Notes

Invasive Pests that Threaten Strategic Agricultural Crops in the Arab and NENA Region

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Introduction

Near East and North Africa (NENA) region are often challenged by the continuous threat of transboundary plant pests and diseases. Increased trade activities, movement of people, plants and animals, accentuated by conflicts and crises in the region and lack of effective control measures and coordination multiply the risk of pathogens. In addition, climate change increases the risk of new pest and disease incidence and establishment. Because of limited capacities, inadequate quarantine and surveillance measures, funds and perception of risks towards transboundary pests and diseases and their food safety implications, many countries in the region have been unable to effectively implement and monitor, or take the required measures for prevention and control.

Heavy annual losses in crop production are triggered by pests and diseases, estimated at 25 to 30 percent of global production, representing a considerable negative economic impact. The effects of climate change on the increasing spread of new transboundary pests and diseases cannot be ignored.

The aim of this paper is twofold to highlight the status of the most significant – in terms of economic impact – transboundary plant pests and diseases in the NENA region; and to propose a regional strategy as a tool to strengthen regional cooperation in addressing transboundary pests and diseases. The strategy aims to improve the performance of national plant health services of the NENA countries to enable better monitoring, prevention, early detection, and effective and timely control of transboundary plant pests and diseases.

I. Transboundary plant pests and diseases

Plant pests and diseases threaten food security and nutrition around the world and seriously compromise food security in the NENA region, with severe economic and environmental consequences. Most of these transboundary diseases are transmitted by propagative plant material and have no curative measures. Therefore, prevention remains as the most

efficient strategy. Some emergent plant pests and diseases with significant impacts in the NENA region are briefly described below; some are already reported in some countries while others pose an imminent threat in the region. The lack of harmonized certified propagation materials and relative diagnostic protocols in NENA countries increased considerably the spread of transboundary plant pest and diseases.

A) Transboundary plant insect pests

Fall armyworm (FAW) (Spodoptera frugiperda) is an insect seriously affects food security and nutrition in the NENA region. The FAW feeds on more than 80 plant species, and causes yield losses up to 100 percent. The pest has been spreading rapidly in the last years in the majority of middle and South African countries and has been introduced to the Sudan in late 2016. The pest have been recently reported in Yemen.

Red palm weevil (RPW) (Rhynchophorus ferrugineus) cause the loss of tens of thousands of palm trees. The literature reports that palms worth up to €483 million have been destroyed or infested in the region.

Fruit flies (Bactrocera zonata, Bactrocera dorsalis and Drosophila suzukii) remain at the top of the list of devastating insects in the NENA region, causing severe losses to fruit crops. For example, the damage due to *Bactrocera dorsalis* was estimated at EUR 320 million in the Near East.

Nevertheless, forests are also affected by transboundary pests for example: the dangerous transboundary insects affects also forests, recent example is the *Western Conifer Seed Bug (WCSB) (Leptoglossus occidentalis)* detected in 2013 in Lebanon causing loss of pine seed production estimated at 10 000 hectares of stone pine forests.

B) Transboundary plant diseases

The latest outbreak of *Xylella fastidiosa* in Italy highlighted the potential danger of transboundary plant diseases when they turn into an epidemic. The diseases caused by a pathogenic bacterium introduced to Europe from American continent, infected more than 230 000 hectares causing losses to Italy's economy estimated at EUR 1 billion in 2016.

Citrus greening, known, as *Huanglongbing (HLB)* is another example of transboundary plant diseases associated with the bacterium Candidatus Liberibacter that compromise citrus production in the NENA region. Economic losses caused by HLB in the United States in 2007-2008 season was estimated at USD 9.1 billion.

Fungal transboundary pathogens like *Fusarium oxysporum f. sp. cubense* (Foc) the causal agent of Fusarium wilt of banana is considered as one of the most destructive of all plant diseases, responsible for losses estimated at USD 2 billion, at least.

Other *Fusarium* spp. is: *Fusarium oxysporum f. sp. albedinis* the causal agent of Fusarium wilt of date palm (or Bayoudh), which destroyed 3 million date palm trees in Algeria and 10 million in Morocco.

Forest diseases such as Boxwood Blight caused by *Cylindrocladium pseudonaviculatum* were introduced to the NENA region in 2012, causing sudden leaf and twig blight of up to 80 percent of the infected area.

C) Transboundary invasive weeds

Invasive weeds cause yield losses ranging from 30 to 70 percent and reach 80 to 100 percent in some crops. *Water hyacinth (Eichhornia crassipes)* is one of the most serious invasive weeds in the NENA region. This aquatic weed affects water quality and ecological communities of water in addition to fish. The annual economic impact in seven African countries has been estimated at USD 20 million.

Whitetop weed (Parthenium hysterophorus) and *Silverleaf nightshade (Solanum elaeagnifolium)* are among the most dangerous transboundary weeds due to their various modality of spread making their control remarkably difficult.

