euromesco
Policy Study

N. 30

TOWARDS A RENEWED EURO-MEDITERRANEAN COOPERATION ON SUSTAINABLE AGRI-FOOD SYSTEMS FOR FOOD SECURITY IN THE REGION

Marko Lovec
Coordinator

Desirée A.L. Quagliarotti

Tommaso Emiliani

Ines Gasmi

Shutterstock

IEMed.
European Institute of the Mediterranean

Co-funded by the European Union

euromesco
Policy Study

N. 30

TOWARDS A RENEWED EURO-MEDITERRANEAN COOPERATION ON SUSTAINABLE AGRI-FOOD SYSTEMS FOR FOOD SECURITY IN THE REGION

Marko Lovec
Coordinator

Desirée A.L. Quagliarotti

Tommaso Emiliani

Ines Gasmi

IEMed.
European Institute of the Mediterranean

Co-funded by
the European Union

euromesco
research dialogue advocacy

EuroMeSCo has become a benchmark for policy-oriented research on issues related to Euro-Mediterranean cooperation, in particular economic development, security and migration. With 116 affiliated think tanks and institutions and about 500 experts from 30 different countries, the network has developed impactful tools for the benefit of its members and a larger community of stakeholders in the Euro-Mediterranean region.

Through a wide range of publications, surveys, events, training activities, audio-visual materials and a strong footprint on social media, the network reaches thousands of experts, think tankers, researchers, policy-makers and civil society and business stakeholders every year. While doing so, EuroMeSCo is strongly engaged in streamlining genuine joint research involving both European and Southern Mediterranean experts, encouraging exchanges between them and ultimately promoting Euro-Mediterranean integration. All the activities share an overall commitment to fostering youth participation and ensuring gender equality in the Euro-Mediterranean experts' community.

EuroMesCo: Connecting the Dots is a project co-funded by the European Union (EU) and the European Institute of the Mediterranean (IEMed) that is implemented in the framework of the EuroMeSCo network.

As part of this project, five Joint Study Groups are assembled each year to carry out evidence-based and policy-oriented research. The topics of the five study groups are defined through a thorough process of policy consultations designed to identify policy-relevant themes. Each Study Group involves a Coordinator and a team of authors who work towards the publication of a Policy Study which is printed, disseminated through different channels and events, and accompanied by audio-visual materials.

POLICY STUDY

Published by the European Institute of the Mediterranean

Policy Peer Review: Sébastien Abis
Academic Peer Reviewer: Anonymous

Editing: Jorge Piñera Álvarez

Design layout Maurin.studio
Proofreading Neil Charlton
Layout Núria Esparza
Print ISSN 2462-4500
Digital ISSN 2462-4519
Arabic version ISSN 2696-7626
May 2023

This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union or the European Institute of the Mediterranean.

IEMed.
European Institute of the Mediterranean

The **European Institute of the Mediterranean** (IEMed), founded in 1989, is a think and do tank specialised in Euro-Mediterranean relations. It provides policy-oriented and evidence-based research underpinned by a genuine Euromed multidimensional and inclusive approach.

The aim of the IEMed, in accordance with the principles of the Euro-Mediterranean Partnership (EMP), the European Neighbourhood Policy (ENP) and the Union for the Mediterranean (UfM), is to stimulate reflection and action that contribute to mutual understanding, exchange and cooperation between the different Mediterranean countries, societies and cultures, and to promote the progressive construction of a space of peace and stability, shared prosperity and dialogue between cultures and civilisations in the Mediterranean.

The IEMed is a consortium comprising the Catalan Government, the Spanish Ministry of Foreign Affairs, European Union and Cooperation, the European Union and Barcelona City Council. It also incorporates civil society through its Board of Trustees and its Advisory Council.

euromesco

Policy Study

Content

Executive Summary

The food and energy price spikes triggered by the war in Ukraine revealed deep vulnerabilities of the Mediterranean agri-food system that concern human security of people living in the region. The Middle East and North African (MENA) region, the largest food importing region in the world, faces systemic challenges on the demand side (population growth, urbanisation, dietary changes, macroeconomic constraints in several cases) and supply side (scarcity of natural resources such as water and land aggravated by the impact of climate change) with negative future forecasts. Often, the rural population and farmers are amongst the food insecure. European countries, while more resilient, are not immune; high prices of imported food and inputs impact macroeconomic trends and vulnerable segments of the societies.

