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FAO REGIONAL CONFERENCE FOR THE NEAR EAST

Thirty-seventh Session

Amman, Jordan 5-8 February 2024 and 4-5 March 2024

Management Strategy of Transboundary Plant Pests and Diseases in NENA region

Executive Summary

Efforts to build resilience and improve food security, nutrition, and livelihoods in the Near East and North Africa (NENA) region are often challenged by the continuous threat of transboundary plant (including forests, hereinafter 'plant') pests, and diseases. Increased movement of people, plants, and animals, exacerbated by conflicts and crises in the region, as well as a lack of efficient control measures and coordination, increases the risk of these pests. Furthermore, climate change is one factor driving the spread of pests and diseases and increases the likelihood of establishing new devastating pests. Climate change can have an impact on pest population size, survival rate, and geographical distribution, as well as the development and spread of plant diseases.

Many countries in the region have struggled to effectively implement, monitor, or take the necessary measures for the prevention and control of transboundary pests and diseases due to limited capacities, inadequate quarantine and surveillance measures, insufficient funds, and perceptions of risks towards these transboundary pests and diseases and their implications for food safety.

FAO has developed a strategy for sustainable management of Transboundary Plant Pests and Diseases (TPPDs) in the Near East and North Africa (NENA) region, which will be implemented through the establishment of a regional cooperation programme (Trust Fund) governed by a Steering Body (composed of NENA member countries and development partners) and supported and facilitated by FAO. The programme Steering Committee, composed of the FAO Assistant Director General/Regional Representative for the Near East and North Africa (ADG/RNE) and chaired by a senior officer, will meet annually to provide overall guidance to programme activities and play a crucial role in ensuring government commitment. The secretary will be the regional plant protection officer in the NENA region.

The proposed programme is expected to improve regional and national collaboration through improved coordination, information sharing, and early warning, as well as to facilitate timely response to pest and disease incidence and outbreaks, thereby reducing their devastating socioeconomic and environmental impacts.

Documents can be consulted at www.fao.org

The overall outcome of the proposed FAO strategy is the sustainable management of TPPDs, by coordinating the effort to avoid the further spread of the TPPDs and reduce their negative impacts.

To this end, FAO works closely with its development and resource partners to maximize coordinated results and minimize duplications.

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I. Introduction

1. The NENA region is challenged by the continuous threat of [Transboundary Plant Pests and Diseases](#) (TPPDs), the introduction and spread of which is facilitated by increased trade activities, movement of people, plants, and animals, growing conflicts and crises in the region, and lack of effective and coordinated phytosanitary control measures.
2. Pests and diseases cause heavy annual losses in agricultural production, estimated at 25 to 40 percent of global production (FAO, 2021)¹, with a considerable negative economic impact.
3. In addition, the effects of climate change on the increasing spread of new transboundary pests and diseases cannot be ignored. The distribution of pests and infectious diseases and the incidence of outbreaks are often closely linked to climate change effects. Climate change has put many countries at significant risk, and its impact is exerting pressure on the scarce resources of these countries.
4. TPPDs threaten food security and nutrition worldwide and in the NENA region, particularly with severe economic and environmental consequences. Most of these transboundary diseases are not curable in the field and are transmitted by propagating plant materials.
5. The weakness of quarantine systems, the absence of adequate surveillance and early warning systems, and the lack of harmonized production systems of certified propagation materials and appropriate diagnostic protocols all contribute to a significant increase in the risk of introducing and spreading transboundary plant pests and diseases in NENA countries. Therefore, prevention remains the most effective strategy.
6. Some emerging plant pests and diseases with a significant economic impact in the NENA region are briefly described below, some of which have already been signalled in some countries, others representing an imminent threat in the region.

II. Status and trends in TPPDs management in the NENA region

Transboundary plant pests and diseases

- Fall Armyworm (FAW) (*Spodoptera frugiperda*): it is an insect that severely threatens food security and nutrition in the NENA region. The FAW feeds on more than 80 plant species and can cause a total loss of yields. The pest was introduced in Sudan in late 2016 and has spread rapidly in the last years in most NENA countries and reported in Egypt, Jordan, Lebanon, Mauritania, Oman, Palestine, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates, and Yemen².
- Red Palm Weevil (RPW) (*Rhynchophorus ferrugineus*): it has caused the loss of tens of thousands of palm trees. Literature reports that palm trees worth EUR 483 million have been destroyed or infested in the region³.
- Fruit Flies (*Ceratitis capitata*, *Bactrocera zonata*, *Bactrocera dorsalis*, and *Drosophila suzukii*): they remain at the top of the list of devastating insects in the NENA region, causing severe losses of fruit crops. For example, the damage due to *Bactrocera zonata* has been estimated at EUR 320 million in the Near East countries⁴. Furthermore, additional

¹ FAO, 2021, Pests on the march as climate change fans spread of crop destroyers.

