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## STRENGTHENING CAPACITIES TO PREVENT THE INTRODUCTION AND SPREAD OF XYLELLA FASTIDIOSA – OLIVE QUICK DECLINE SYNDROME IN NENA COUNTRIES

March 2019

SDGs:



Countries:

Algeria, Egypt, Lebanon, Libya, Morocco, Tunisia and West Bank and Gaza Strip

Project Codes:

TCP/RAB/3601

FAO Contribution:

USD 499 000

Duration:

15 June 2016 – 31 January 2019

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## Implementing Partners

Government partners of beneficiary countries.

## Beneficiaries

Olive producers (farmers and plant growers/breeders) in the participating countries, as well as institutions from the respective Ministries of Agriculture with a mandate for plant protection.

## Country Programming Framework

Country Programming Framework Outcome: Algeria (priority area 1), Egypt (priority area B), Lebanon (priority areas A and B), Morocco (priority area 2), Tunisia (priority area 1).



## BACKGROUND

*Xylella fastidiosa*, the causal agent of Olive Quick Decline Syndrome (OQDS), represents a serious threat to olive production in the Mediterranean region. Olive trees infected by the bacterium progressively weaken and ultimately die in a relatively short period of time. Olive trees are considered as one of the region's main crops, as well as being a symbol of Mediterranean culture and history. Olive production and the olive oil industry are among the most important sources of income for thousands of low and medium-income families. In addition, countries in the Near East and North Africa (NENA) region rely largely on the importation of planting material from a number of countries in which the disease has been reported. The risk of introduction and establishment of the bacterium in NENA countries is high not only due to trade, but also on account of the prevalence of host plants, insect vectors and the suitability of environmental conditions.

In response, FAO, the International Plant Protection Convention (IPPC) and the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) jointly organized an international workshop on *X. fastidiosa* in Bari, Italy in April 2016. The workshop concluded that there was a need to coordinate the national efforts of Mediterranean countries at high risk of the introduction of *X. fastidiosa*.

FAO, together with the governments of Algeria, Egypt, Lebanon, Libya, Morocco, Tunisia and West Bank and Gaza Strip, initiated project TCP/RAB/3601, "Strengthening capacities to prevent the introduction and spread of *X. fastidiosa* – Olive Quick Decline Syndrome in NENA countries". The project had the objectives of (i) improving phytosanitary measures, (ii) initiating surveillance programmes at national level, (iii) building essential capacities in terms of survey activities, diagnostics, extension and pest risk management, (iv) raising public awareness for stakeholders on *X. fastidiosa* disease and (v) establishing a coordination body at the national level.

## IMPACT

The expected impact of the project was to enhance food security and farmers' income in participating countries. It was therefore envisaged that the project would positively contribute to saving over 40 million ha of olive trees, but also to saving the incomes and livelihoods of more than 500 000 farmers across all of the participating countries.

## ACHIEVEMENT OF RESULTS

The project activities were initiated in each country through an inception workshop, to which the main stakeholders from the different concerned sectors were invited. These included Ministries of Agriculture (MOA), National Plant Protection Organizations (NPPOs), research centres, government authorities, agriculture extension services, agriculture associations and societies, farmers' unions and private sector companies. The participants worked together to develop a national work plan to deal with the threat of *X. fastidiosa*. The main components of the national contingency plans were as follows: i) compile the required data to develop Pest Risk Analysis (PRA), including data on host plant distribution, the importation of host plants, nurseries and propagation materials; ii) set phytosanitary regulations concerning the importation of host plants; iii) launch national surveillance programmes to identify the pest status in country territories and to achieve early detection if the disease may have been introduced. The surveillance programme specified a number of elements, including sampling, laboratory testing, data management, reporting and others; iv) training of agriculture, phytosanitary, extension and laboratory diagnosis specialists; v) awareness and extension programmes to deliver the early warning messages and information to olive farmers and growers, including mass communication tools and awareness materials; and vi) coordination of different parties' efforts for planning and implementing *X. fastidiosa* risk management and securing the required funds for the implementation of sustainable activities.

