ورشة عمل خطط الطوارئ كتمرين محاكاة عملي

Contingency Exercise Workshop

Xylella fastidiosa

Hammamet, Tunisia, 26 – 28 May 2025

The Socio-Economic Impacts of *Xylella fastidiosa* for the NENA Region

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Regional Plant Protection Officer-FAO

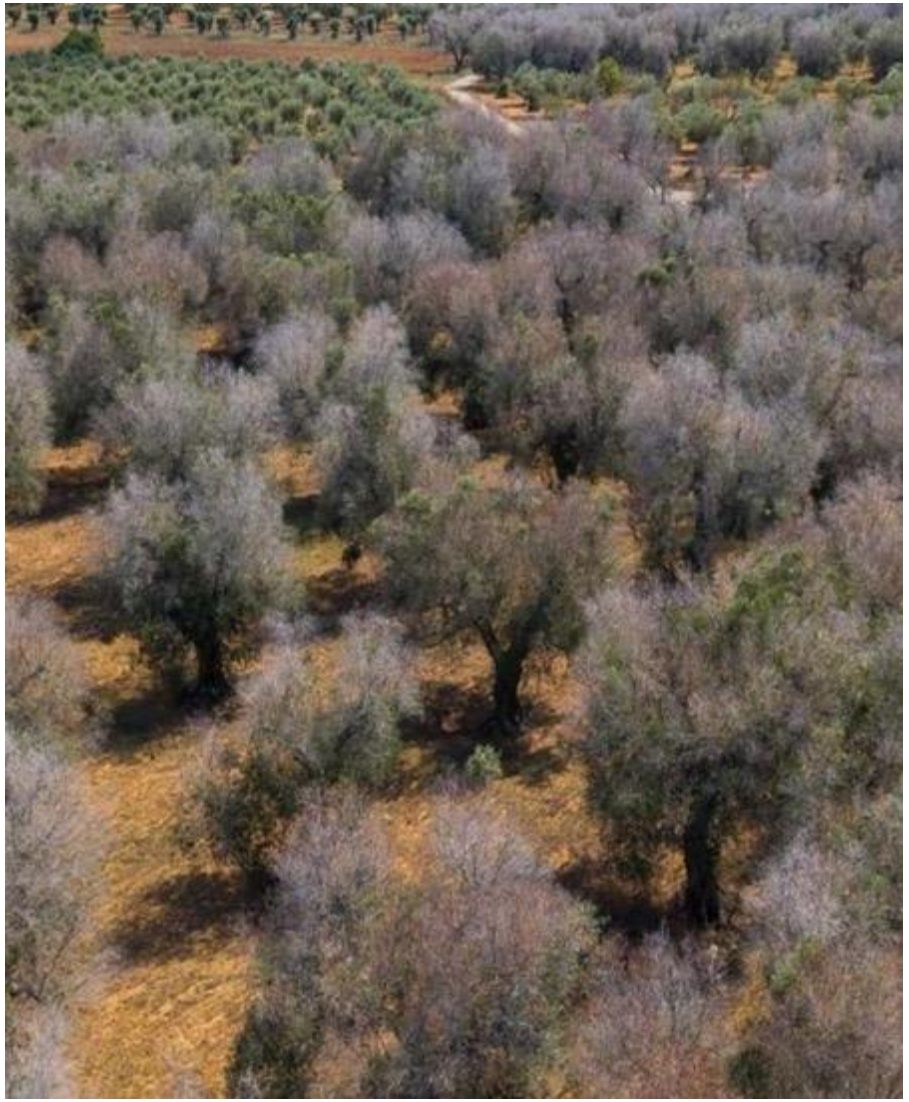
Outlines

An Introduction

FAO actions to mitigate the risk of XF in the NENA region

Socio-economic impacts of *Xylella fastidiosa* for the NENA Region

Conclusion



Introduction

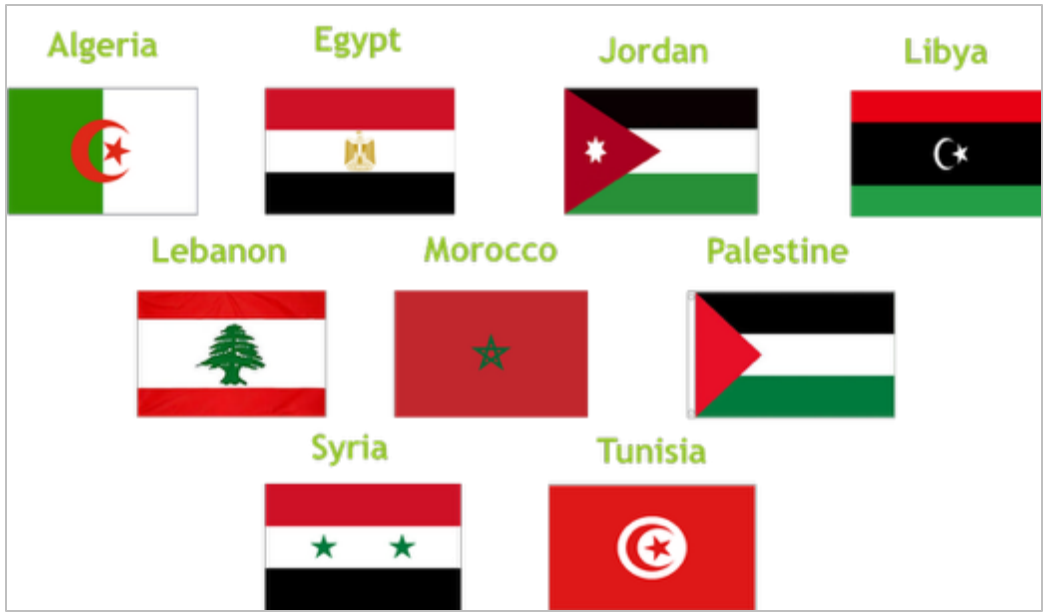
NENA Regional Context

- World top producers of olive and citrus
- Main host plants represent more than 10% of total cultivated land
- Mostly small-scale family farms
- More than 6M tonnes of imports of planting materials of host plants from countries with official reports of *Xf*
- Low preparedness

FAO Actions to Mitigate The Risk of XF in the NENA Region

FAO TCP/RAB/3601: Strengthening preventive measures for the introduction and spread of XF (Olive Quick Decline Syndrome in NENA countries

2016 -2019



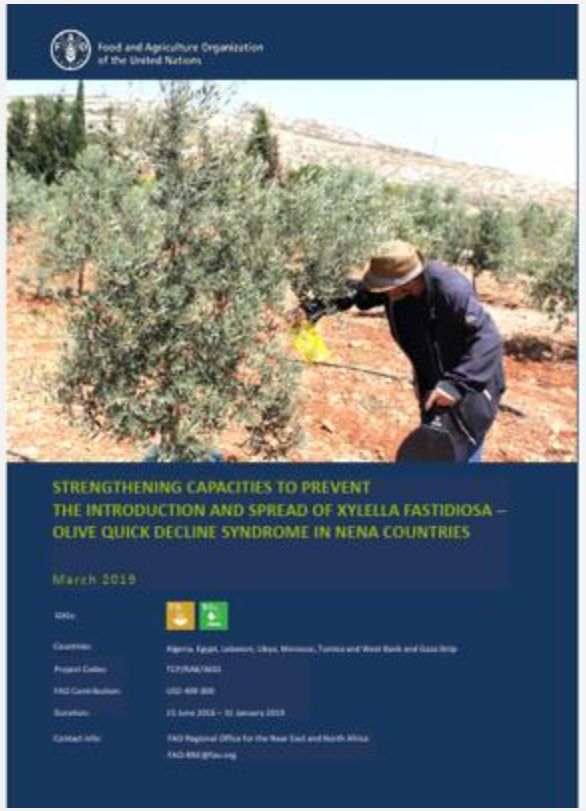
Project main objectives

1. **Set up Contingency Plans & Phytosanitary Measures**