The existing policies informed by the food security concept emphasising international trade and production fell short of addressing the complex food-environment-society nexus. The food sovereignty concept, developed by the critics, offers valuable insight that could, by feeding into context-dependent local and macroregional strategies, support transformative change towards more resilient agricultural and food systems. The 'Euro-Mediterranean blueprint for sustainable agricultural and food systems' should be based on six pillars: (1) agroecological transition to preserve soil and agro-biodiversity (sustainable agricultural practices including precision, organic and conservation agriculture, more resilient crop species, natural resources saving strategies, diversified farm systems); (2) promotion of traditional 'high value' agricultural and food systems (Mediterranean diet, traditional crops and practices, defined as globally important agricultural heritage systems by the Food and Agriculture Organization [FAO]); (3) support for initiatives targeting the agri-food chain (seed conservation for gene diversity, reducing food loss and waste, [semi]urban agriculture); (4) promotion of blue foods strategy (expansion of sustainable fisheries and aquaculture via investment, regulation, promotion, monitoring and standards); (5) participatory policy-making (rebalancing power in the food chain, trust-building, inclusion of a broad range of stakeholders); and (6) macroregional cooperation (regional trade integration, common Euro-Med food crisis response facility, cooperation on rural development, research and education).

The Euro-Mediterranean region is shaped by changing geopolitics where, apart from the traditional North-South relations, East-West relations are coming to the fore. Despite the importance of food for human security, interdependencies and certain leverage, regional cooperation in agriculture has never been particularly strong; the regional institutional framework – the rigid and status quo biased Union for the Mediterranean (UfM) and the European Neighbourhood Policy (ENP) preoccupied with conditionality and migration – has lost its integrational-transformative momentum. The systemic disruptions brought about by the cumulative impacts of the COVID-19 pandemic and the Russian invasion of Ukraine provide an opportunity to make a new case for cooperation where, instead of being seen as a problem, agriculture could act as an enabler for climate policy, for farm upskilling and rural development as a guarantee of stability and security, and for partner-

ship in innovation and education providing critical mass and multiplication effects in the transition towards sustainable food systems.

There are several European Union (EU) initiatives where (better) involvement of Southern Mediterranean countries could spur synergetic effects, such as Horizon, European Political Community, and Ukraine Solidarity Lane. Secondly, despite being one of the sectors most affected by and affecting climate change, agriculture and food attract only 3% of the world's climate funding. There is some opportunity in modernisation of the Common Agricultural Policy (CAP), the ENP, and the European Fund for Sustainable Development (EFSD+), including the External Action Guarantee for transition to sustainable food systems. The biggest leverage is, however, in reengagement of regional trade negotiations (based on common standards and new sustainability conditionality) and the engagement of both the public and private sector, including finance, and addressing bottlenecks such as logistics. Third, partnership in research, innovation and education can build on the existing platforms such as EIT Food and the Partnership for Research and Innovation in the Mediterranean Area (PRIMA), and networks such as the Centre International des Hautes Etudes Agronomiques Méditerranéennes (CIHEAM). Topics covered could include food waste, digitalisation, and adaptation to and mitigation of climate change. Finally, it is important to win the hearts and minds of the people via unifying narratives; e.g., by launching a 'Euro-Med Olive Branch' initiative modelled after the New European Bauhaus where food already plays an important role.

The EU's CAP, the largest agricultural subsidy system in the Euro-Mediterranean, despite reforms it underwent in the last 30 years to support trade and socioenvironmental sustainability, has remained more an obstacle than a driver of integrative-transformative strategy in the region. During this period, parallel with the multilateral trade liberalisation, the EU's CAP has become less trade distorting and better oriented towards new objectives such as environmental protection and rural development. In this context, attempts were made to deepen trade in the region and support policy developments that would mirror the CAP. However, the process faced blockades and lack of political will to address structural challenges and, in the last 10 years, against the backdrop of various crises, largely stalled. In response to the recent food security crisis, calls were made to reverse the CAP policy development and support increased production in the EU. While potentially (but not necessarily) delivering in the short run, this contradicts structural challenges such as the need to support production on the southern shore and gear towards environmental sustainability on the northern shore, and brings long-term economic, social and environmental risks.

What should be done instead is to strengthen targeting of CAP payments, e.g., of climate and biodiversity objectives, in line with the EU's Farm2Fork and Biodiversity strategies, as well as introducing conditionalities on trade to support development of sustainable practices elsewhere. The CAP could along with other agricultural policy instruments in the region also play a more direct role in supporting transition towards sustainable food systems in terms of regional market monitoring systems, producer and interbranch organisations, quality schemes, sustainable energy (crop) production on farms, European Innovation Partnership (EIP), agricultural knowledge and information systems, and similar. The 'southern shore' participants in the joint schemes could be funded via an investment plan for the southern neighbourhood as a part of the new ENP-South strategy, where agriculture and food are currently underrepresented.