The national contingency plan was communicated to the respective Ministers of Agriculture in each participating country.

The phytosanitary measures applied by each country were reviewed and discussed with representatives of NPPOs in a number of meetings. The project provided support for NPPOs to develop and benefit from the PRA developed by the North American Plant Protection Organization (NAPPO).

The project engaged targeted stakeholders through two dedicated workshops in each country, as well as follow-up meetings. The workshops and meetings aimed to raise the awareness of key stakeholders on *X. fastidiosa* disease risk and the expected damage to the olive industry if OQDS were to enter the national territories. The important role and responsibilities of every stakeholder were discussed and emphasized during the workshops and meetings.

The project held a series of Training of Trainers (ToT) workshops in all participating countries. The ToT workshops trained specialists from different government parties to understand the biology and epidemiology of *X. fastidiosa* and OQDS, through sampling of host plants, reliable identification and diagnosis of the disease, development of awareness campaigns and a review of the phytosanitary regulations. International experts conducted the first ToT workshop for selected national experts who were trained as instructors and subsequently conducted national training workshops. A total number of 808 specialists were trained across the seven participating countries.

In addition, specific training was conducted on the installation and usage of XylApp and XylDatabase, the dedicated software developed by CIHEAM for use in the collection and management of data for the *X. fastidiosa* survey programme.

A fundamental component of the mission of NPPOs is to assess the pest status on their respective territories, particularly for pests with a high risk of introduction. The project supported participating countries in planning and implementing a surveillance programme to guarantee the pest-free status of their countries, or otherwise to fulfil the requirement of early detection as emergency action against accidental introduction. The surveillance activities performed through the project aimed to initiate national efforts to carry out more comprehensive surveillance plans, as well as to provide technical and scientific assistance to NPPOs. In addition, the project supported the national surveillance plans by providing the following: i) laboratory equipment. Eight ICGENE real-time LAMP system devices were provided, one each for Algeria, Egypt, Lebanon, Morocco, Tunisia and West Bank and Gaza Strip, and two (with extra battery) to Libya; ii) laboratory consumables. LAMP kits, each containing 40 tests, were provided for Algeria (10 kits), Egypt (14 kits), Lebanon (15 kits), Libya (15 kits), Morocco (10 kits), Tunisia (15 kits) and West Bank and Gaza Strip (15 kits); iii) enzyme-linked immunosorbent assay (ELISA) kits, each containing 960 tests, were provided for Lebanon (2 kits), Morocco (one kit) and West Bank and Gaza Strip (one kit); iv) data storage and management tools. Seven hand-held tablets with the XylApp application – dedicated software and maps for data management of *X. fastidiosa* survey activities.

These devices were made available to Egypt, Morocco, Tunisia, West Bank and Gaza Strip, Libya and Lebanon; and v) XylDatabase is a dedicated database and software, with a user-friendly interface that allows collection of information from multiple hand-held tablets and connects field data to laboratory data. The software is able to store, retrieve, manage and present data in graphical illustrations and on maps. The database was provided to participating countries. The total number of samples collected and tested through project activities exceeded 20 000.

Awareness-raising campaigns were planned and implemented, including short seminars for agriculture specialists, university students, farm managers, growers and farmers. Around 3 050 participants benefited from the awareness-raising seminars. In addition, mass communication was used to deliver the message to a broad audience, in particular newspaper reports, a television programme, radio broadcasting, brochures and posters.

Facing the challenge of potential introduction of *X. fastidiosa* makes it necessary to implement a range of activities performed by different parties. The cooperation and coordination between the activities of such parties is crucial for successful risk management. The establishment of the institutional framework for coordinating the efforts was achieved through the formation of national committees to represent all of the parties concerned. Ministerial decrees were issued in Egypt, Libya and Tunisia to represent the institutional framework for the committee.