<https://www.fao.org/news/story/en/item/1402920/icode/>

² Makgoba MC, Tshikhudo PP, Nnzeru LR, Makhado RA. *Impact of fall armyworm (Spodoptera frugiperda) (J.E. Smith) on small-scale maize farmers and its control strategies in the Limpopo province, South Africa*. Jamba. 2021 Oct 27;13(1):1016. doi: 10.4102/jamba.v13i1.1016. PMID: 34858557; PMCID: PMC8603208.

³ Yaseen T., *Invasive Pests that Threaten Strategic Agricultural Crops in the Arab and NENA Region*, New Medit, 18 (4): pp. 117-130, <http://dx.doi.org/10.30682/nm1904i> https://newmedit.iamb.it/bup/wp-content/uploads/2019/12/nm1904i_Note.pdf

⁴ OEPP/EPPA (2005) *Bactrocera zonata*. *Data sheets on quarantine pests*. European and Mediterranean Plant Protection Organization. EPPO Bull 35: 371–373.

phytosanitary measures applied by importing countries limit fruit crop market access and competitiveness from the NENA region.

- *Xylella fastidiosa*: the introduction of this plant bacterium into Italy in 2013 has dramatically highlighted the potential risk of transboundary plant diseases when they invade new areas and become devastating epidemics. This bacterial disease, introduced into Europe from the American continent, caused severe damage to more than 6.5 million olive trees (650 km²) in 2017. The EU agriculture could suffer potential damage estimated at over EUR 5.5 billion per year if the disease spreads without control⁵.
- Huanglongbing (HLB, Citrus Greening): it is one of the most destructive citrus diseases worldwide, caused by three species of *Candidatus Liberibacter*. Due to the absence of resistant citrus varieties, and the limited control measures to prevent the bacterium progression, the disease is considered the most fearsome transboundary disease that can compromise citrus production in the NENA region. The estimated damage caused by the disease over the past five years amounts to over USD 1 billion per year, with nearly 5 000 jobs lost annually in Florida⁶.
- *Fusarium oxysporum* f.sp. *cubense* (Foc TR4): it is a transboundary fungal pathogen that causes Fusarium wilt of bananas, one of the most destructive banana diseases, responsible for losses estimated at USD 2 billion⁷.
- *Fusarium oxysporum* f. sp. *Albedinis*: it is the causal agent of Fusarium wilt of date palm (Bayoud) and is responsible for the destruction of 3 million and 10 million date palms in Algeria and Morocco, respectively, from 1950 to 2000⁸.

Transboundary invasive weeds

- Invasive weeds cause yield losses ranging from 30 to 70 percent and reach 80 to 100 percent in some crops⁹. 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 to USD 50 million¹⁰.
- Whitetop weed (*Parthenium hysterophorus*) and silver leaf nightshade (*Solanum elaeagnifolium*) are among the most dangerous transboundary weeds due to their various modality of spread making their control remarkably difficult.
- An example of forest transboundary weeds is the Paulownia tree or Kebreet tree (*Ailanthus altissima*) which grows rapidly, outcompeting many other plant species for light and space and produces toxins that inhibit the growth of other plants.

⁵ Kevin Schneider & Wopke van der Werf & Martina Cendoya & Monique Mourits & Juan A. Navas-Cortés & Antonio Vicent & Alfons Oude Lansink, 2020. *Impact of Xylella fastidiosa subspecies pauca in European olives*, Proceedings of the National Academy of Sciences, vol. 117(17), pages 9250-9259, April.

⁶ Li, S., Wu, F., Duan, Y., Singerman, A., & Guan, Z. (2020). *Citrus Greening: Management Strategies and Their Economic Impact*. HortScience horts, 55(5), 604-612. Retrieved Sep 8, 2023, <https://doi.org/10.21273/HORTSCI14696-19>

⁷ Staver C, Pemsil DE, Scheerer L, Perez Vicente L and Dita M (2020) *Ex Ante Assessment of Returns on Research Investments to Address the Impact of Fusarium Wilt Tropical Race 4 on Global Banana Production*. Front. Plant Sci. 11:844. doi: 10.3389/fpls.2020.00844

⁸ Benzohra, Ibrahim & Mohamed, Megateli & Rafik, Berdja. (2015). *Bayoud disease of date palm in Algeria: History, epidemiology and integrated disease management*. African Journal of Biotechnology. 14. 542-550. 10.5897/AJBX2014.14292.

