Challenges to Intensification and scaling out

Presentation in the Annual Review and Planning Workshop of the Africa Rising Project

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Maize farmers in Kericho and Bomet suffer a loss due to outbreak of a fungal disease.

Despair as mysterious bug destroys maize farms

Disease threatens Kenya's maize crop

The maize disease that could change Kenya

Kenya: 300 Hectares of Maize Ruined By Disease in Nandi

Experts at war as maize growers harvest big losses

KENYAN MAIZE CROP FAILING…AND MINISTRY OF AGRICULTURE FAILINGS…

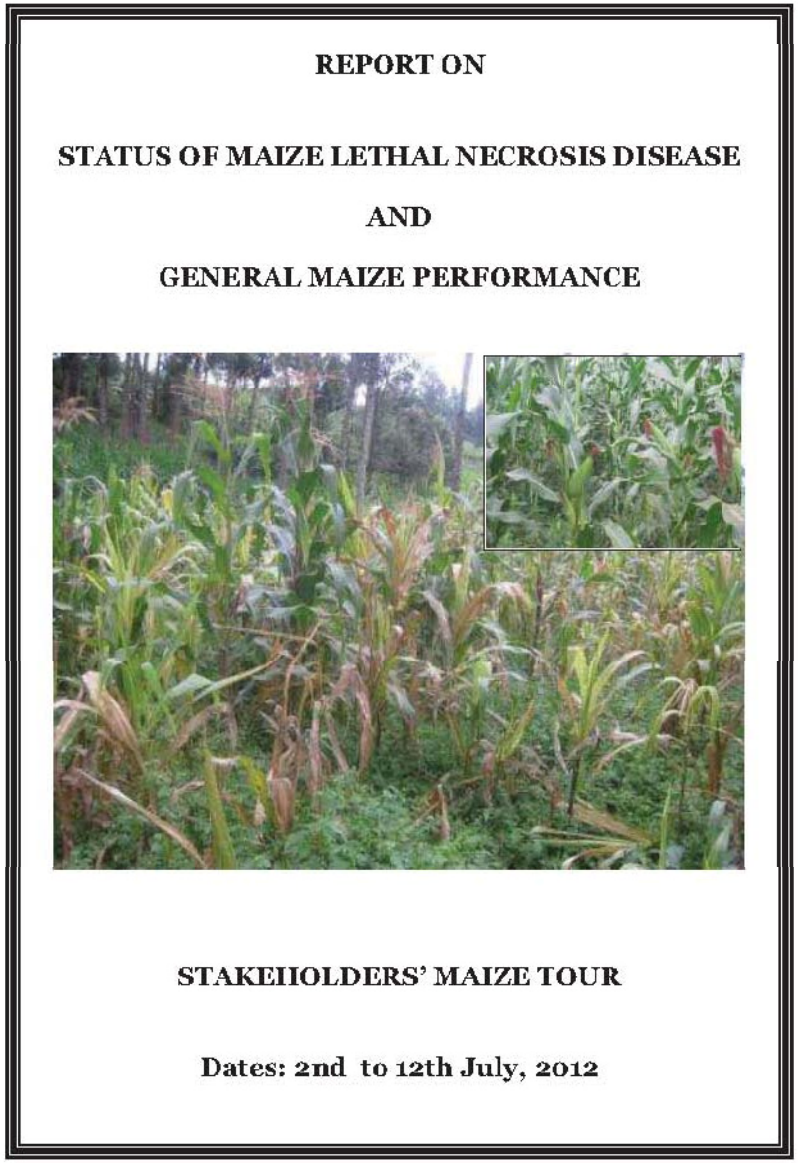
What is this disease that is threatening maize in Kenya?

- **Leaf yellowing, scrotching, necrosis and eventual death of the affeced plant.**
- **Affected plants decline rapidly (within days to weeks).**
- **Reports suggested rpaid spread within and between the fields.**

What is the cause?

