Distribution and impact of maize lethal necrosis in Kenya

Brief on ***a working paper (May 2015)***

- Maize lethal necrosis (MLN) suddenly hit Kenya in 2011 causing major losses, which continue to date.
- Discussions with 121 groups countrywide provided loss estimates, from which national losses were interpolated and estimated at 0.5 million metric tons (23%), valued at USD188 million.
- Western Kenya is the hardest hit.

Maize lethal necrosis (MLN) is a viral maize disease that has rapidly become a major concern for East Africa's maize production. First reported in Africa in 2011 in Bomet County, Kenya, the disease has since spread in most maize-growing regions.

Farmers facing food shortage after MLN outbreak in Narok County.

Since 2012, MLN has been reported in other countries including DR Congo, Ethiopia, Rwanda, Tanzania, South Sudan, and Uganda. Infected plants have mottled and dying leaves, are stunted with shorter-than-normal distance from one leaf to the next along the stem, have a dead heart, sterile tassels and produce poor grain. If a plot is infected when the plants are young, the entire crop can be lost.

Despite rapid spread and devastation, there are few statistics on MLN incidence, distribution and severity. Yet this information is critical for prioritizing research and extension.

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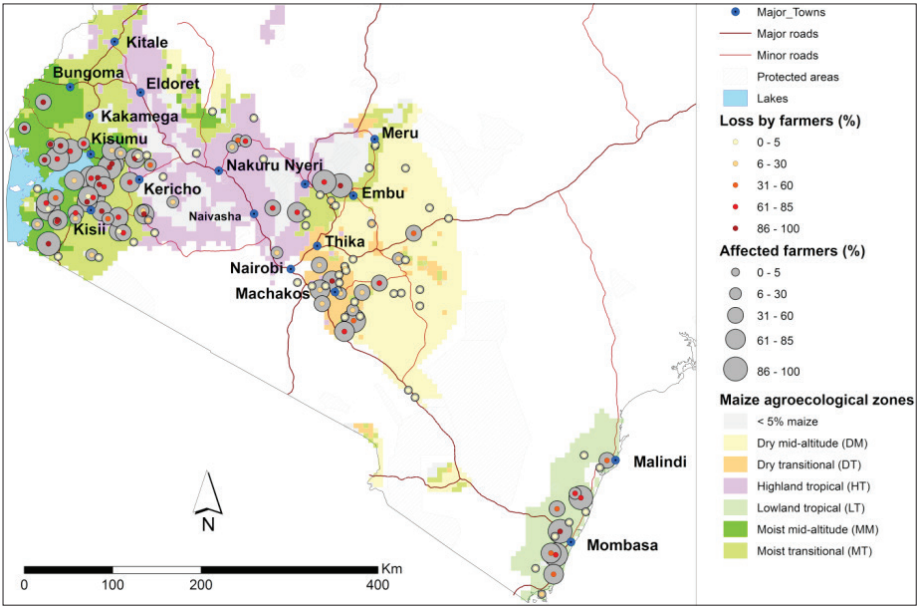
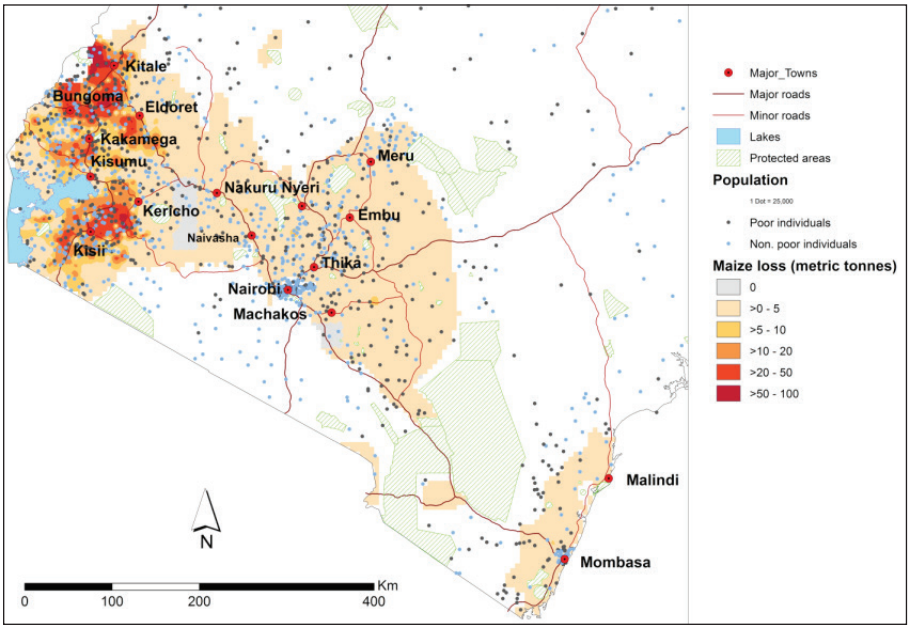
To fill this gap, group discussions with farmers were held in 2013 in 121 sub-locations in major maize zones. Respondents were asked if they had heard about MLN, when they first observed it, the proportion of households affected, and the estimated yield loss. Communities were randomly selected, so their responses could be used for interpolation of the results to estimate national and regional loss.

The analysis shows that MLN distribution and severity were highest in the high tropics and moist transitional zones where – by 2013 – all communities were affected, and lower in the dry and coastal areas. Western Kenya was the hardest hit (more than half the farmers), followed by Central and Eastern Kenya (up to a third of farmers). Correspondingly, yield losses were highest in Western Kenya, followed by the highlands and the coast, but low in the drylands. Kenya's loss was estimated at 0.3 million tons per year, or 23% of the average annual production before MLN, estimated at USD 110 million.



Proportion of farmers affected and estimated yield loss on affected farms.



Maize losses due to MLN in metric tons per pixel (approximately one square kilometer each)

Maize production and MLN losses

Agro-ecological zone	Maize production (tons)	Estimated loss (tons)	Average loss (%)
Moist mid-altitude	304,994	96,707	32
Moist transitional West	1,040,794	298,277	29
Highland tropical	583,681	87,750	15
Moist transitional East	49,003	2,649	5
Dry mid-altitude	157,159	5,021	3
Dry transitional	27,409	762	3
Lowland tropical	8,228	1,227	15
< 5% maize	141,579	21,634	15
Total	2,171,268	492,393	23

Conclusions and Recommendations

MLN has suddenly become a very critical maize disease, with losses of 0.3 million tons, valued at USD 110 million (USD 365/ton). And although these losses are based on farmer estimates, they correspond to estimated losses arrived at by various extension services. The USDA Foreign Agricultural Service estimates yield losses as high as 10% for the 2014/15 marketing season amounting to more than USD 50 million (USDA, 2014).

Given the importance of MLN and its devastating effect on farmer livelihoods, urgent action is needed. First, farmers need to be sensitized on appropriate agronomical practices to reduce disease incidence and severity including crop rotation, a maize-free season, early planting, timely detection and destruction of infected plants, planting of certified maize seed and crop diversification where possible (CIMMYT, 2013). This information needs to be translated into clear and informative messages, and effectively disseminated.

In the long term, developing maize varieties resistant – or at least tolerant – to MLN is the single most economical solution (Morris and Heisey, 2003). At this stage, focus should be on the moist transitional and moist mid-altitude zones, where most of the losses occur and which have the highest concentration of people living below the poverty line (De Groote et al., 2011), followed by the highlands. Ultimately, resistant varieties need to be developed for all zones because all agro-ecological zones are clearly affected – even if at different levels – and because the disease is still spreading.

Acknowledgement

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