The growing role of climate and digital agenda through concepts such as Climate Smart Agriculture (CSA) brings to the fore the intricate nature of agriculture and food systems with complex agroecological and social interconnections and compromises between (a) reduction of global greenhouse gas emissions, (b) climate resilience, and (c) increase of productivity, wages and employment in the sector. A basic problem in implementing CSA across multiple locations is coordinating policies and programmes that detect these compromises and allow for prioritising or reconciliation among the three objectives where there are conflicts. The adoption of CSA principles by the 5+5 countries (Algeria, France, Italy, Libya, Malta, Morocco, Portugal, Spain and Tunisia) shows a differentiated and fragmented picture in terms of regulatory measures, incentive programmes, research and technological development, in both a climate-specific context and one arising from other concurrent environmental and economic priorities. The fundamental difficulties in implementing CSA regionally, such as different priorities, high starting costs and lack of education and skills, indicate an absence of incentive structures, coordination and finance, and are especially visible in the southern shore of the Mediterranean.

The evidence suggests the following needs: encourage context-driven, climate-smart ideas and solutions (investments in ecosystem-based methodologies, cutting-edge technology, and a supportive environment); adapt water management to promote food security in the context of CSA (assessing water resources and storage, promoting rainfed agriculture, using additional irrigation to manage climatically-related water variability, and boosting resilience through sophisticated techs); improve policy coordination and strengthen local, national and regional institutions (farmers and farmer associations, among other institutions and stakeholders, and government-level coordination); boost smallholders', governments' and private sector entrepreneurs' access to funding (besides cooperative and national banks, public funding is expected to be the largest source, including the Global Environment Facility [GEF], the Green Climate Fund and national policy instruments like National Adaption Plans [NAPs] and Nationally Appropriate Mitigations Actions [NAMAs]; and raise the level of national investments in climate-friendly agriculture (e.g., carbon financing could help farmers in the early phases of investments in permanent crops such as trees).

Introduction

Marko Lovec
Associate Professor at the University of Ljubljana, Faculty of Social Sciences

Russian aggression against Ukraine triggered a rise in food and energy prices. The Southern and Eastern Mediterranean Countries (SEMC) are among the hardest hit (Scmidhuber et al., 2022). In SEMCs, price trends are in addition to structural challenges on the demand side (growing urban populations, changing diets, macroeconomic constraints) and the supply side (scarcity of natural resources, including water, exacerbated by climate change). Rural areas and farmers in the region itself are often vulnerable in a number of ways. European Union (EU) member states, while more resilient, are also affected by rising prices that impact macroeconomic trends and the most vulnerable segments of society.

Food security in the Euro-Mediterranean region has already been brought into focus during food and energy price spikes in the late 2000s and early 2010s. However, despite the strong interdependencies and potential leverage of several countries in the region that are major food and energy exporters (FAO, 2022b), the Euro-Mediterranean region has failed to develop a strategy for agricultural and food cooperation.

At the global level, there have been renewed calls for a coordinated and rules-based approach to prevent the externalisation of food insecurity (FAO, 2016). There has been growing awareness of the limitations of existing production- and trade-oriented food security[1] policies and a better understanding of the socioeconomic and environmental dimensions of food security (G7 Presidency, 2022). Proposed solutions include greater market transparency to avoid speculation, improving fertiliser use efficiency, and financing development projects based on public-private partnerships specifically targeting smallholder farmers (FAO, 2022a)

The purpose of this study is to examine policy areas that have the potential to improve food security in the region. In Chapter 1, Desirée Quagliarotti[2] challenges the traditional concept of food security by using a variety of perspectives and data that demonstrate policy failure. Instead, she explores the provocative concept of food sovereignty-that is, greater autonomy in agricultural and food systems decision making–advocated by individual local smallholder organisations to see what we might learn from it to support the transition to sustainable food systems in the region.

The second chapter by Tommaso Emiliani[3] explores how the changing geopolitical environment – e.g., the growing role of China and a more assertive Russia – could serve to strategize and strengthen regional cooperation on agriculture and food. Drawing on strategic documents and interviews with policymakers and experts, it identifies the limitations of existing regional institutional forums such as the Union for the Mediterranean (UfM) and the European Neighbourhood Policy (ENP), as well as policy areas such as trade and the Common Agricultural Policy (CAP), and explores other forums, actors, and policy initiatives.