- **Fungal disease, Poor seeds, etc…….**
- **Burn the crop….**
- **Don't feed to animals…..**

Multi-institutional and Multidiscplinary Team Study


REPORT ON

STATUS OF MAIZE LETHAL NECROSIS DISEASE

AND

GENERAL MAIZE PERFORMANCE

STAKEHOLDERS' MAIZE TOUR

Dates: 2nd to 12th July, 2012

http://dx.doi.org/10.1094/PDIS-06-12-0576-PDN

First report of Maize chlorotic mottle virus and maize lethal necrosis in Kenya

Wangi et al., 2012, Plant Disease (in press)

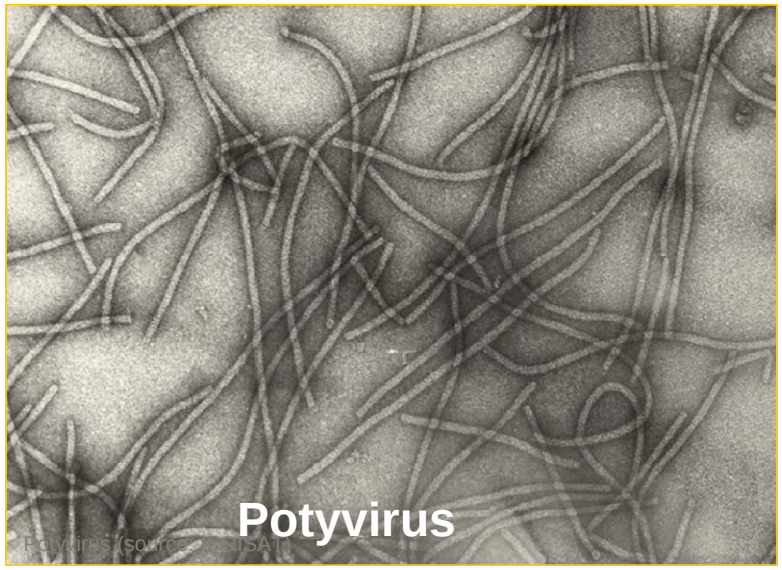
Incidence of MLND*

District	Incidence (%)
Kisii	90 – 100
Narok	90 – 100
Bomet	80 – 100
Ngakinyua	80 – 100
Nakuru	70 – 100
Embu	60 – 100
Meru	60 – 100
Eldoret	5 – 20
Makueni	Nil
Machakos	Nil
Bungoma	Nil
Kakamega	Nil

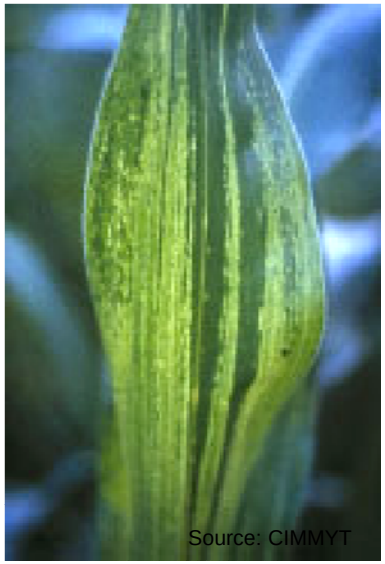
•MLD spread in 90,000 ha [4.3% of 2.13 million ha devoted to maize in Kenya]

*Source: Report on MLND, Multidisplinary Team Report, Ministry of Agric, Kenya (July 2012)