⁹ Kubiak, A.; Wolna-Maruwka, A.; Niewiadomska, A.; Pilarska, A.A. *The Problem of Weed Infestation of Agricultural Plantations vs. the Assumptions of the European Biodiversity Strategy*. Agronomy 2022, 12, 1808. <https://doi.org/10.3390/agronomy12081808>

¹⁰ Enyew BG, Assefa WW, Gezie A. *Socioeconomic effects of water hyacinth (Echhornia Crassipes) in Lake Tana, North Western Ethiopia*. PLoS One. 2020 Sep 2;15(9):e0237668. doi: 10.1371/journal.pone.0237668. PMID: 32877434; PMCID: PMC7467254.

Climate Change Influence on Plant Pests and Diseases

7. Different climatic regions likely harbour distinctive plant pests and pathogens, with future changes in temperature and precipitation caused by global warming, pests, and pathogens are expected to change their behaviour, including their spreading patterns and population fluctuation. For example, wheat leaf rust will develop earlier due to higher temperatures at the beginning of the season. Wheat yellow rust is developing heat-tolerant strains that may facilitate epidemic spread in the region. Moreover, climate change could also affect host-plant physiology, plant-pest interactions, natural enemy populations, and plant-pest management strategies. Increased temperature has also been shown to reduce life cycle duration and promote the rapid multiplication of some insects.

III. Opportunities and challenges

- Countries in the NENA region face significant challenges and implement a wide range of measures to combat TPPDs. However, insufficient national capacities and the lack of proper regional cooperation programmes increase these problems by limiting the capacity of surveillance, border controls and inspections, risk assessments, accurate diagnoses, and effective and timely responses.
- It is challenging for one country to adequately address the problems created by certain transboundary plant pests and diseases. Although since 2009 the NENA contracting parties to the International Plant Protection Convention (IPPC) established the Near East Plant Protection Organization (NEPPO), the support of the member countries is still needed to fulfil its coordinating role. Therefore, regional cooperation among NENA countries is strategic and essential to create synergies to analyse threats, exchange knowledge, and useful information, and coordinate response actions with harmonised standards.
- FAO has continued to support NENA countries to strengthen their phytosanitary measures and increase the resilience of plant production systems to invasive species. Nonetheless, FAO has supposed that the need for a permanent programme to continuously develop the regional capacity and improve the preparedness of NENA countries is higher than at any time before. A regional strategy will work – hand-in-hand with national programmes and pest-specific programmes that will continue to be important.
- FAO sponsored a pre-conference meeting on 29 January 2020 in Bari, Italy to promote the establishment of a regional trust fund that will support a strategic programme to address transboundary plant pests and diseases. Plant protection officials from NENA countries, experts, donors, funding agencies, and stakeholders were invited to discuss the proposed component of the regional programme.
- The 34th Session of the FAO Regional Conference for the Near East (NERC 34), held in Rome, Italy, from 7 to 11 May 2018, discussed action to address the transboundary plant, animal, and fish Pests and Diseases under the framework of One Health.
- As a follow-up to the pre-conference in Bari, NERC, in collaboration with the International Centre for Advanced Agricultural Studies for the Mediterranean in Bari (CIHEAM Bari) organized a high-level meeting in Bari, Italy, from 21 to 23 June 2023. The meeting aimed to consolidate collaborative efforts for all NENA countries and to develop the regional strategy for sustainable management of transboundary plant pests and diseases in the NENA region. Over three days, representatives of Agriculture Ministers and officials discussed the weaknesses of the NENA countries' plant protection systems, the modality of establishing a regional strategy for sustainable management of TPPDs and endorsed the Bari Declaration. The Declaration called for a five-year action plan to manage the TPPDs in the region and strongly recommended facilitating cooperation and communication with donors to secure resources for the regional strategy.
- A draft strategy for a five-year Regional Programme for TPPDs in the NENA Region, with a Trust Fund budget of USD 47.7 million has been developed and shared with concerned member countries. The Trust Fund is proposing that governments and partners commit resources to implementing the strategy.

- The draft strategy identified actions needed for: i) strengthening coordination and knowledge sharing; ii) enhancing capacity building for monitoring, early warning, surveillance, phytosanitary measures, plant certification programs, and pesticide management; and iii) assessing the environmental, economic, and social impacts of TPPDS in NENA region.