[1] Food seucrity was defiend at the World Food Summit in 1996 as availability of sufficient quantities of food of proper quality, access, efficient utilization of food and related factors and sustainable management of the resource base. Existing policies focused mostly on (short term) availability and access via increased production, trade and aid.

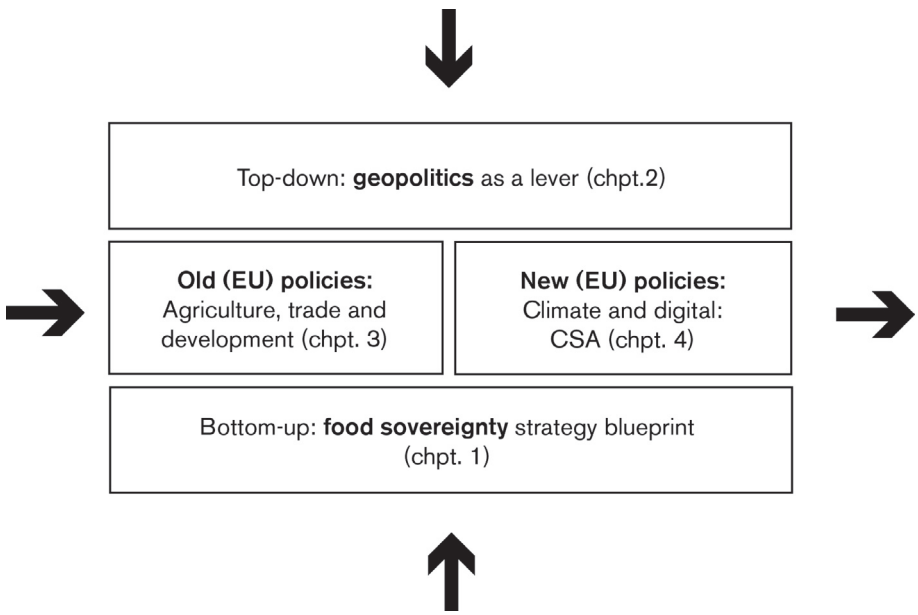
[2] Researcher at ISMED.

[3] Strategic Synergies Cluster Manager at EIT Food.

The third chapter by Marko Lovec[4] focuses specifically on CAP as the largest agricultural subsidy system in the region and its relationship to multilateral and regional trade and development policies, as well as environmental and social issues relevant to food security in the region. The chapter includes an assessment of the short- and medium-term impacts of changes to CAP (exemptions from existing rules, CAP 2023-2027, and initiatives related to the European Green Deal) and ENP-South on food security in the region.

The fourth chapter by Ines Gasmi[5] focuses on the concept of Climate Smart Agriculture (CSA), which combines the potential of the emerging environmental and digital agendas to promote sustainable production in the region. To this end, an experimental inventory of initiatives in the region and a survey of stakeholders are conducted, existing experiences on institutional, financial and policy incentives and barriers are collected and summarised, and an action plan is proposed.

Figure 1. Design of the study



[4] Associate professor at the Unviesity of Ljubljana, Faculty of Social Sciences

[5] Project officer at the Centre for Mediterranean Integration CMI-UNOPS.

References

FAO (2016). Food self-sufficiency and international trade: a false dichotomy? In: *The State of Agricultural Commodity Markets 2015-2016.*

FAO (2022a, May 13). Presentation by the Director-General Meeting of the G7 Ministers of Agriculture Stuttgart, Germany – 13 May 2022.

FAO (2022b, May 20). FAO puts forward proposals to address current and future food shortages. Retrieved from: https://www.fao.org/newsroom/detail/g7-fao-food-shortages-agriculture-ukraine-russia-germany/en

G7 PRESIDENCY (2022, May 20). Joint statement: Establish Global Alliance for Food Security to Catalyze Response to Food Crisis. *Reliefweb.* Retrieved from: https://reliefweb.int/report/world/joint-statement-g7-presidency-world-bank-group-establish-global-alliance-food-security-catalyze-response-food-crisis

SCHMIDHUBER, J. ET AL. (2022). The war in Ukraine and the risks it poses for global food commodity markets. In *FAO Food Outlook 2022.*

Towards a Common Euro-Mediterranean Food Sovereignty Policy Agenda

Desirée A.L. Quagliarotti
Researcher, CNR-ISMed, Naples

Introduction

Today, the Mediterranean region is facing significant challenges in relation to food security and nutrition, which are expected to worsen further in the coming decades. The demand for food is expected to increase by the mid-century as a result of population growth, urbanisation and shift in dietary patterns. At the same time, food security is increasingly threatened by the lack of two strategic resources for agricultural production – fertile land and water –, the impact of climate change, and greater price volatility and instability in the global food market. Furthermore, even though the region has made significant progress in reducing undernutrition, the double burden of malnutrition, which refers to both micronutrient deficiency (hidden hunger) and over-nutrition (overweight and obesity) still affects a considerable part of the population.