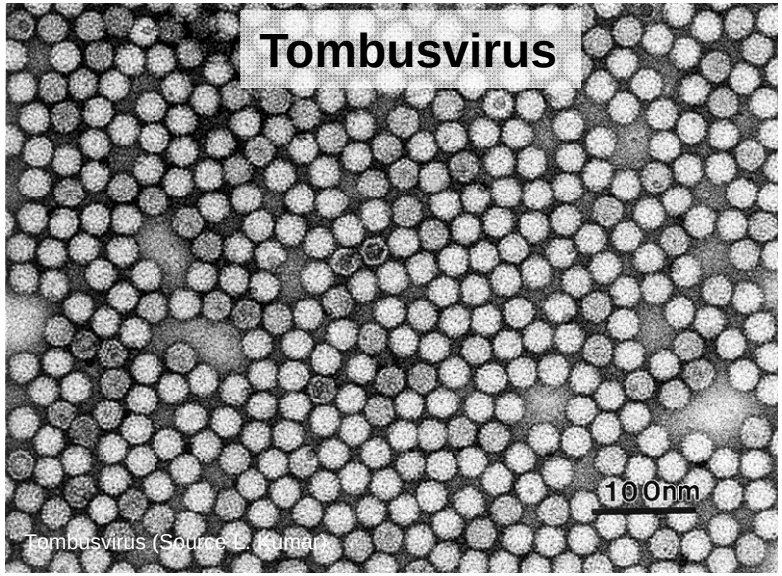
Sugarcane mosaic virus



Potyvirus (source: ICRISAT)

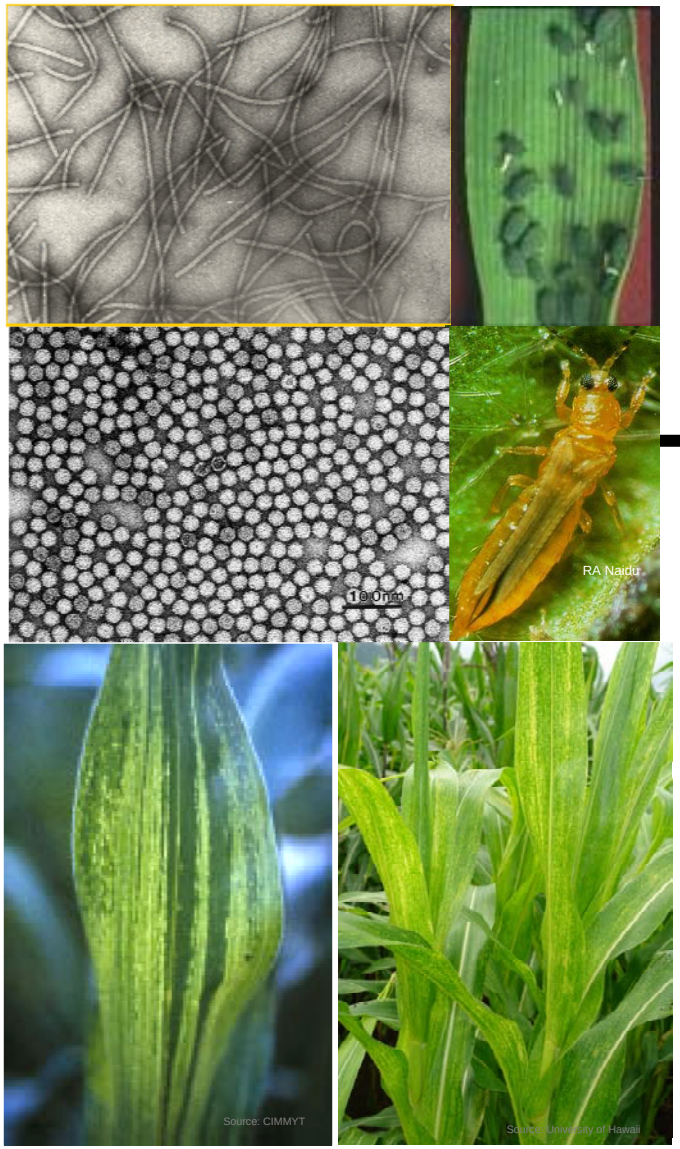


Maize chlorotic mottle virus



Tombusvirus (Source L. Kumar)

Maize lethal necrosis disease (MLND)



Sum of all

Maize lethal necrosis disease (MLND)
What do we know?

Disease distribution: South of Rift Valley; and spreading….

Causal agents: Maize chlorotic mottle & sugarcane mosaic viruses

Cause of disease emergence: Not known. SCMV is known to occur in Kenya and many other countries in Africa; MCMV is new (was it introduced?)