2. **Improving Capacity Building** in XF Surveillance, Diagnosis, and Management
3. **Developing effective Action Plans** for XF Surveillance
4. **Knowledge transfer & Raising Awareness**

FAO Actions to Mitigate The Risk of XF in the NENA Region

Capacity building

Regional TCP/RAB/3601

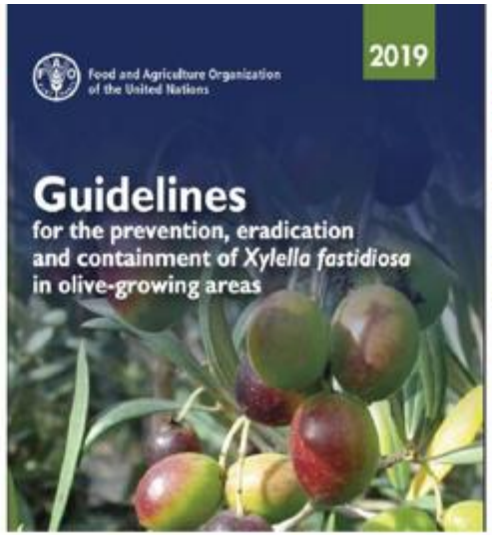


- Six Trainings of Trainers (ToTs) programs
- 3,858 participants were trained by trainers
- Providing 8 real-time LAMP devices for quick detection.

FAO Actions to Mitigate The Risk of XF in the NENA Region

Raising Awareness

Regional TCP/RAB/3601



Useful links:

FAO video English:
https://www.youtube.com/watch?v=NaOVEJkvmME

FAO video Arabic:
https://www.youtube.com/watch?v=MUt1GsXguf8&list=UUtu8MkufmVgxS8_Oct7mMig&index=888

EFSA Xylella fastidiosa: Can science find a solution?
https://www.youtube.com/watch?v=BrDGAz03YS8

Link of Superquark RAI 1 program
https://www.youtube.com/watch?v=LhSwztxaAoU

Simple carton film in Italian "Emergenza Xylella: voce alla scienza"
https://www.youtube.com/watch?v=powXal24MAI

FAO Actions to Mitigate The Risk of XF in the NENA Region

TCP for Lebanon

In 2020, Lebanon reported the first infection with *Xylella fastidiosa* subsp. *fastidiosa* on almond trees in Bint Jbeil, South Lebanon