One of forest transboundary weeds is *Paulownia tree* or *Kebreet tree (Ailanthus altissima)* that grows rapidly, outcompeting many other plant species for light and space and produces toxins that inhibit the growth of other plants.

II. Climate change influence on plant pests and diseases

Regions with low temperature will likely harbour more plant pathogens with future rising temperatures caused by the global warming. For example, wheat leaf rust would develop earlier due to an increase of temperatures earlier in the season. Wheat yellow rust is now developing heat-tolerant strains that can make the disease spread more as epidemics.

Climate change will directly affect the behavior, reproduction rates, geographic distribution ranges, overwintering success, and pesticide resistance and dispersal ability of plant transboundary pests. Climate change would also affect host-plant physiology, plant-pest interactions, plant pest enemy populations and management strategies of plant pests. It has been shown that rising temperature enhances the rapid multiplication of certain insects.

III. FAO interventions to address transboundary plant pests and diseases

FAO established the Food Chain Crisis Management Framework (FCC), an integrated approach combining prevention, early warning, preparedness, and response to emergencies affecting the food chain to address the challenge of increasing outbreaks of transboundary plant and animal pests and diseases, including forest pests and aquatic diseases, food safety and radiation events.

One of these important plant disease control programs is the ongoing program against wheat rusts. The program has been coordinated by FAO through its Wheat Rust Disease Global Program (WRDGP) since 2008. This program provides policy and technical support to the concerned countries, in the context of the Borlaug Global Rust Initiative (BGRI). It can be considered as a good example to follow for combating many diseases threatening the NENA region.

Historically, one of the most important cases of successful transboundary plant pest combat is that against the Desert Locust (DL), which is well managed by FAO and member countries. The cost of the campaigns amounted to just USD 7 million compared with over USD 400 million in Northwest Africa in a case of absence of prevention systems.

IV. Towards effective regional cooperation strategy to address transboundary pests and diseases in NENA

The introduction and unexpected spread of these pests and diseases will further jeopardize food security, nutrition and livelihoods, limit international trade and force each NENA country to allocate more resources for their management, without guaranteed success.

Countries in the NENA region are facing significant challenges in implementing the wide range of diversified measures to address transboundary plant, animal and fish pests and diseases including prevention, early warning and early response. Insufficient national capacities and the lack of proper regional cooperation programs are contributing to these challenges and limiting surveillance, border controls and inspections, risk assessments, proper diagnosis and effective timely response.

The transboundary nature of some plant pests and diseases makes it impossible for a single country to adequately address them alone. Therefore, regional cooperation strategy among NENA countries becomes vital to create synergy in order to analyze threats, exchange useful information, and coordinate response actions with established standards.

A) Improved preparedness

- Socioeconomic studies will be conducted at national and regional levels to determine priorities for intervention to control plant pests and diseases.
- To support efficient and effective responses, networks of surveillance and early warning based on risk evaluation in the NENA countries will be established.
- For better prediction, prevention, and management of pests and diseases, capacity building activities related to plant health services, including extension services, diagnostic laboratories and research institutions will be implemented.

B) Facing transboundary threats

- Considering the high threat of transboundary pests and diseases, existing national programs will be harmonized with a coordinated regional strategy.
- For transboundary animal diseases, in particular, region wide sound contingency plans, standard operating procedures (SOPs) and coordinated prevention programs based on active surveillance and appropriate control measures will be established, and national and regional reference laboratory networks will be enhanced.

C) Preparedness for climate change

In order to face the influences of climate change, more efforts must be made towards:

1) onducting predictive modelling studies to map areas where threatening pests and diseases may spread more or less actively;
2) using advanced up-to-date technologies to forecast climatic events;
3) conducting studies to predict natural climatic conditions and develop mechanisms of appropriate early response to prevent negative consequences on crops and animals.

D) Appropriate regulations

- To optimize the quality and effectiveness of the prevention and control systems for plant pests and diseases, legislations and regulations will be developed, where appropriate, taking current international standards into account; and the regional commission for certified propagation materials to be established.
- For harmonized cooperation at the regional level, common standards for the regulation and control of transboundary pests and diseases will be developed in accordance with the FAO-IPPC.
- Capitalizing on the capacity building activities of the regional and sub-regional commissions of the League of Arab States and Arab Maghreb Union and the network of NEPPO for better coordination among countries.

Conclusions

Sustainable food production in the NENA region requires specific solutions, policies and investments. Ensuring higher levels of efficiency, early warning and reaction to threats to food systems requires sound planning, while taking into account the following facts:

1) Many countries in the world (including the NENA countries) are not adequately prepared to effectively respond to new and emerging transboundary plant pests and diseases. Activities of prevention, early warning, control, eradication and containment are not conducted to the fullest extent possible.
2) Human resources and logistical capabilities of NENA countries are generally not at a level sufficient to face large and urgent plant or animal health issues.
3) Given the international dimension of plant health issues, they are considered as International Public Goods.

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