Control: Vector control and resistant varieties

-No resistance to MLND

-But resistance to SCMV or MCMV prevents MLND.

-A number of popular varieties are being evaluated in endemic areas.

MLND in Ghana?

Outbreaks of chlorotic blotching and necrosis reported from Kwadaso, Ejura and Mampong in Ghana

Cause of blotching and Necrosis

Spittle bugs
Poophilus costalis
Locris rubens

Georg and Manu

Common on sorghum and other cereals in West and Central Africa
(Ajayi and Oboite, AAB 1999, 136, 9-14)

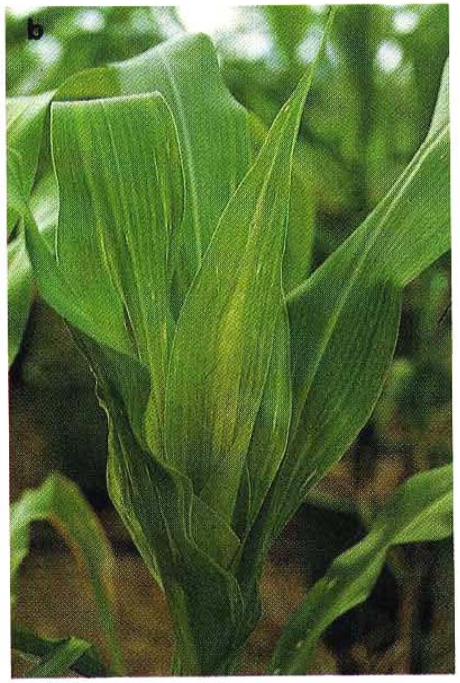
•Why this pest became a problem on maize?

•Effect of system diversification?
•Ecological dynamics?

In Nigeria as well

Known Unknowns

- **Scant knowledge on distribution, diversity of number of maize pathogens**



Maize mottle chlorotic stun virus (?)