Title	Supporting national capacities to enhance the containment and mngmt measures for Xylella fastidiosa		
Objectives	Readiness to contain and manage Xylella fastidiosa enhanced		
Symbol	TCP/LEB/3904	Oracle Activity	OTCP22LB23284
Entity Number	747587 (TCP Project)		
Recipient as per GRMS	Lebanon	1 January 2024- 31 December 2025	
Recipient	Lebanon	Donor	FAO

National capacities for surveillance, containment and management of *Xylella fastidiosa* strengthened

FAO Actions to Mitigate The Risk of XF in the NENA Region

The Socio-economic impacts of *X. fastidiosa* for the NENA Region

LoA FAO Xylella 2019 Project *"An assessment of risks of Xylella fastidiosa and its potential socio-economic impacts in NENA countries"*, funded by FAO

Food and Agriculture Organization of the United Nations

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FAO Budget Code:
PO Number :

Your Ref.:GRMS Supplier Number: 30612

LETTER OF AGREEMENT

Between

the Food and Agriculture Organization of the United Nations ("FAO")

and

the International Centre for Advanced Mediterranean Agronomic Studies

Mediterranean Agronomic Institute of Bari (CIHEAM BARI)

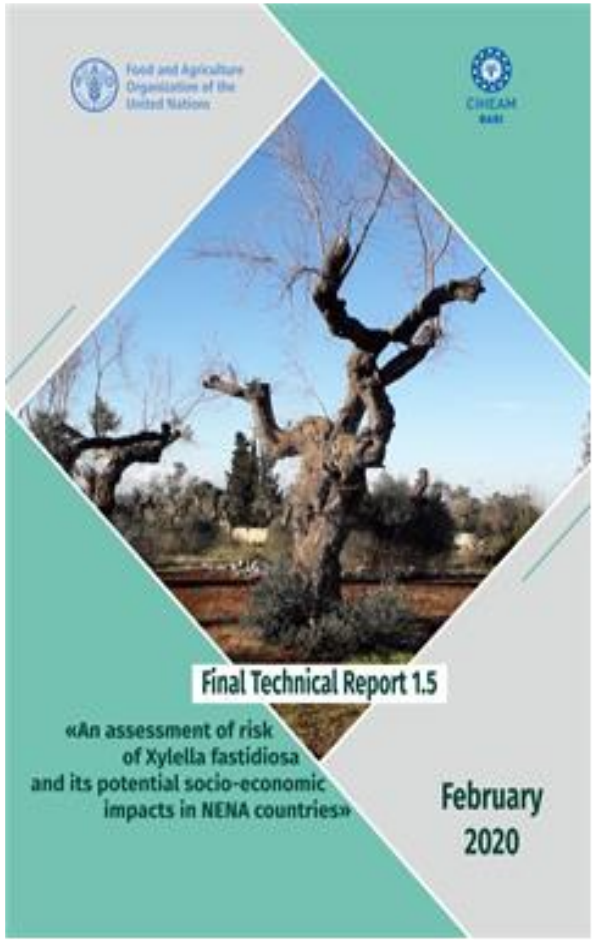
Via Ceglie 9, Valenzano Bari

For Provision of funds to prepare

An assessment of risks of *Xylella fastidiosa* and its potential socio-economic impacts in NENA countries

Food and Agriculture Organization of the United Nations

CIHEAM BARI



NEW MEDIT

Potential socio-economic impact of *Xylella fastidiosa* in the Near East and North Africa (NENA): Risk of introduction and spread, risk perception and socio-economic effects

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DOI: 10.30682/nm2102c
JEL codes: J43, N5, O13, Q1

Abstract

The serious damages of Xylella fastidiosa (Xf) in Euro-Mediterranean countries (e.g. Italy, France, Spain) raise concerns for the Near East and North Africa (NENA). Therefore, a study was performed to a) assess the risk of Xf entry, establishment and spread in target NENA countries (viz. Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia); b) analyze risk perception and preparedness level among agri-food chain stakeholders; c) estimate potential socio-economic impacts for olives, grapes and citrus. Pest risk appraisal suggests that Morocco, Lebanon, Palestine and Syria are the most exposed to Xf risk; other target NENA countries, except Algeria, have an intermediate risk. Risk perception analysis shows that governance efficacy and practices application can be improved by involving stakeholders and raising their awareness. Socio-economic impact assessment indicates declining yields, production, profitability, export, employment, and increasing import, with the highest impacts relating to olives, then citrus and grapes. The study suggests that the expected socio-economic impacts are unacceptable and require urgent action against Xf at national and regional levels.

Keywords: Olive growing, Viticulture, Citrus production, Transboundary plant pests, Pest risk assessment, Profitability, Employment, Trade, Olive quick decline, Risk management.