More recently, the COVID-19 pandemic increased global food insecurity in almost every country by reducing incomes and disrupting food supply chains, conditions worsened by Russia's unprovoked invasion of Ukraine. In the Mediterranean countries of Europe, the European Union (EU) food system, supported by a wide range of effective sectoral, national and EU policy measures, demonstrates a certain level of resilience, but the measures to counter the crises have highlighted some structural weaknesses in the EU's food supply chain, as well as on the affordability of safe and healthy food in the EU itself. In particular, the response to the pandemic has revealed the limitations in the EU's crisis response mechanism, particularly where market support may be needed. The EU does not have the necessary budget for sustained market intervention. Instead, by easing state aid rules, the EU has shifted responsibility to member states in supporting their agricultural sectors, leading to unbalanced sectoral parity within the EU single market. Consequently, there has been a rise in popular sentiment supporting local food production as a way of ensuring a more resilient food system and increasing food security. This call has received several high level supports, i.e., from the Agriculture Commissioner Janusz Wojciechowski as well as President Macron in France, who have couched this goal in various ways: as a call for reshoring production, for reducing reliance on global and EU supply chains, and promoting shorter supply chains (Matthews, 2020).

In the Middle East and North Africa (MENA) countries, the situation is somewhat different. Food systems in the MENA region are highly vulnerable to global shocks due to the presence of a series of factors that limit their resilience and their ability to adapt in times of crisis. Due to scarce endowment of resources, domestic production of water-intensive food has never been considered an efficient way of using natural resources; and countries, from the end of the 20th century, have generally adopted a trade-oriented food security strategy based on the neoclassical theory of international comparative advantages. This makes the MENA the most food import-dependent region in the world and extremely vulnerable to international agricultural market instability. In addition, high levels of political instability, protracted conflicts, and the lack of effective long-term food security strategies make the situation even worse, increasing countries' vulnerability to economic shocks and volatility in global food markets (Abis & Demurtas, 2023). What emerges is that in the MENA region food security is a

very complex issue influenced by the interrelationship between multiple variables. As a result, an appropriate food security strategy has to go beyond the neo-classical economic theory to include relevant political, social and environmental concerns (FAO, CIHEAM, & UfM, 2021).

These challenges raise the question of whether the principles and objectives that shaped the Mediterranean food systems in the 20th century need revision in order to simultaneously provide enough food, in quantity and quality, to meet the nutritional needs of a growing population and improve the livelihood of small farmers through income generation and employment creation, in a context of natural scarcity of resources and in a scenario of increasing climate change impacts, without putting further pressure on natural systems (FAO-CIHEAM, 2016).

This awareness implies a paradigm shift towards food production and consumption systems based on the principles of sustainability able to contribute to healthy food from a nutritional and environmental point of view. Addressing food system transformation in the Mediterranean region is a very complex and dynamic process that requires diverse institutional, socioeconomic and agroecological constraints to be considered in countries and territories on all shores of the Mediterranean. This work makes the case for a *common Euro-Mediterranean food policy agenda,* which sets a roadmap to enable transformative change. A key component of such an agenda is the concept of food sovereignty at the Mediterranean level as a lever to improve the sustainability of both food systems and consumption patterns, through which Mediterranean countries may achieve food security by combining sustainable, context-specific domestic food production and effective regional cooperation strategies. Through a literature review and secondary data analysis, the paper is structured into two main sections. A general, more theoretical part, in which specific aspects related to food security and nutrition in the Mediterranean region and a political economy analysis of food security strategies are provided, and the concept of food sovereignty at the Mediterranean level is introduced.

A second part aims to provide a framework within which to outline a blueprint for a common Euro-Mediterranean food policy agenda. Finally, for concrete ideas to be put forward, specific recommendations are made, proposing a range of actions in a number of key policy areas.

The state of food security in SEMCs

The MENA region is considered one of the most food insecure in the world. Three main factors contribute to such a view: limited agricultural potential, increasing food demand, and high food imports dependency.

