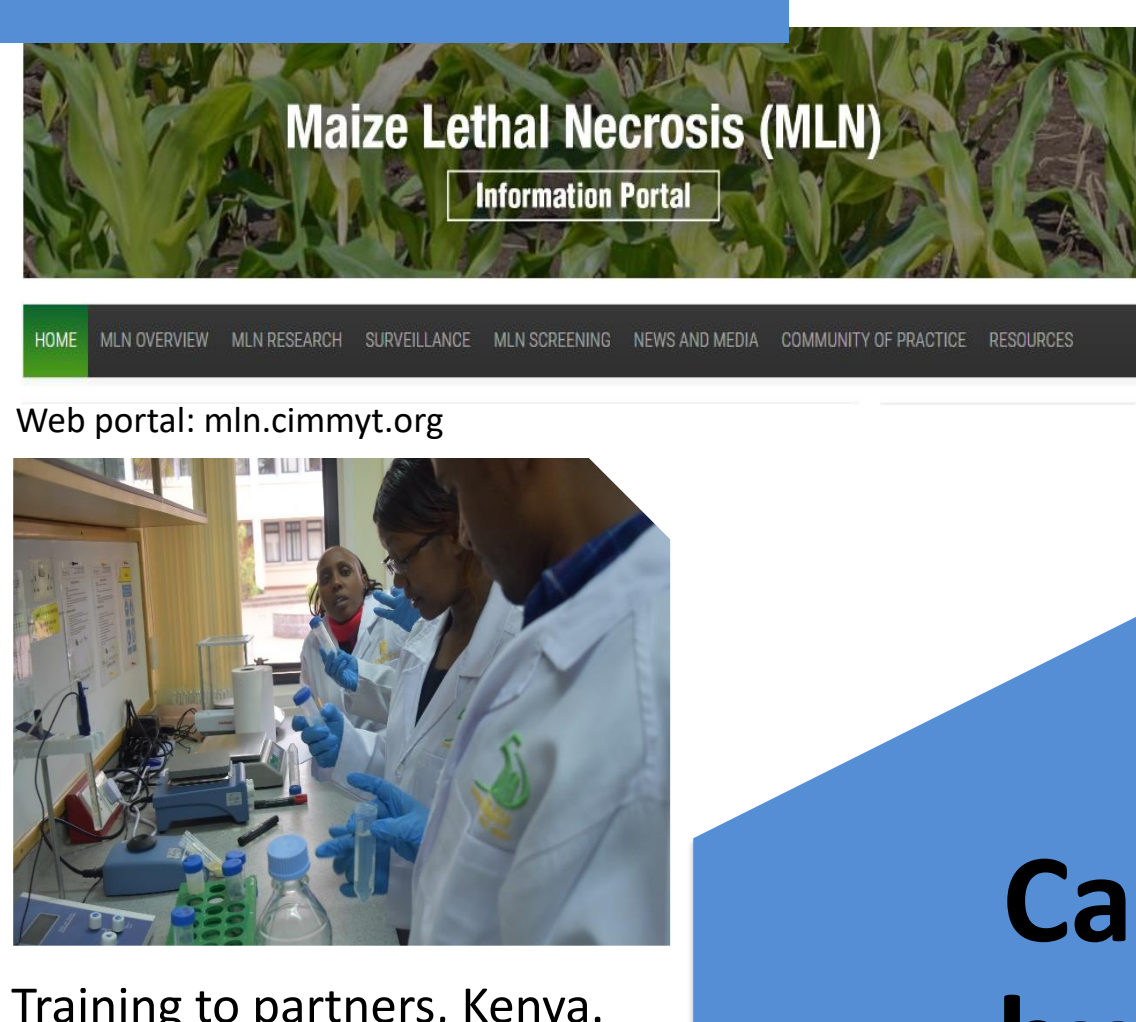
MLN Monitoring and Surveillance by the NPPOs

1. Optimization of MCMV diagnostic protocol using immunostrip and surveillance system using digital ODK platform.
2. Training NPPO's, SME's and NARS for MCMV diagnosis and disease surveillance.
3. Conducting MCMV surveillance in ESA during 2016-2019.
4. Updating the MLN surveillance data (country wide) in MLN web-portal.



Capacity Building, Communications & Outreach

1. Disseminating information on farming practices for minimizing MLN incidence and update in MLN web portal.
2. Establishing an MLN Phytosanitary Community of Practice for sharing of learning, MLN diagnostic and surveillance protocols, and best management practices for MLN control in Africa.
3. Strengthening capacities of national plant protection organizations (NPPOs) on MLN diagnostics, monitoring and surveillance system.