1 Introduction

Xylella fastidiosa (*Xf*) is a destructive bacterial pathogen that attacks a wide range of plant species worldwide [about 600, according to EFSA PLH Panel (2020)]. It is a xylem-limited gram-negative bacterium of the family *Xanthomonadaceae* and is considered a serious threat to agriculture, the environment and the economy as a whole. *Xf* causes severe direct damages, as in the case of grapevine Pierce's disease, olive quick decline, citrus variegated chlorosis, phony peach, coffee leaf scorch and other diseases of plum, almond, oak and oleander, and indirect

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The Socio-economic impacts of *X. fastidiosa* for the NENA Region

Rationale

to evaluate the direct and indirect losses and trade consequences for the main crops

To identify the most vulnerable production sectors and farmer communities.

To raise awareness and increase the preparedness of NENA countries

To provide justifications for prevention measures to be taken by stakeholders

The Socio-economic impacts of *X. fastidiosa* for the NENA Region

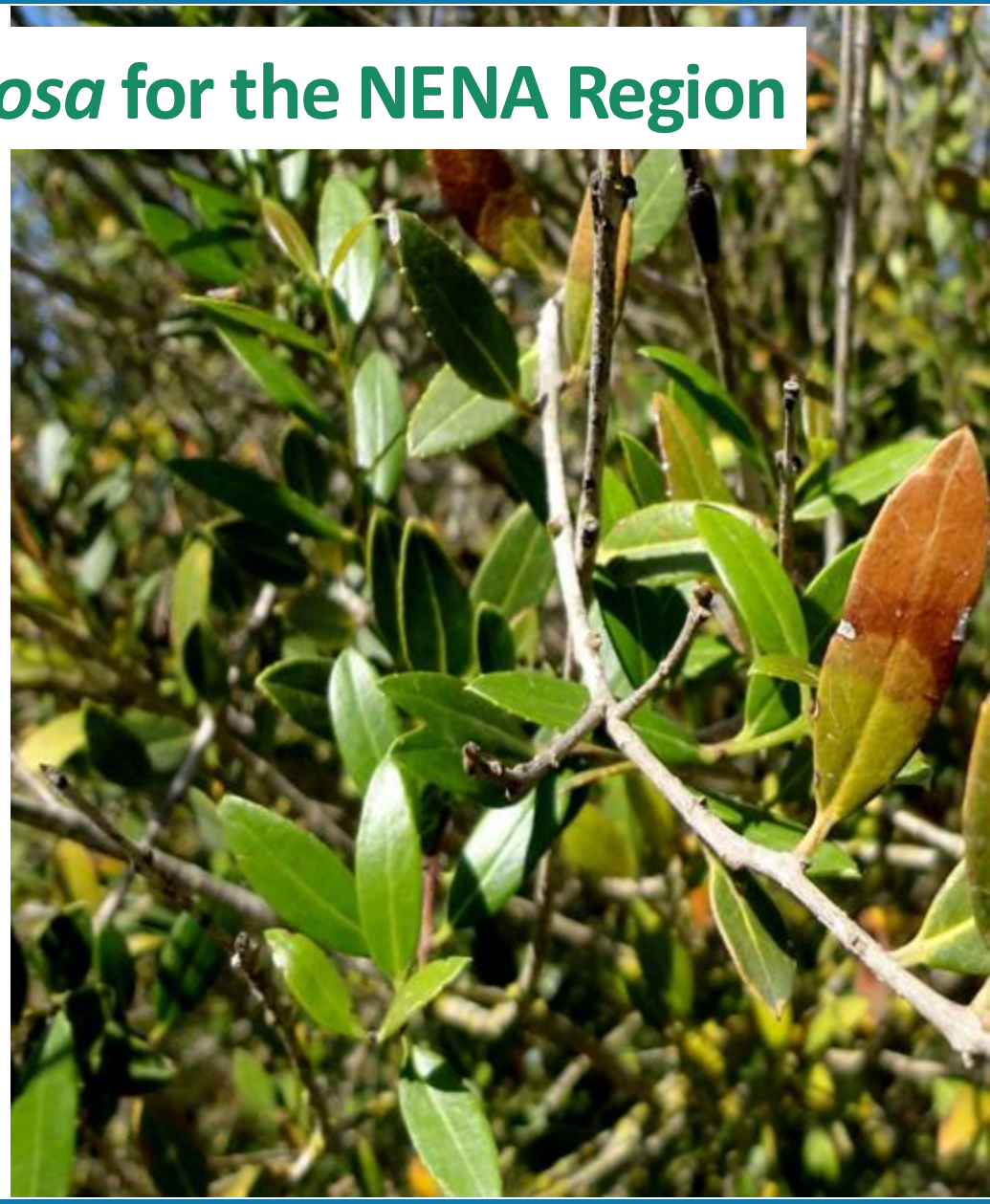
Methodology

- **Selected NENA countries:**

Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, and Tunisia for the similarity of their climatic and agricultural conditions to Mediterranean European countries (e.g. Spain, France, and Italy) in which *X. fastidiosa* is established.

- **Sources for data collection:**
  - International literature;
  - Databases: FAOSTAT, UN.COMETRADE
  - National Institutions (Ministry of Agriculture, Research centres, etc.) directly contacted through an online survey.