In addition, the project enhanced regional coordination among key stakeholders in participating countries. The regional meetings, ToT workshops and national workshops assisted countries in the preparation of their own customized contingency plans and in identifying gaps and ways of finding suitable solutions.

### IMPLEMENTATION OF WORK PLAN

The project work plan was consolidated during the inception workshop, which was held in Tunisia from 29 August to 2 September 2016.

The project funded the honorarium of national consultants in each of the participating countries and of the international consultants who supported the implementation of the project activities in all countries, in particular through ToT training sessions and training on XylApp.

The project funded the expenses of training sessions, transportation for attendance of the regional workshops and to olive orchards to collect samples during the survey activity, per diem for participants in activities, compensation for transport and catering costs, purchase of laboratory equipment (ICGENE real-time LAMP), testing kits, laboratory consumables and sampling tools and the preparation and printing of awareness materials.

The project required an extension, as some of the initial outputs (monitoring and surveillance activities) took longer than expected. The TCP funding paid for both national staff and international consultants (for capacity training).

The approved budget of USD 500 000 was allocated by FAO. External contributions for the implementation of the project were made by the national governments of the participating countries, local farm owners and by the CIHEAM in Bari, Italy.

Each country was required to conduct a Pest Risk Analysis (PRA), a study that identifies the levels of risks in the case of the introduction of *X. fastidiosa* and evaluates the economic, social and environmental impacts. According to the epidemiology of *X. fastidiosa* and the environmental conditions within the participating countries, the risk of introduction and establishment of this pathogen is high, as outlined below: i) NENA countries mostly rely on the importation of planting materials from countries where *X. fastidiosa* was reported; ii) The phytosanitary control at the borders is not sufficient due to limited human capacity and funding resources, as well as a lack of awareness of the risk; iii) No systematic and well-planned surveillance programmes were launched due to the unavailability of funds and the need for trained specialists; and iv) Most of the efforts are fragmented and lack good coordination and communication among the parties concerned.

As demonstrated above, the probability of introduction and establishment of *X. fastidiosa* in NENA countries is high and the consequences will certainly have a significant impact at economic, social and environmental levels.





In this context, the mitigation measures taken for risks related to project implementation are as follows:

- ✓ There was a risk that unavailability of a clear work plan developed according to each country particularities and fitting the national conditions might lead to losses in time and funding resources. This risk was mitigated by the development of a standard work plan and consultation with the National Project Coordinator and the national consultant over the adjustment of work plan details and operational action plans fitting the national conditions.
- ✓ Weak cooperation from government partners and stakeholders had the potential to cause failure or delay in achieving certain project objectives. This risk was managed by holding a stakeholder workshop in each country at the very beginning of the project. During the workshop, all stakeholders were asked to present their current knowledge of the risk and whether they had applied any measures to tackle it, as well as their future plans. During the implementation of the project, government partners and stakeholders were constantly involved in the activities, not only as beneficiaries but also as key actors performing activities in decentralized systems using their own funds. As an example, some trainers who received ToT organized seminars and awareness sessions and developed awareness materials organized and funded by their respective organizations.
- ✓ To address the risk of limited funding resources and budget restrictions, efficient allocation of funding resources was achieved by prioritization of activities, which were performed as training, and by supporting local agriculture authorities to continue to carry out the activities using alternative funding resources.
- ✓ The risk of bureaucratic procedures amid a limited time frame was managed by prioritizing activities and extending the period of project implementation.
- ✓ The sustainability of the implementation of the activities required to reduce the risk of *X. fastidiosa* introduction and establishment is the key component in any pest risk management plan. The risk of untenable implementation for the national contingency plan, usually as a result of limited funding resources following the termination of the project, was mitigated by the organization of a donor workshop at the end of the project, during which national/regional/international funding organizations were invited to invest funds in sustaining the required resources for the implementation of national contingency plans.