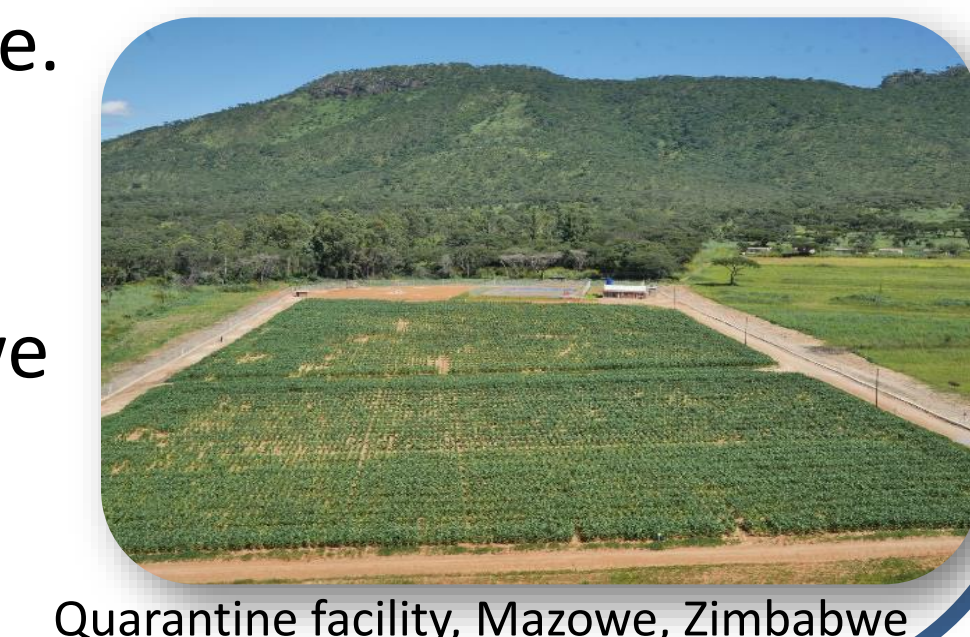
Breeding & Deploying MLN Resistant Varieties