Source: Dr. Gianluigi Cardone, (PPT, IAMBari 2023)



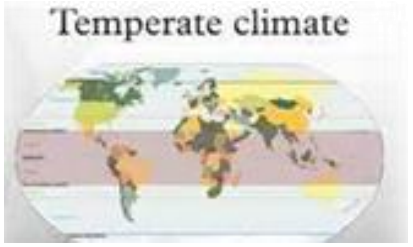
The Socio-economic impacts of *X. fastidiosa* for the NENA Region

Methodology

Spread of *xf*: OVERALL SCORE calculpest risk assessment of the establishment and ATION per country (sc)

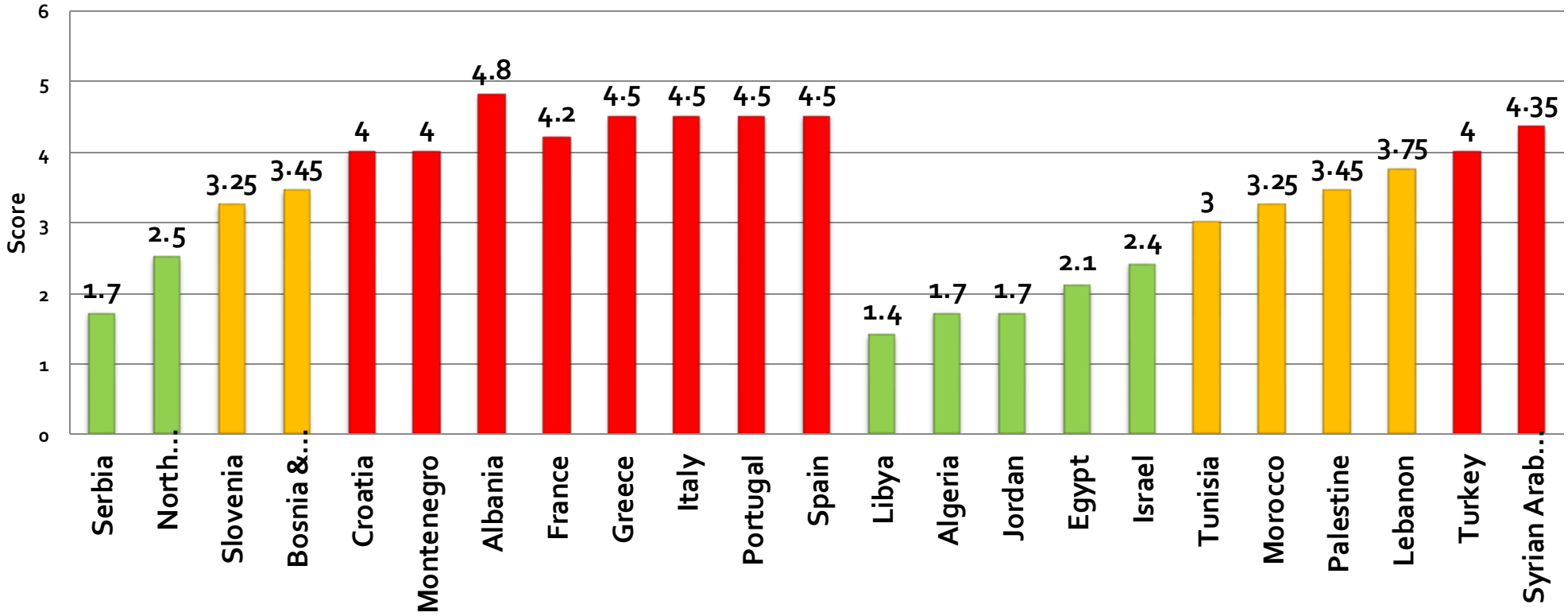
Source: Overall score calculation is based on Cardone et *al.*, 2021

Risk driver score (#) (from 1 to 6) (A)	Partial coefficient (B)	Score (Sn) = (A) * (B)
1. Surveillance program Source: Survey	0.20	S1
2. Vectors Source: http://dmitriev.speciesfile.org/	0.25	S2
3. Climate suitability Source: www.ClimaTemps.com	0.25	S3
4. Abundance of alternative hosts Source: http://www.fao.org/statistics/databases	0.10	S4
5. Abundance of the main crops Source: http://www.fao.org/statistics/databases	0.10	S5
6. Certification program Source: Survey	0.10	S6
Overall score per country	**1.00**	$S(c)=\sum_{n=1}^{6} Sn$



Risk of establishment & spread of *X. fastidiosa* in European Mediterranean, Balkans & MENA countries

RESULTS



Score Risk level

< 3 Low

Between 3 & 4 Medium

≥ 4 High

HIGH

MEDIUM

LOW

Source: Dr. Gianluigi Cardone, (PPT, IAMBari 2023)

Estimation of potential socio-economic impacts in target countries

The **parameters and indicators** to estimate the socio-economic impacts of *Xf* on the main crops (olive, grape, Citrus spp., almond) are:

1. **Production phenomena**:
    a. Productivity: yields of agricultural production
    b. Value of production: revenues of agricultural products
    c. Agricultural value-added: profitability and gross margin
2. **Social phenomena**:
    a. Employment: job and working days
3. **Marketing phenomena**:
    a. Trade: export loss
    b. Consumption: import increase

Source: Dr. Gianluigi Cardone, (PPT, IAMBari 2023)