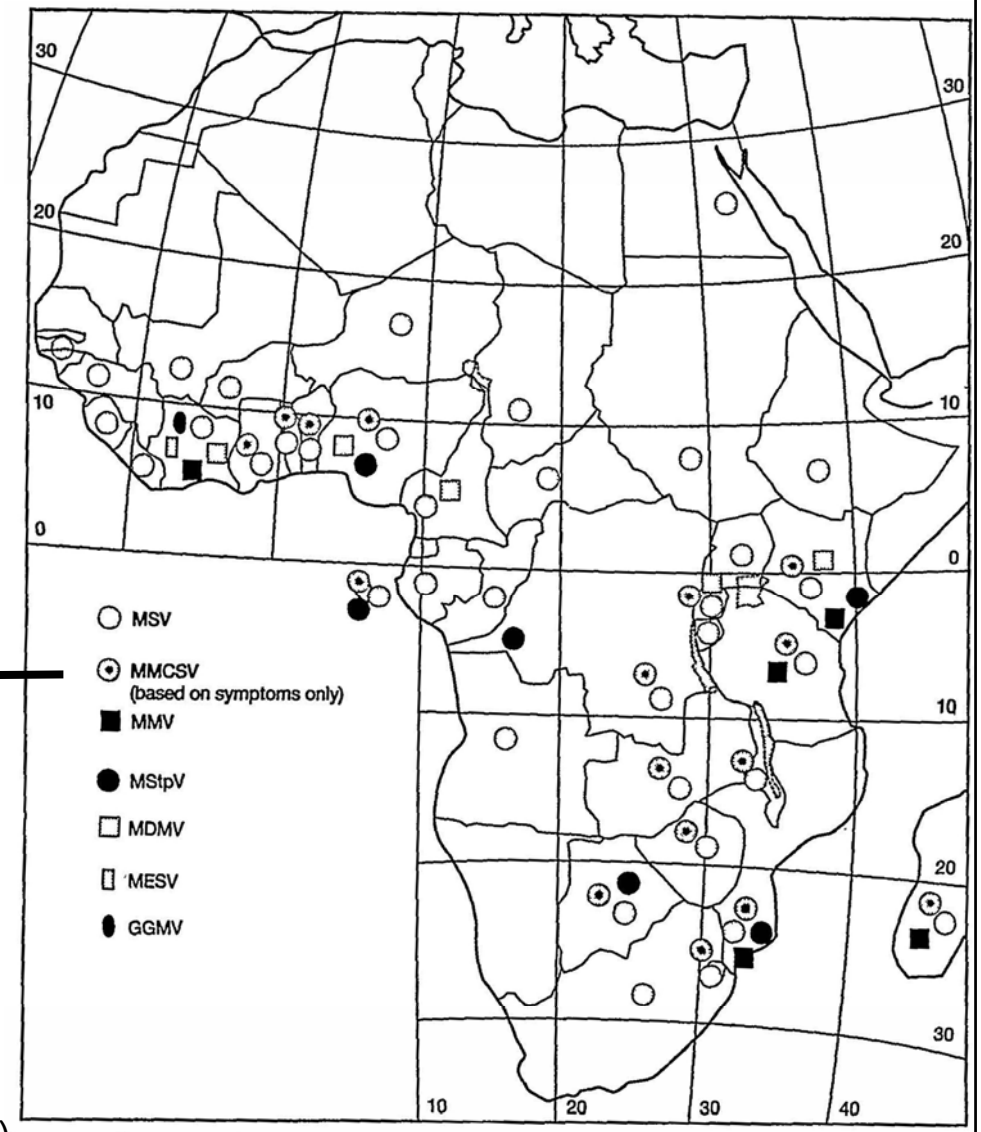


Fig. 1. Distribution of maize viruses in tropical Africa. MSV, maize streak geminivirus; MMCSV, maize mottle/chlorotic stunt virus; MMV, maize mosaic rhabdovirus; MStpV, maize stripe tenuivirus; MDMV, maize dwarf mosaic potyvirus; MESV, maize eyespot virus; GGMV, guinea grass mosaic potyvirus.

Source: Thottappillay et al., Plant Pathol. 42: 1993 (494-509)

