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Session 11: Information and Training Resources

Current and Emerging Threats to Crops: A Practical Course

Day 3: Risk Management of Threats to Crops

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PANELIST BIO

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Dr. Raman is an expert in pest and disease management, especially of potato and sweet potato. His teaching, research, and international extension focus on improving food production in developing countries. He has worked at the International Institute for Tropical Agriculture (IITA), Ibadan, Nigeria and the International Potato Center (CIP), Lima, Peru. He was also instrumental in the release of Bt eggplant in Bangladesh. Currently, he works on promoting international agriculture, rural development, and management of current and emerging pests of major crops grown in the developing world.

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INFORMATION AND TRAINING RESOURCES ON CURRENT AND EMERGING THREATS TO CROPS

Prof K.V. Raman & Prof Karim Maredia

Cornell University and Michigan State University

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CURRENT AND EMERGING THREATS TO CROPS

FAO estimates that annually up to 40 percent of global crop production is lost to pests. Each year, plant diseases cost the global economy over $220 billion, and invasive insects at least $70 billion.

New Pests, diseases, pathogen races, novel insect biotypes, weeds are being accelerated due to climate change, international trade and human mobility. Major ones now being researched by international and national programs are:

- Maize Lethal Necrosis Disease (coinfection by Maize Chlorotic Mottle and Sugarcane Mosaic Virus in East Africa);
- Papaya mealy bug in West Africa;
- Parthenium sp (Weed) in South and East Africa;
- Fall Army worm in Africa and Asia;
- Fusarium wilt of Banana in Africa, Central and South America;
- Desert Locust in Africa; Wheat Blast in Bangladesh

ECONOMIC LOSSES DUE TO CURRENT AND EMERGING THREATS

1) ***Maize Lethal Necrosis (MLN)*** First reported in the late 1970s in Kansas and Nebraska, MLN today has become a global threat to corn (maize) production worldwide, particularly in East Africa, where initial outbreaks in Kenya inflicted yield losses of up to 90 percent. Maize lethal necrosis also is problematic in South America and Asia.

2) ***Papaya Mealy Bug:*** Now found in more than 35 tropical countries around the globe. Since it was first observed on the African continent in Ghana, it has spread more than 4000 km, primarily along the coast of West and Central Africa. To date its presence in the Afrotropics has been verified for at least nine further countries including Mauritania, Senegal, Sierra Leone, Burkina Faso, Togo, Benin, Nigeria, Cameroon and Gabon.

3) ***Parthenium weed:*** Reported in Uganda, Ethiopia, Zimbabwe is now reported to spread to other tropical and sub-tropical regions posing serious threat to crop production, biodiversity, animal and human health due to production of toxic allelochemicals.

Source: https://www.ars.usda.gov/; cabi.org; https://www.fao.org/home/en/

ECONOMIC LOSSES DUE TO CURRENT AND EMERGING THREATS TO CROPS

4. ***Fall Army Worm (FAW)*** If left unchecked, FAW in Africa has the potential to cause an economic loss of around 13 billion US dollars per year through damage to maize, sorghum, rice, and sugarcane, alone.

5. Fusarium Wilt of Banana Yield loss caused by this pathogen is huge, and significant to destroy approximately **950,000 metric tons of crop yields annually**, thereby affecting the producer countries in various continents of the world.

6. ***Desert Locust in Africa*** 9 countries affected in Greater Horn of Africa: Ethiopia, Somalia, Sudan, and Kenya worst affected. It is a serious threat to food and nutrition security and means to earn a living. It destroys crops and pastures, on which the region's economy depends. The risk of new infestations and continuous breeding could limit food and fodder availability, leading to a rise in food prices.

Source: https://www.ars.usda.gov/; cabi.org; https://www.fao.org/home/en/

INFORMATION SOURCES RELATED TO CURRENT AND EMERGING THREATS TO CROPS

- https://plantvillage.psu.edu/cetcil **The Feed the Future Innovation Lab for Current and Emerging Threats to Crops at Penn State** focuses on tackling pests, diseases and weeds of crops in a climate changed world.
- https://cired.vt.edu/programs/integrated-pest-management-innovation-lab.html Since 1993, **Virginia Tech's Center for International Research, Education, and Development (CIRED)** has served as the home for the Feed the Future Innovation Lab for Integrated Pest Management, a program that works to protect plants from pests, ultimately helping to feed the world's rapidly growing population.
- https://www.fao.org/faostat/en/#home **FAO data base** for developing world provides statistical data on production and crop losses.
- https://www.cabi.org/publishing-products/distribution-maps-of-plant-diseases/ **CABI** publishes global distribution maps of major pests and diseases
- https://www.cgiar.org/initiative/13-plant-health-and-rapid-response-to-protect-food-and-livelihood-security/ **CGIAR** aims to protect agriculture-based economies of low- and middle-income countries in Africa, Asia and Latin America from devastating crop pest incursions and disease outbreaks by developing, validating and deploying inclusive innovations, and by leveraging and building viable networks

INFORMATION SOURCES RELATED TO CURRENT AND EMERGING THREATS TO CROPS

Kenya: https://kilimo.go.ke/wp-content/uploads/2022/02/Migratory-and-Invasive-Pests-and-Weeds-Management-Strategy-2022.pdf **The Government of Kenya in collaboration with FAO** and World Bank published its 2022- 2027 strategy to manage current and emerging threats to crops.

https://www.canr.msu.edu/legumelab/archived-programs/gates-ipm/index **Gates funded IPM program** for Legumes in West Africa implemented by USAID MSU Legume Innovation Lab

http://www.africaipmalliance.org/IPM.html **Africa IPM alliance program**

https://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/ipm/ipmwestafrica/en/ **FAO integrated crop production and IPM** program in West Africa

https://www.ippc.int/en/publications/ **International Plant Protection Convention and FAO** have produced a series of training materials and information on current and emerging threats in 184 countries

INFORMATION SOURCES RELATED TO CURRENT AND EMERGING THREATS TO CROPS

- https://agrilinks.org/sites/default/files/media/file/Agrilinks%20Webinar%2010.21.2020%20final%20Master%20Deck.pdf **USAID Feed the Future: Knowledge Data, Learning and Training (KDLT) Agrilinks**
- https://www.aciar.gov.au/project/hort-2016-185 **Responding to emerging pest and disease threats to horticulture in the Pacific Islands. Australian Center for International Agricultural Research.**
- https://wwwcp.umes.edu/sans/cegfsd/quarterly/current-and-emerging-threats-to-crops-capacity-building-training-in-the-democratic-republic-of-congo/ **University of Maryland Eastern Shore**

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