The MENA region is considered one of the most food insecure in the world.

Although Southern and Eastern Mediterranean Countries (SEMCs) differ each other in their agricultural potential, in the MENA region as a whole there is limited scope to increase agricultural production extensively through a greater use of inputs such as fertile land and water (Quagliarotti, 2018; Saab, 2017) (Table 1).[6]

[6] To meet the growing food demand, agricultural production can be increased either through the expansion of the crop area or increasing yield per unit area, or both. Classified as an arid and semi-arid climatic region, MENA countries are affected by a lack of fertile land and water resources, which limits the option for cropland expansion.

Table 1. Agricultural inputs in the Mediterranean region (2020)

Country	Agricultural land (% of land area)	Agricultural land (km2)	Agricultural irrigated land (% of total agricultural land)	Arable land (ha per person)	Renewable internal freshwater resources per capita (m3)	Annual freshwater withdrawals, total (% of internal resources)
Albania	42.5	11,656	15.6	0.21	9,385	4
Bosnia and Herzegovina	43.3	22,161	-	0.31	10,68	1
Croatia	26.9	15,051	1.1	0.22	9,222	2
Cyprus	14.5	35,239	20.0	0.08	656	27
France	52.1	285,538	4.9	0.27	2,981	14
Greece	45.5	58,672	20.2	0.20	5,404	17
Italy	44.0	129,991	19.9	0.11	3,055	19
Malta	32.4	104	33.7	0.02	104	85
Portugal	42.3	38,728	14.5	0.09	3,695	16
Slovenia	30.3	6,105	0.6	0.09	9,002	5
Spain	52.3	261,426	14.4	0.25	2,437	28
Algeria	17.4	413,588	3.2	0.17	266	87
Egypt	4.0	39,712	-	0.03	10	114.1*
Libya	8.7	153,503	-	0.25	105	817
Morocco	68.1	303,82	6.0	0.21	805	36
Israel	29.9	6,464	33.4	0.04	84	148
Jordan	11.6	10,292	8.1	0.02	68	132
Lebanon	65.5	6,697	-	0.02	700	38
Palestinian Territories	73.9	4,449	3.7	0.01	178	37
Syria	75.8	139,211	9.4	0.27	421	196
Tunisia	62.6	97,311	3.9	0.22	363	90
Turkey	49.1	377,62	13.8	0.23	2,757	27
European Union	**41.0**	**1,639,615**	**-**	**0.22**	**3,043**	**14**
MENA	**33.4**	**3,746,084**	**-**	**0.12**	**513**	**123**
Sub-Saharan Africa	**42.5**	**10,163,808**	**-**	**0.20**	**3,602**	**3**
World	**36.5**	**47,338,929**	**-**	**0.18**	**5,658**	**9**

* For Egypt annual freshwater withdrawals, the total is calculated as % of total resources.

Source: World Bank, 2022.

If resource scarcity constitutes a significant constraint for food production, even more critical is the level of qualitative deterioration. Phenomena such as soil erosion, land degradation, salinisation and water pollution corroborate the awareness that the agricultural sector is approaching or has already passed its ecological limits as a result of decades of distortive policies and poor agricultural

practices,[7] which have undermined its long-term sustainability (FAO, 2011)

Table 2. Land degradation caused by water and wind erosion in SEMCs (1000 ha)

Country	Area affected by water erosion	Area affected by wind erosion
Algeria	3,9	12
Egypt	-	1,4
Jordan	330	3
Lebanon	65	-
Libya	1,3	24
Morocco	3,6	600
Syria	1,2	3
Tunisia	3,8	4

Source: Food and Agriculture Organization (FAO) and Intergovernmental Technical Panel on Soils (ITPS), 2015.

Table 3. Desertified area and the area threatened by desertification in some SEMCs, 2012

Country	Total area (000 of km2)	Desertified area (000 of km2)	Desertified area (%)	Area threatened by desertification (000 of km2)	Area threatened by desertification (%)
Algeria	2,382	1,97	83	230	9.7
Libya	1,807	1,589	88	381	21.1
Morocco	711	455	64	195	27.4
Tunisia	164	-	-	105	64

Source: Saab, 2017.

Physical limits to resource availability imply that SEMCs have to rely primarily on intensive increases in agricultural output, which is improving crop productivity in terms of yields on existing agricultural land and water resources. As shown in Table 4, although cereal yields across the MENA region average around 2,341 kg per ha, above the average of sub-Saharan Africa, they are still below the 4,072 kg per ha global average, and since 2000 this gap has been

[7] In many countries, agricultural and trade policies have caused environmental harm by distorting price signals through, for example, linking support to agricultural commodities and encouraging farming on environmentally fragile land, and lowering the costs of inputs, such as energy and water.