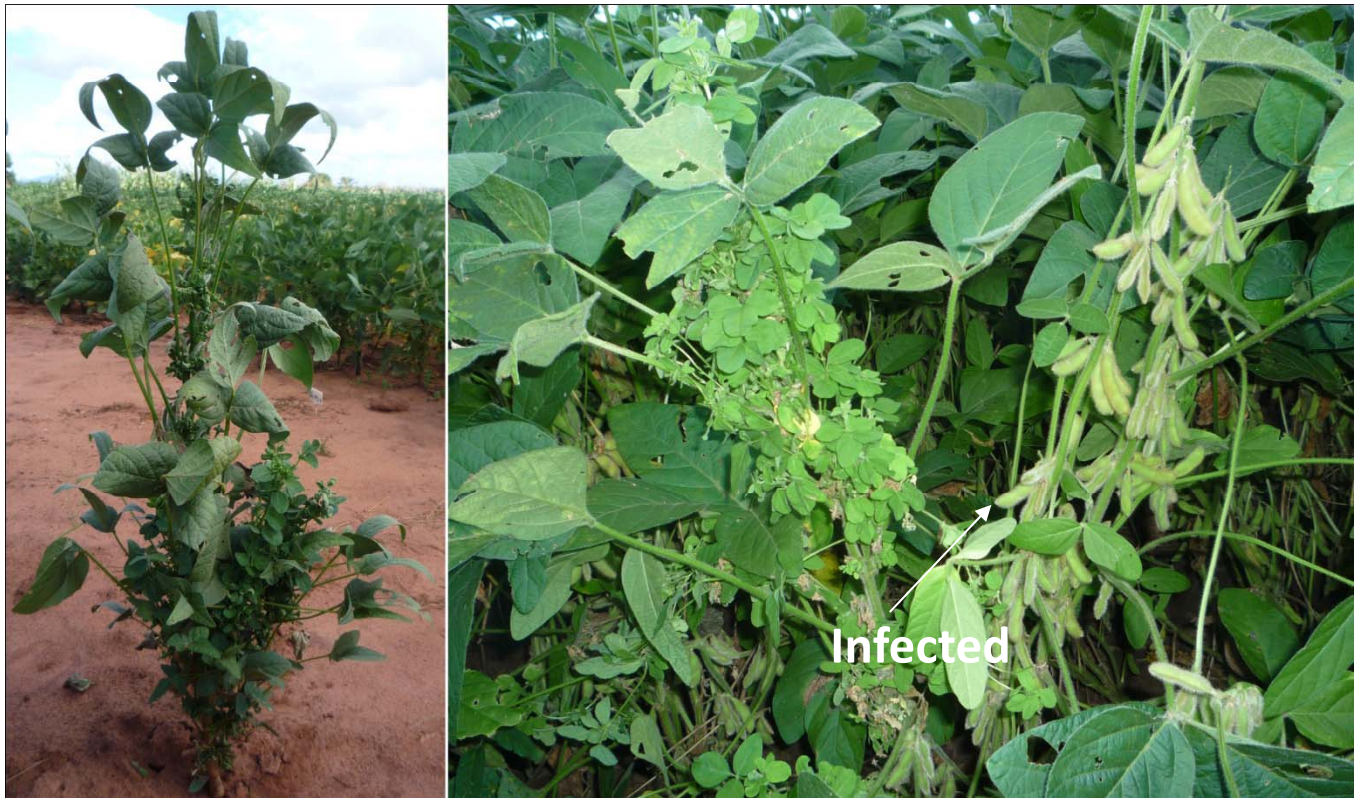
Known Unknowns

- **Maize rough dwarf virus diseases reported from Uganda in 2011 (ProMed news)**

- **Unknown disease in DRC (2011)**
  Symptom similarity with Maize rough dwarf virus