IV. Response actions for the sustainable management of TPPDS in the NENA region

Response # 1 Coordination and knowledge sharing

- Establishing a Regional Committee for the Sustainable Management of Transboundary Plant Pests and Diseases (RCTPD) to coordinate and supervise FOUR regional panels.
 1. panel on TPPDs detection and surveillance;
 2. panel on sustainable management of TPPDs;
 3. panel on the phytosanitary standards following the International Plant Protection Convention IPPC International Standards for Phytosanitary Measures (ISPMs); and
 4. panel on certified plant propagation materials.
- Developing a regional strategic plan for TPPDs risk management.
- Coordinating and activating an action plan (approved by the RCTPD) for any threat from a potential or newly introduced transboundary pest or disease in a NENA country.
- Improving information sharing and communication through regional meetings, newsletters, reports, training materials, and awareness-raising campaigns.
- Encouraging the implementation of regional rather than national programmes to tackle the risk of introducing and spreading TPPDs.
- Supporting the study on importing, rearing, and releasing non-indigenous Biological Control Agents (BCA) of plant pests.
- Conducting studies to develop readily effective measures to prevent adverse impacts on strategic food security crops.
- Promoting the exchange of personnel between research institutes in different countries to facilitate the transfer of knowledge and know-how on transboundary pests and diseases.

Response # 2 Capacity building

A. Surveillance, monitoring and early warning systems for TPPDs

- Implementing capacity building of plant health and extension services, diagnostic laboratories, and research institutions for improved pest and disease surveillance, monitoring, early warning, prediction, prevention, and management.
- Supporting the use of innovative tools for the early identification and detection of TPPDs.
- Supporting modelling and mapping of areas threatened by TPPDs.
- Creating a regional platform for collecting and sharing information related to the monitoring data and surveillance results of NENA countries.
- Gradual introduction of technology, for example, new tools for early detection of RPW.
- Using drones and photo satellites in some countries is forbidden or restricted, conduct monitoring by using forecasting models.
- Capacity-building programmes to train on innovative technologies.

- Planning for training programmes to develop harmonised and coordinated regional strategies and protocols to support existing national surveillance programmes.
- Support the countries with monitoring tools like apps.

B. Developing appropriate quarantine measures

- Developing capacity-building programmes on phytosanitary and quarantine measures.
- Harmonising phytosanitary regulations at the regional level to improve cooperation and coordination and encourage intra-regional trade of agricultural commodities.
- Standardizing inspection, sampling, diagnostic methods, and protocols for identifying and detecting pests and pathogens.
- Organising training courses to update inspection, sampling, detection methods, and diagnostic protocols.
- Supporting the NENA representative to the IPPC Standard Committee, coordinating actions with the NENA region, and providing useful comments and suggestions for the preparation of drafts.
- Organising regional training and workshops on Pest Risk Analysis (PRA).
- Developing and harmonizing quarantine pest lists according to national requirements and International Standard for Phytosanitary Measures (ISPM) principles for PRA.
- Creating a platform for quick notifications on reporting new transboundary pest/disease.
- Establishing a Phytosanitary Academy in the region.

C. Harmonized production systems for certified plant propagation materials

- Establishing a regional agreement on certified plant propagation materials allows the mutual recognition of nationally produced planting materials.
- Organizing training workshops on the innovative plant propagation material production system and certification programs.
- Harmonizing legislation and regulations to optimise the quality of the control systems and improve intra-regional trade in plant propagation materials.
- Organizing regional training workshops, technical meetings, and conferences to bring together researchers, National Plant Protection Organizations (NPPOs), phytosanitary inspectors, and laboratory specialists from NENA countries to exchange technical opinions and expertise.
- Identifying reference laboratories and standard protocols for verifying the phytosanitary status of plants for planting.
- Implementing regional and harmonised protocols for certification schemes.

D. Harmonized registration systems for pesticides

- To promote the harmonization of pesticide registration.
- Organizing training programmes on Pesticide Registration (Registration Toolkit), control of pesticide quality, and chemical analysis.
- To establish a regional pesticide management network in the NENA region to address common problems and challenges and take joint action by exchanging information and sharing working experiences.

Response # 3 Environmental, Economic, and Social Assessments

- Assessing the risks and impacts that TPPDs could cause at three levels:
 - a. economic impact
 - b. environmental impact
 - c. social impact
- Valorize the concept of One Health to plant health.
- Climate change and the TPPD role and mitigated action plan.
- Promoting environmental solutions and innovative green projects to reduce risks of TPPD spread.
- Youth employment.