Estimation of potential social impacts in target countries

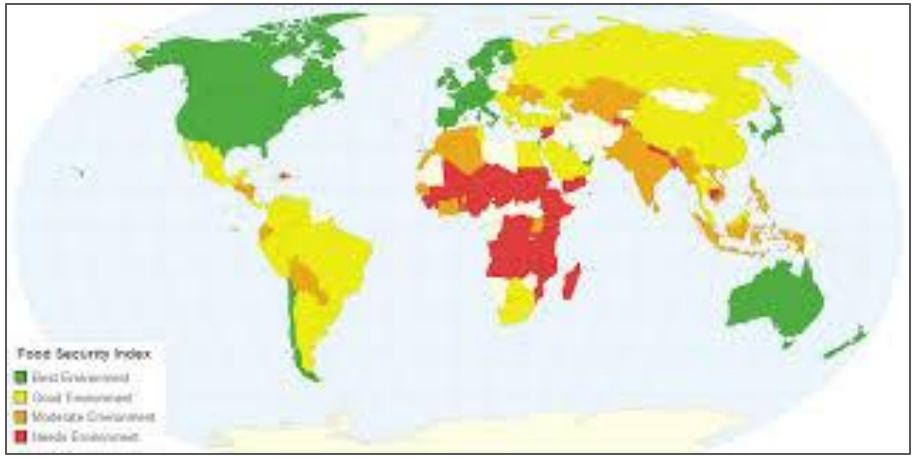
A complex index "**Social vulnerability index**" considers **four components** (indexes):

1. Employment in agriculture: the weight of agricultural jobs on the total employment.

2. Global Food Security index: the issues of food affordability, availability, quality and safety, and natural resources and resilience.

3. Average size per agricultural holding: the presence of large, medium and small farms, and the weaknesses of marginal communities composed mainly of small farmers.

4. Gross National Income (GNI) per capita, that means the country's economic strengths and needs, as well as the general standard of living enjoyed by the average citizen.



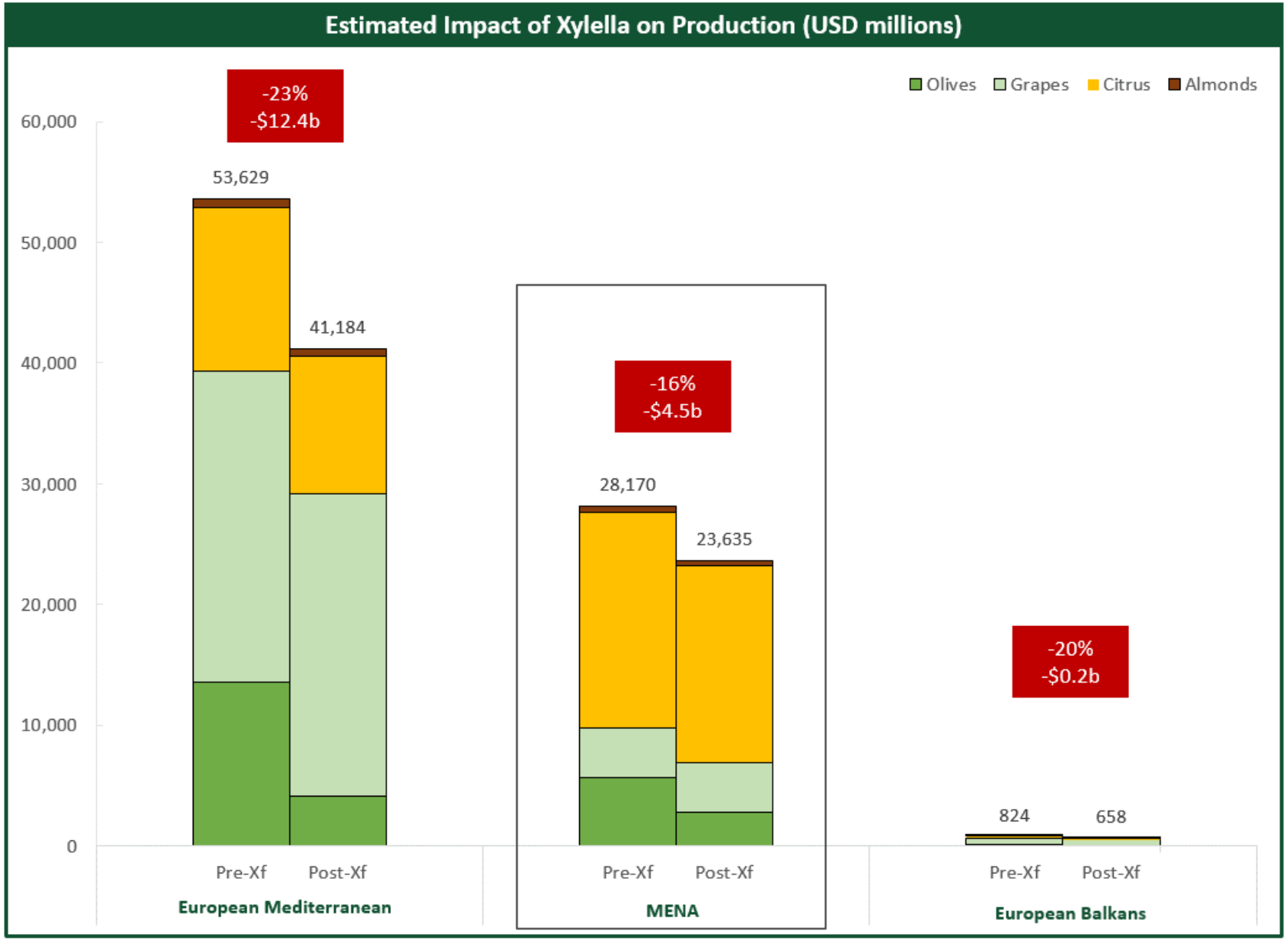
Source: Dr. Gianluigi Cardone, (PPT, IAMBari 2023)