Photos: S. Hauser / D. Coyne

Witches broom disease: an emerging threat to soybean in Southern Africa

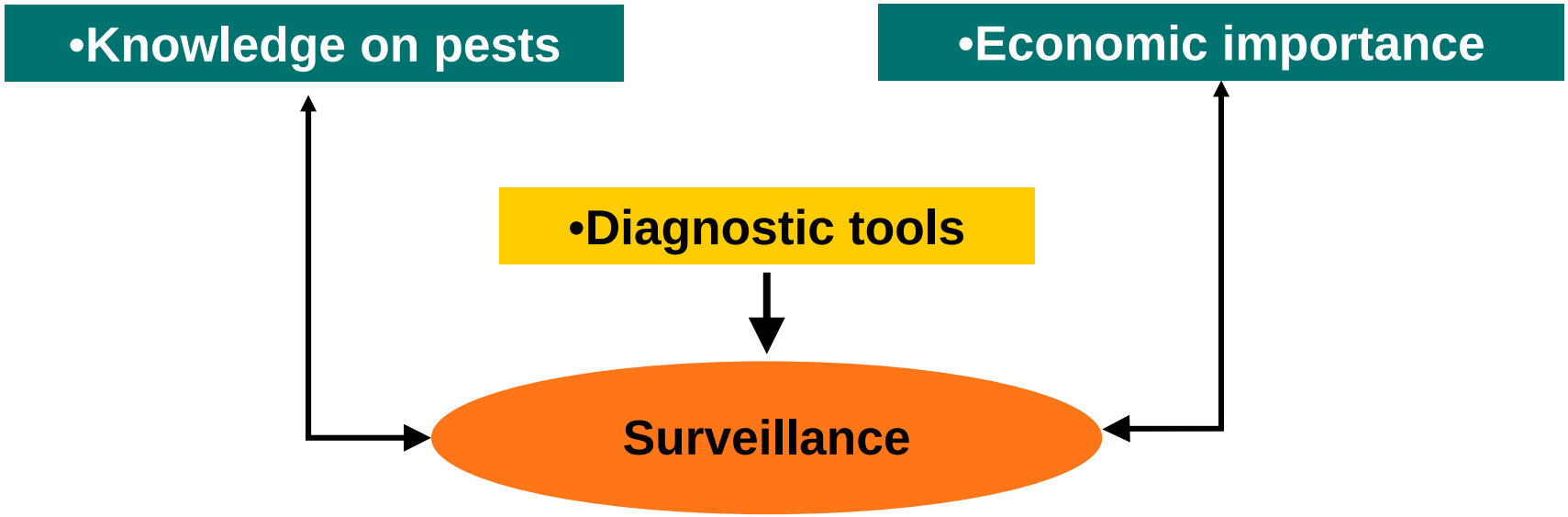


Known to occur in Mozambique and Malawi

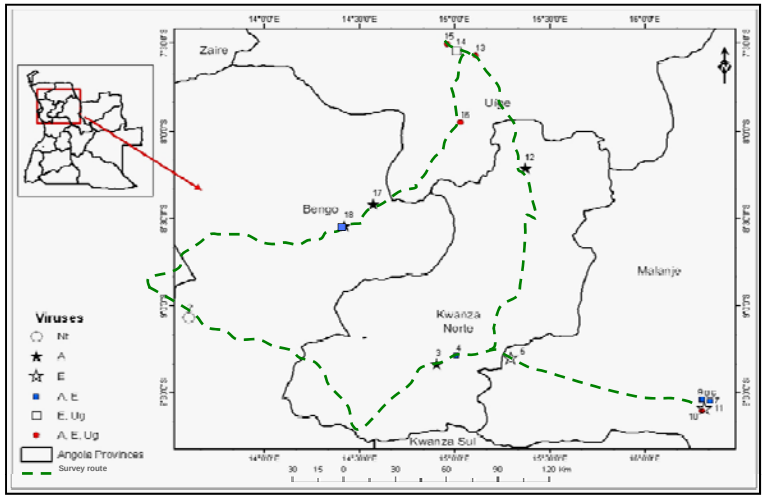
Preventing New Epidemics to Sustain the Cropping Systems

- **Awareness about diseases (threats and impact)**
- **Capacity for disease diagnosis (rapid & precise diagnosis)**
- **Understanding the threats in maize/ crop production areas**

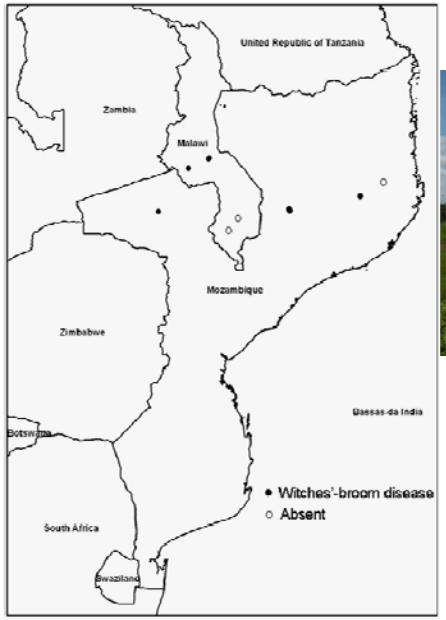
  Conduct multidisciplinary team surveys in action sites to determine threats and risks.



Scoping surveys in action sites



Cassava and banana survey in Angola



Survey for legume pests and diseases

- **Generate baseline information (to known what is out there)**
- **Perform using a multidisciplinary team.**
- **Operates with a pre-defined scope.**
  - **•Biotic and abiotic threats and risks**
  - **•Assessment of local capacity to counter threats / adopt technologies.**
  - **•And other…..**
- **Outputs will lead to the development of a strategy to mitigate pest and disease risks to intensification and intensification plans.**

Thanks for your attention

Invitation to Africa Rising Team, Partners & Stakeholders

TANZANIA

12th IPVE Symposium

www.iita.org/web/ipve

IITA

Research to Nourish Africa

Special workshop on Strengthening Plant Virology in SSA and Development of Partnerships