Programme Management

8. Overall supervision will be carried out by the FAO Regional Office for the Near East and North Africa (FAO RNE) as the main implementing party, with guidance from the FAO RNE Regional Plant Protection Officer, NEPPO, and CIHEAM IAMB experts. Technical and management coordination meetings with the three partner organisations will occur quarterly in person or remotely. In addition, regular on-site visits, support, and supervision missions will be performed at least once a year and as needed based on the partners' performance. Within the targeted countries, contact points appointed by each partner organisation will be responsible for implementing the work plans and timely delivery of activities and outputs. They will also be responsible for compiling and preparing quarterly reports and other documents to be submitted to the programme's funders.

9. The programme Steering Committee, composed of the ADG/RNE and chaired by a senior officer, will meet annually to provide overall guidance to programme activities and play a crucial role in ensuring government commitment. The secretary will be the regional plant protection officer in NENA region.

10. The programme Technical Committee, composed of technical staff from FAO RNE, CIHEAM IAMB and NEPPO, and other national partners, will meet twice a year to review the programme's progress against the agreed work plan and propose corrective actions as necessary. The programme Technical Committee has the role of coordinating and supervising the work and implementations of the four regional panels:

- i. panel on transboundary plant pests and disease detection and surveillance;
- ii. panel on sustainable management of transboundary plant pests and diseases;
- iii. panel on facilitating the application of quarantine standards; and
- iv. panel on certified plant propagation materials.

11. The Programme Implementation Unit (PIU), established at FAO RNE, will coordinate all day-to-day programme activities. It will be managed by the Programme Leader and supported by NEPPO, national partners, and experts. PIU staff will conduct regular visits to supervise and support programme activities. The participation of relevant partners will be ensured during the field visits.

Monitoring, Evaluation, and Reporting Arrangements

12. The reports submitted from the panels will be evaluated, and a reporting system between NENA countries will be established to ensure:

- regular and systematic updating of the progress of funds usage;
- the measurement of progress on planned targets and objectives;
- evaluation of the impact of programme achievements;

- regular updating on the introduction and progress of existing TPPDs in the Mediterranean area; and
- the introduction and implementation of the most innovative techniques and approaches to addressing TPPDs threats in NENA region.

13. At the beginning of the programme, a comprehensive work plan with milestones and deliverables for each activity will be developed in collaboration with partners. Activities and results will be tracked accordingly. Standard data collection formats will be designed to facilitate data collection by the implementing partners, store them in a database, and use them for analysis, reporting, and management. Data collected through monitoring will feed into the quarterly and annual progress reports produced by the programme manager and distributed to all partners. FAO financial system, which allows real-time monitoring of expenditures, will generate financial reports according to the frequency and format required by the programme funders.

Risks And Mitigation Measures

14. FAO will work closely with the governments of the targeted countries to formulate and appraise this programme to ensure that it meets national objectives and priorities.

V. Accelerators and cross-cutting issues

Inclusiveness and gender

- Sustainable practices and innovations in plant production and protection are more widely adopted when gender-sensitive, inclusive methods are taken.
- Inclusion of vulnerable communities in mitigating the risk of TPPDS is critical, particularly small-scale producers, Indigenous Peoples, women, youth, and local and rural people.
- Engaging people in rural areas who are most vulnerable to the risks of TPPDs and building their capacities to act at the local level.
- Ensuring that men and women farmers have equal access to understanding, advice, tools, resources, risk management, and a conducive environment to sustainably manage the TPPD.

Governance

- Addressing the risk of TPPDs requires effective guidelines and governance mechanisms.
- Policies and regulations that support the sustainable management of TPPDs including phytosanitary measures and quarantine practices for early eradication are crucial.
- Country members should assess the national phytosanitary systems to identify the strengths and gaps and develop action plans.
- Enforcing the regulations and measures within the phytosanitary legislation for the importation and movement of plant propagative materials.
- Developing guidelines for establishing plant certification schemes
- Implement a policy on farmers/ stakeholder participation and engagement for TPPDs management.

Innovations and Technology

- Sustainable crop protection has emerged as a primary priority for innovation in the agricultural sector.
- Mitigating the risk and impacts of TPDDs will foster the development and testing of new technologies, tools, and strategies for early detection and pest diagnosis.
- Cooperation with the research institutions on developing, testing, and validating biotechnology-based and eco-friendly control methods and practices.