[8] According to the fifth wave of the *Arab Barometer survey,* Arab societies show significant concerns with water pollution. In Egypt, nearly all respondents cite water pollution as a serious or very serious problem (96%), roughly nine-in-ten say the same in Libya (93%), Tunisia (94%), Lebanon (90%) and Algeria (89%). Rates of concern remain high in Palestine (88%), Jordan (85%) and Morocco (83%) (Green, 2019).

widening.[9] Focusing the analysis at country level, most SEMCs have cereal yields significantly below the developing country average, and particularly low values are found in Libya, Morocco, Tunisia and Algeria (World Bank, 2022).[10]

Table 4. Land degradation caused by water and wind erosion in SEMCs (1000 ha)

Country	Area affected by water erosion	Area affected by wind erosion
Albania	3,175	5,209
Bosnia and Herzegovina	2,55	6,051
Croatia	4,115	6,992
Cyprus	931	1,955
France	7,232	6,384
Greece	3,869	4,197
Italy	4,994	5,627
Malta	4,008	4,881
Portugal	2,794	4,849
Slovenia	4,803	7,393
Spain	3,603	4,502
Algeria	883	1,521
Egypt	7,289	6,188
Libya	638	672
Morocco	367	743
Israel	2,443	3,817
Jordan	1,728	1,711
Lebanon	2,415	3,101
Palestinian Territories	2,185	2,223
Syria	1,149	1,832
Tunisia	985	1,327
Turkey	2,371	3,342
European Union	**3,825**	**5,461**
MENA	**2,041**	**2,341**
Sub-Saharian Africa	**1,182**	**1,546**
World	**3,091**	**4,072**

Source: World Bank, 2022.

[9] When it comes to agricultural yields, a clarification must be made. Low levels of performance do not always mean bad practices or backwardness. Lower yields can be associated with sustainable agricultural practices which, by not making use of the technological package of the Green Revolution (high yielding varieties, mechanisation, irrigated water, and chemical fertilisers), sacrifice high yields in the short term for the benefit of guaranteeing agricultural productivity in the longer term achieved through greater protection of natural resources. Furthermore, it is necessary to consider that yields as a measure of agricultural productivity are based on a strictly economic perspective that considers only the edible part of crops. Consequently, the other vegetable components, despite having a value in many rural realities, are neglected and are not captured by the market, giving a distorted measure of agricultural productivity. Finally, the diffusion of hybrid varieties with higher yields has contributed to a high loss of agro-biodiversity leading to the disappearance of many local agricultural varieties, which are more resistant and with a higher nutritional value.

[10] What is surprising is that the yields are so high in Egypt. The United States Department of Agriculture (USDA) attaché explained in an annual report on the grains sector dated 17 March 2021, that "wheat production in Egypt has improved through the development of breeding and cultivation techniques, citing "the use of high yielding seed varieties, expanding the amount of certified seeds distributed to farmers, ideal sowing time, laser leveling techniques and increasing areas of wheat raised bed cultivation to more than 420,000 hectares as techniques that have made the greatest contribution to increasing yield over the last six years" (Wally & Akingbe, 2021).

Table 5. Cereal production and yields at regional and global level

MENA region	**1961**	**1990**	**2012**
Cereal area (1,000 ha)	19	26	26
Cereal Production (1,000 ton)	15	37	46
Cereal yields (kg/ha)	796	1,418	1,794
World	**1961**	**1990**	**2012**
Cereal area (1,000 ha)	648	708	703
Cereal production (1,000 ton)	877	1,952,459	2,545,002
Cereal yields (kg/ha)	1,353	2,757	3,619

Source: Sadik, el-Solh, & Saab, 2014.

Yield gap in MENA countries suggests considerable room for growth and the need for a new agricultural paradigm based on a mix between agricultural inputs and practices capable of ensuring long-term sustainability within the bio-capacity of available agricultural resources. Moving from challenges related to food supply to those related to demand, it should be highlighted that in MENA countries the demand for food is first triggered by rapid population growth. According to the World Bank, the MENA population surpassed 472 million in 2021 with an annual growth rate of 1.7%, well above the world average of 0.9%, as a result of sustained high fertility rates, successful efforts in improving public health, and lowering mortality rates (Table 6).