Assessment of Social Vulnerability index in MENA countries (2019)

Index	Partial index to Social vulnerability index	Weights	Palestine		Syria		Egypt		Lybia		Tunisia		Jordan		Algeria		Lebanon		Morocco		Turkey	
			Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted	Risk score	Risk weighted
1	Agricultural employment	0,20	6	1,2	3	0,6	6	1,2	5	1	4	0,8	2	0,4	3	0,6	4	0,8	6	1,2	5	1,0
2	GFI - Affordability	0,10		0,0	4	0,4	3	0,3		0	2	0,2	1	0,1	1	0,1		0,0	1	0,1	2	0,2
	GFI - Availability	0,10		0,0	4	0,4	1	0,1		0	3	0,3	3	0,3	3	0,3		0,0	3	0,3	2	0,2
	GFI - Quality and Safety	0,05		0,0	3	0,2	2	0,1		0	2	0,1	2	0,1	2	0,1		0,0	2	0,1	1	0,1
	GFI - Natural Resources and resilience	0,05		0,0	4	0,2	3	0,2		0	3	0,2	3	0,2	4	0,2		0,0	3	0,2	3	0,2
3	Average size per agricultural holding	0,20	5	1,0	3	0,6	1	0,2	1	0,2	1	0,2	1	0,2	1	0,2	1	0,2	3	0,6	3	0,6
4	Gross national income (GNI) per capita	0,30	6	1,8	6	1,8	6	1,8	6	1,8	6	1,8	6	1,8	6	1,8	6	1,8	6	1,8	6	1,8
	Total Social vulnerability index	1,00	n.a		4,2		3,9		n.a.		3,6		3,1		3,3		n.a.		4,3		4,0	
5,0	**Pest risk management (Establisment and spread)**		3,5		4,4		2,1		1,4		3,0		1,7		1,7		3,8		3,3		4,0	
6,0	**Social vulnerability index post-Xf**		n.a.		18,1		8,1		n.a.		10,7		5,2		5,6		n.a.		13,8		16,0	

Considering the effects of risk of establishment and spread post-Xf, the social vulnerability post-Xf changes significantly.
In fact, it reaches **very high values in Syria, Turkey, Morocco and Tunisia**.
It could mean, with all the precautions the using index impose, that the establishment and spread of Xf (post-Xf) in those countries could significantly **impact on social conditions especially for small farms**.

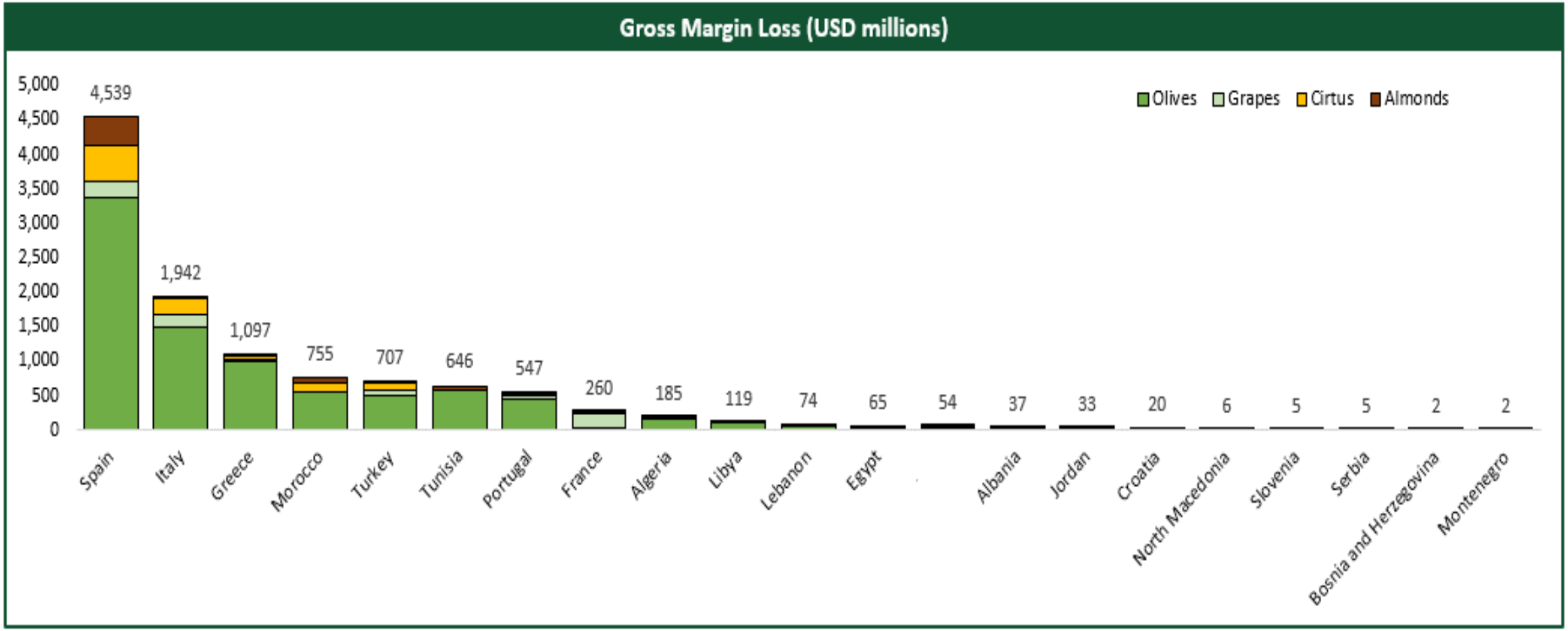
Source: Dr. Gianluigi Cardone, (PPT, IAMBari 2023)