## FOLLOW-UP FOR GOVERNMENT ATTENTION

The national authorities of NENA countries will be supported to include awareness-raising campaigns as an important tool in managing the risk of trans-border quarantine pests. Local extension programmes tend to focus on endemic diseases with high yield losses, while less attention is paid to the possibility of the introduction of new pests. Support can be provided in terms of training agriculture extension specialists on professional methods to deliver the message to farmers. In addition, the extension programme can be supported by providing more awareness-raising material with simple messages to the local farmers. National survey programmes for the detection of as yet unreported quarantine pests on national territories are often not well planned or implemented. The lack of proper training for surveyors and the absence of sufficient funds are the main challenges. As national survey programmes are among the main responsibilities of NPPOs, attention will be paid to supporting countries in carrying out such an important activity. This support can manifest itself in terms of helping the local authorities to approach funds from national and international resources.



## SUSTAINABILITY

### 1. Capacity development

The project assisted the participating countries in building capacity at different levels, such as through preparation of national contingency plans, compilation of basic data for the PRA study, preparation of awareness materials, support for national efforts towards the surveillance programme through training of specialists and the provision of equipment (ICGENE real-time LAMP) and sampling tools. The activities achieved and the progress made demonstrate that participating countries have gained essential experience from the project and are able to follow-up the measures implemented to face the risk of the disease. The project's capacity-building goals are of great interest to NENA countries as these can be used as a model for other invasive trans-border pests.

### 2. Gender equality

The participation of women was clearly observed in the implementation of project activities, albeit to a varying degree. Female participation was more evident in laboratory activities, for instance, than in field activities. Of the 3 858 participants in all of the events organized by the NENA countries, more than 940 were women.

### 3. Environmental sustainability

A number of ornamental plant and forest species are hosts of *X. fastidiosa*. These plant species play a major role in the environmental system of the NENA countries. If the disease reaches these countries, the impact on the environment will be significant, potentially leading to the destruction of forests, particularly those with single dominant sensitive species. Road and urban landscapes could also be severely affected by the destruction of sensitive plants. In addition, the intensive use of insecticides for the control of insect vectors of *X. fastidiosa* will lead to the disruption of ecosystems by affecting non-target insects, as well as carrying consequences for human health.



### 4. Human Rights-based Approach (HRBA) – in particular Right to Food and Decent Work

Olive cultivation represents a major source of food and income for vulnerable societies in the NENA region. The average consumption of olive oil in Lebanon, West Bank and Gaza Strip, Morocco and Tunisia is 3.7 litres per capita per annum (according to 2014 figures from the International Olive Council (IOC)), ten times the average world consumption of 0.39 litre per capita per annum (IOC, 2016). Meanwhile, olive production in NENA countries represents almost 35 percent of world production. Olive cultivation and the olive oil industry in the NENA region is predominantly operated by small and medium-scale farmers, who usually represent the more vulnerable producers' groups. The risk posed by the introduction of *X. fastidiosa* disease on the olive industry will certainly affect one of the main staple food materials in NENA countries, as well as affecting the income of small and medium-scale farmers in the region.

### 5. Technological sustainability

The agriculture industry, particularly in terms of crops such as olive, citrus and grape (specifically packing, manufacturing, extraction and agro-industry) has significantly developed through the use of new technology. Agro-industrial activities would certainly be affected by the reduction in yield or acreage of a specific crop. The introduction of *X. fastidiosa* will have a negative effect on the production and economic potential associated with the industry. Activities related to the prevention of the disease's introduction will contribute to the development of the technology through research and application.

### 6. Economic sustainability

Agriculture is one of the main drivers of economic growth in the NENA countries. It contributes to the national economy and remains the main activity with major employment capacity. Many sectors of great economic interest for these countries, such as citrus, olive, vine, and rosaceous, ornamental and forest plants, are hosts of the *X. fastidiosa* bacterium. The damage that may be caused by an outbreak of *X. fastidiosa* will have a major impact on domestic production in NENA countries and on their economies.