Monitoring & Surveillance by the NPPOs

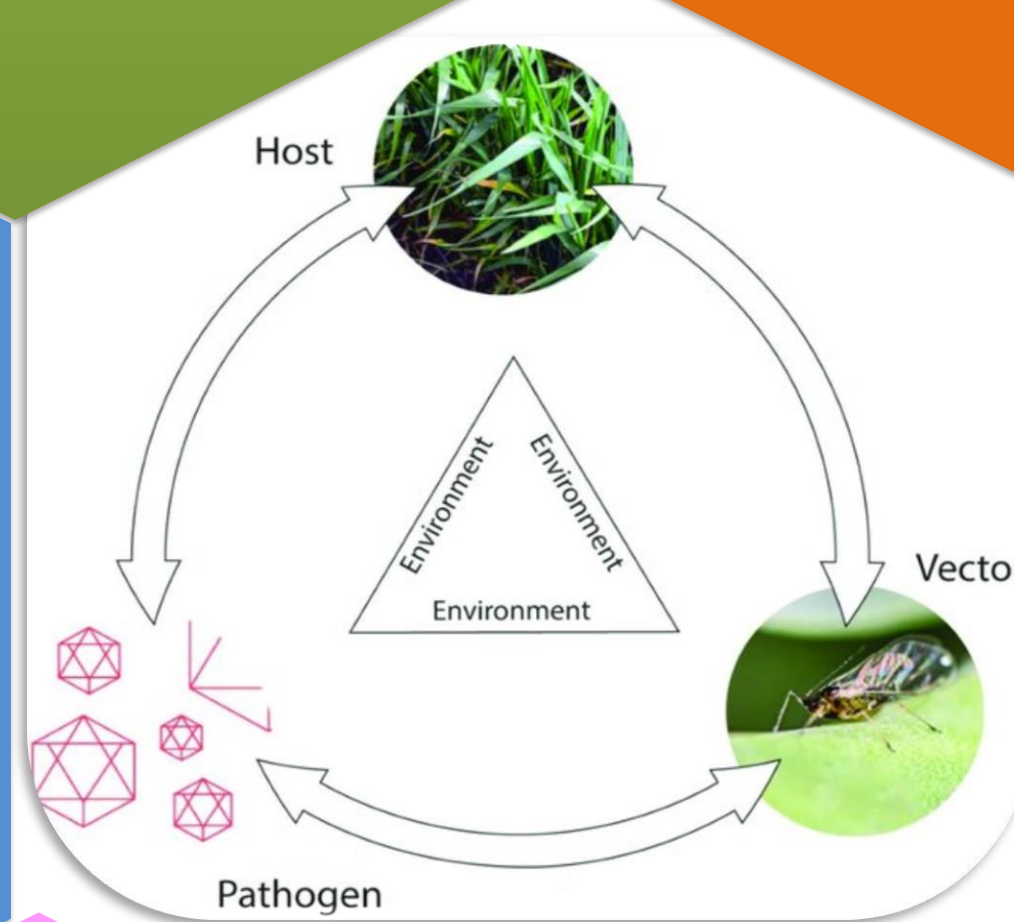
MLN-free Germplasm Exchange

Safe germplasm exchange and distribution from Kenya to other countries in ESA with following stringent practices:

1. Periodical surveillance in breeding site at Kiboko from CIMMYT and KEPHIS team.
2. Testing every single seed entry at CIMMYT lab, Nairobi.
3. Testing the seeds at KEPHIS lab and get Phyto-certificate.
4. After seed arrival, testing the seeds again at Harare, Zimbabwe.
5. Growing these germplasm in quarantine facility Mazowe and testing the seeds and finally distribute to all non-endemic countries.



Capacity building, Communications & Outreach



Safe germplasm exchange and distribution

Agronomic Management

MLN-free Commercial Seed Production

Next Steps

The CGIAR Plant Health Initiative will continue to focus on mitigating the threat of MLN in sub-Saharan Africa through partnerships with national and regional partners on:

1. Monitoring and surveillance of MLN by the NPPOs.
2. Implementing an integrated disease management strategy, including MLN-free commercial seed production and deployment, and promoting awareness of farming communities on MLN and its management.
3. Strengthening partners' capacity on MLN surveillance, diagnostics, and management.

MLN-free Commercial Seed Production

- MLN Phytosanitary Community of Practice, including Researchers, Seed producers and the NPPOs.
- MLN management checklist for seed companies to produce MLN-free seed.
- Training of stakeholder on the use of the checklists.
- Disseminating communication materials on MLN disease management in local languages
- Creating awareness among the diverse stakeholders in the maize value chain on SOPs for producing and exchanging MLN-free commercial seed.



Training to partners on Harmonized checklists for MLN-free commercial seed production at Kitale, Kenya.

Reference: Prasanna et al. (2020). Maize lethal necrosis (MLN): Efforts toward containing the spread and impact of a devastating transboundary disease in sub-Saharan Africa. Virus Research <https://doi.org/10.1016/j.virusres.2020.197943>.

Agronomic Management

- 1 Selection of Field**
 - Selection of the field with careful study on cropping / disease history.
 - Avoid maize planting, where neighbor field is with older maize crop with suspected MLN symptomatic plants.
- 2 Preparation of Field**
 - Make sure the soil in the farm is fertile at all times. This ensures crop are healthy thus can fight disease infections.
 - Remove and incinerate previous crop debris if the previous crop was noticed with MLN suspected maize plants. Ensure all the farm free from volunteer maize or cereal plants.
- 3 Use of Certified - MLN disease free seeds**
 - Use only certified seeds produced in MLN free areas for each growing season
 - Avoid using grain as seeds, and seeds from previous infected maize plants or fields.
- 4 Use of Clean / disinfected farm tools and equipments**
 - Clean farm equipment/tools using disinfectants before and after use to eliminate MLN virus contamination.
- 5 Scouting, roguing, and clean crop cultivation**
 - Monitor the field every week for presence of insect vector population. A high insect vector population increases chances of MLN infection.
 - Maintain a clean farm by removing grasses, weeds and other alternative hosts from fields.
- 6 Managing insect vectors**
 - Control of insect vectors can be done using recommended insecticides (once every 1-2 weeks).
 - Spray insecticides either in the morning or evening but not in hot and windy period. Before roguing plants, spray systemic insecticides.
- 7 Roguing and incinerating infected plant parts**
 - Scout weekly for MLN viral symptoms for early detection and control of insect vectors. Uproot MLN symptomatic plants and destroy them through burning.
 - Do not feed MLN-infected plants to livestock, such as cattle.
- 8 Crop rotation and Host free period**
 - Practice crop rotation for at least one season by growing non-cereal crops preferably legumes (beans, soybean and peas).
 - Avoid continuous cropping of maize ensuring a closed maize season of at least 2 months where possible

Partners