- The highest losses in value of production for area are in European Mediterranean countries (-23%)
- The highest losses of value of production for crop in the whole Mediterranean region are in olives

Source: Dr. Gianluigi Cardone, (PPT, IAMBari 2023)

- The **highest loss of GM** is in Spain, less in Italy, Greece, Morocco, Turkey, Tunisia and Portugal
- The **highest losses of GM** are in olives, less in Citrus spp., such as in value of production



Source: Dr. Gianluigi Cardone, (PPT, IAMBari 2023)

Area	Average quantity of production losses (tons)	Value of production loss (million USD)	Decrease in production (%)	Production loss as % of Total Agricultural Value	Gross margin loss (million USD)	Employment Loss (million days)	Social Vulnerability Score
Total Mediterranean Region	**16,256,797**	**17,147**	**-20.8%**	**7.4%**	**11,099**	**338**	
European Mediterranean	**11,063,600**	**12,445**	**-23.2%**	**10.4%**	**8,385**	**204**	
France	189,886	434	-3.1%	1.0%	260	6	6
Greece	1,685,631	3,938	-51.0%	33.8%	1,097	31	11
Italy	2,347,814	2,274	-19.9%	7.5%	1,942	49	7
Portugal	655,615	406	-22.8%	9.6%	547	15	7
Spain	6,184,653	5,393	-29.0%	17.1%	4,539	103	6
MENA	**5,063,993**	**4,536**	**-16.1%**	**4.3%**	**2,637**	**131**	
Algeria	290,334	407	-5.8%	2.4%	185	8	6
Egypt	492,376	175	-6.2%	1.0%	65	2	8
Jordan	67,290	88	-19.9%	6.7%	33	1	5
Lebanon	122,114	207	-18.4%	9.4%	74	2	N/A
Libya	41,372	41	-12.3%	N/A	119	3	N/A
Morocco	917,558	586	-19.1%	6.8%	755	23	14
Palestine	34,411	68	-23.1%	8.7%	N/A	0	N/A
Syria	656,283	827	-24.8%	N/A	N/A	22	18
Tunisia	547,732	309	-26.3%	10.0%	646	38	11
Israel	48,830	99	-6.5%	2.5%	54	1	6
Turkey	1,845,693	1,728	-24.5%	3.4%	707	31	16
European Balkans	**129,204**	**166**	**-20.1%**	**2.1%**	**77**	**3**	
Albania	93,584	134	-39.3%	9.8%	37	2	N/A
Bosnia and Herzegovina	633	0	-1.4%	0.0%	2	0	N/A
Croatia	22,448	29	-13.2%	2.8%	20	1	N/A
Montenegro	2,625	N/A	N/A	N/A	2	0	N/A
North Macedonia	6,382	1	-1.0%	0.1%	6	0	N/A
Serbia	889	1	-0.6%	0.0%	5	0	N/A
Slovenia	2,643	1	-1.8%	0.3%	5	0	N/A

Results: Estimation of potential socio-economic impacts in targeted countries

- Total production value at risk across the Mediterranean region is over $17 billion in yearly production, putting at risk over 7% of the overall agricultural value of production.
- In MENA region, yearly production is expected to decrease by about 16%, corresponding to a $4.5 billion decrease in yearly production, that is equivalent to loss of 4.3% on total agricultural value.
- Contrarily to Europe, the spread of Xylella in MENA poses serious social risks on top of economic ones (higher social vulnerability score, particularly Syria, Turkey, Morocco and Tunisia).

Conclusion

- The socio-economic impacts of X. fastidiosa in the NENA region present significant challenges that require urgent attention.
- The bacterium poses a serious threat to olives, citrus, and grapes, leading to substantial yield losses and economic strain on farmers and communities.
- Collaborative efforts are essential to implement surveillance and control measures effectively.

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Thank you