## DOCUMENTS AND OUTREACH PRODUCTS

- ❑ Final report on inception and launch workshop – Tunisia. M. Fatmi. Tunis, Tunisia. September 2016. 51 pp.
- ❑ Final report on Training of Trainers workshop – Algeria. M. Fatmi. Algiers, Algeria. December 2016. 18 pp.
- ❑ Final report on Training of Trainers workshop – Morocco. M. Fatmi. Meknes, Morocco. February 2016. 16 pp.
- ❑ Final report on Training of Trainers workshop – Egypt. M. Fatmi. Cairo, Egypt. May 2017. 20 pp.
- ❑ Libya Progress Report – September-June 2017. A. Kafu. Libya. May 2017. 17 pp.
- ❑ Morocco Progress Report – September-June 2017. M. Fatmi and M. Chetto. Agadir, Morocco. June 2017. 25 pp.
- ❑ Algeria Progress Report – September-June 2017. S. Moumene. Algiers, Algeria. June 2017. 37 pp.
- ❑ Tunisia Progress Report – September-June 2017. A. Rhouma and F. Hellali. Tunis, Tunisia. June 2017. 30 pp.
- ❑ West Bank and Gaza Strip Progress Report – September-June 2017. A. Fattum and S. Shubib. West Bank and Gaza Strip . June 2017. 16 pp.
- ❑ Lebanon Progress Report – September-June 2017. E. Choueri. Lebanon. July 2017. 10 pp.
- ❑ Egypt Progress Report – September-June 2017. A. Hussein and A. Sabry. Cairo, Egypt. August 2017. 49 pp.
- ❑ Final report on Tunisia’s Progress Report. M. Fatmi. Tunis, Tunisia. August 2017. 21 pp.
- ❑ Final report on *X. fastidiosa* diagnosis training workshop in Morocco. M. Fatmi. Bouznika, Morocco. December 2017. 11 pp.
- ❑ Final report on Tunisia’s wrap-up workshop. M. Fatmi. Tunis, Tunisia. February 2018. 37 pp.



- ❑ Final report on project wrap-up in Morocco – February 2018. M. Fatmi and M. Chetto. Agadir, Morocco. February 2018. 37 pp.
- ❑ Final report on project wrap-up in Egypt – February 2018. A. Hussein and A. Sabry. Cairo, Egypt. March 2018. 82 pp.
- ❑ Final report on project wrap-up in Lebanon – February 2018. E. Choueri. Lebanon. March/December 2018. 14 pp.
- ❑ Final report on project wrap-up in West Bank and Gaza Strip – February 2018. A. Fattum and S. Shubib. West Bank and Gaza Strip . May 2018. 35 pp.
- ❑ Final report on project wrap-up in Tunisia – February 2018. A. Rhouma and F. Hellali. Tunis, Tunisia. May 2018. 42 pp.
- ❑ Final report on project wrap-up in West Bank and Gaza Strip – February 2018. A. Fattum and S. Shubib. West Bank and Gaza Strip . May 2018. 35 pp.
- ❑ Final report on regional *Xylella fastidiosa* surveillance workshops in Morocco. M. Fatmi. Agadir, Morocco. May 2018. 17 pp.
- ❑ Final report on project wrap-up in Algeria – February 2018. S. Moumene. Algeria. June 2018. 59 pp.
- ❑ Final report on project wrap-up in Libya – February 2018. A. Kafu. Libya. July 2018. 41 pp.
- ❑ Final Report and End of Mission Report. M. Fatmi. Agadir, Morocco. October 2018. 25 pp.



## ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

<b>Expected Impact</b>	Prevention of the risk of the introduction and spread of <i>Xylella fastidiosa</i> – Olive Quick Decline Syndrome in the NENA region, and saving both the livelihoods and incomes of olive growers and national economies
<b>Outcome</b>	National capacities and capabilities of stakeholders in the participating countries strengthened to enforce regionally harmonized phytosanitary measures to prevent the risk of the introduction and spread of OQDS in NENA countries
	<p><b>Indicator</b></p> <ul style="list-style-type: none"> <li>• Effective measures put in place to prevent the introduction of <i>X. fastidiosa</i> into countries by the end of the project.</li> <li>• Number of professionals trained in <i>X. fastidiosa</i> diagnosis, surveillance, phytosanitary measures and management.</li> <li>• Surveillance/monitoring measures applied to maintain the countries free of pest.</li> <li>• Number of farmers trained on the risk of <i>X. fastidiosa</i> and monitoring and preventive measures against it.</li> <li>• Number of stakeholders and partners benefiting or contributing to achieve the project goals.</li> </ul>
	<p><b>Baseline</b></p> <ul style="list-style-type: none"> <li>• Baseline data on the applied preventive measures by countries before the project.</li> <li>• No training has been carried out.</li> <li>• No record on <i>X. fastidiosa</i> in the countries.</li> <li>• No training.</li> <li>• Baseline data to be identified in the inception period on country bases.</li> </ul>
	<p><b>End Target</b></p> <ul style="list-style-type: none"> <li>• Phytosanitary measures reviewed and updated, and contingency plans for the countries developed within the first three months of the project.</li> <li>• At least 80 technicians trained in each country by the end of the project.</li> <li>• Action plan for <i>X. fastidiosa</i> surveillance developed and initiated by country by the end of the first year of the project.</li> <li>• At least 500 farmers in each country trained.</li> <li>• All stakeholders (customs inspectors, agro-industry, NGOs) are aware of the risk of <i>X. fastidiosa</i> and committed to supporting the measures taken by the project.</li> </ul>
<p><b>Comments and follow-up action to be taken</b></p> <p>All targets achieved.</p> <p>Phytosanitary measures should be reviewed and updated periodically.</p> <p>More technicians should be trained in each country.</p> <p>More farmers in each country should be trained.</p> <p>Stakeholders (including customs inspectors, agro-industry, NGOs) should be updated periodically and should be constantly aware of the risk of <i>X. fastidiosa</i> and committed to supporting the measures taken by project.</p>	



<b>Output 1</b>	Partners and stakeholders and their roles in the project are identified, and appropriate contingency plans and phytosanitary measures in line with the IPPC are in place to prevent the risk of introduction and spread of OQDS in NENA countries.		
	Indicators	Target	Achieved
	Development of contingency plan for each participating country	One plan for each participating country (7 countries in total)	Yes
<b>Baseline</b>	No contingency plan		
<b>Comments</b>	Contingency plan was developed through inputs provided by all participating partners and stakeholders		
<b>Output 2</b>	Technical skills of stakeholders are improved in the surveillance and diagnosis and management practices of <i>X. fastidiosa</i>		
	Indicators	Target	Achieved
	Specialists trained on surveillance, diagnosis and management of <i>X. fastidiosa</i>	800	Yes
<b>Baseline</b>	0 (no previous training)		
<b>Comments</b>			
<b>Output 3</b>	Effective action plans for surveillance of <i>X. fastidiosa</i> in participating countries are developed		
	Indicators	Target	Achieved
	Testing plant and vector samples against <i>X. fastidiosa</i> presence within a national surveillance plan	20 000	Yes
<b>Baseline</b>	No previous data on testing against <i>X. fastidiosa</i> during national surveillance plan		
<b>Comments</b>			
<b>Output 4</b>	Knowledge of farmers and public awareness on the risk related to <i>X. fastidiosa</i> and preventive measures are raised		
	Indicators	Target	Achieved
	Number of farmers/growers receive awareness on <i>X. fastidiosa</i> risk	3 000	Yes
<b>Baseline</b>	No awareness sessions were addressed to farmers on <i>X. fastidiosa</i> risk		
<b>Comments</b>			
<b>Output 5</b>	The project outcomes are evaluated and recommendations for national follow-up actions developed		
	Indicators	Target	Achieved
	Wrap-up workshops to evaluate project outcome and plan for follow-up action	Six wrap-up workshops	Yes
<b>Baseline</b>	No evaluation for project outcomes or recommendations for future action		
<b>Comments</b>			

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