Table 6. Demographic indicators in the Mediterranean countries, 2021

Country	**Population (thousands)**	**Population growth (annual %)**	**Fertility rate, total (births per woman)**	**Life expectancy at birth, total (years)**
Albania	2,811.67	-0.9	1.6	79
Bosnia and H.	3,263.46	-0.5	1.2	78
Croatia	3,899.00	-3.7	1.5	78
Cyprus	1,215.59	0.7	1.3	81
France	67,499.34	0.2	1.8	82
Greece	10,664.57	-0.3	1.3	81
Italy	59,066.22	-0.6	1.2	82
Malta	516.87	0.3	1.1	83
Portugal	10,299.42	0.0	1.4	81
Slovenia	2,107,01	0.2	1.5	81
Spain	47,326.69	-0.1	1.2	82
Algeria	44,616.63	1.7	2.9	77
Egypt	104,258.33	1.9	3.1	72
Libya	6,958.54	1.3	2.2	73
Morocco	37,344.79	1.2	2.4	77
Israel	9,364.00	1.6	2.9	83
Jordan	10,269.02	0.6	2.6	75
Lebanon	6,769.15	-0.8	2.1	79
Palestinian Territories	4,922.75	2.5	3.5	74
Syria	18,275.70	4.3	2.7	74
Tunisia	11,935.76	1.0	2.2	77
Turkey	85,042.74	0.8	2.0	78

European Union	**446,946.71**	**-0.1**	**1.5**	**80**
MENA	**472,494.99**	**1.7**	**2.7**	**74**
Sub-Saharan Africa	**1,165,563.99**	**2.6**	**4.6**	**62**
World	**7,836,630.79**	**0.9**	**2.4**	**73**

Source: Compiled by the authors.

Population growth is not the only reason behind the current food demand increase

But population growth is not the only reason behind the current food demand increase: due to urbanisation and rising incomes, traditional diet is shifting towards consumption patterns based on animal products and higher value foods, which require more water, land and energy (Table 7).[11]

Table 7. Income growth and urbanisation in the Mediterranean countries, 2021

Country	GDP, current US$ (millions)	GDP growth (annual %)	GDP per capita, current US$	Urban population (thousands)	Urban population growth (annual %)
Albania	18,260.04	8.5	6,494.4	1,770.48	0.4
Bosnia and H.	22,571.51	7.1	6,916.4	1,612.96	0.3
Croatia	67,837.79	10.4	17,398.8	2,256.66	-3.2
Cyprus	27,719.34	5.5	30,798.5	812.69	0.7
France	2,937,472.76	7.0	43,518.5	54,837.82	0.5
Greece	216,240.59	8.3	20,276.5	8,535.71	0.1
Italy	2,099,880.20	6.6	35,551.3	42,141.39	-0.2
Malta	17,189.73	9.4	33,257.4	490.04	0.4
Portugal	249,886.46	4.9	24,262.2	6,885.06	0.8
Slovenia	61,526.33	8.1	29,200.8	1,167.85	0.8
Spain	1,425,276.59	5.1	30,115.7	38,361.12	0.2
Algeria	167,983.14	3.8	3,765.0	33,132.75	2.4
Egypt	404,142.77	3.3	3,876.4	44,687.20	2.0
Libya	41,879.58	31.4	6,018.4	5,636.00	1.6
Morocco	132,725.26	7.4	3,496.8	23,924.94	2.0
Israel	481,591.27	8.2	51,430.1	8,677.99	1.7
Jordan	45,243.66	2.2	4,405.8	9,409.09	0.9
Lebanon	18,076.62	-10.5	2,670.4	6,030.84	-0.6
Palestinian Territories	18,036.80	7.1	3,664.0	3,790.66	2.8
Syria	21,445.78	1.5	1,265.6	10,257.06	5.5
Tunisia	46,840.04	3.3	3,924.3	8,341.67	1.4
Turkey	815,271.75	11.0	9,586.6	65,116.37	1.4
European Union	**17,088,620.74**	**5.4**	**38,234.1**	**336,072.33**	**0.2**
MENA	**3,636,731.83**	**4.3**	**7,696.9**	**313,055.84**	**2.1**
Sub-Saharan Africa	**1,917,904.00**	**4.1**	**1,645.5**	**487,142.49**	**3.9**
World	**96,100,091.00**	**5.8**	**12,262.9**	**4,433,302.17**	**1.7**

Source: World Bank, 2022.

[11] For more details on dietary patterns in Mediterranean countries, food consumption and sourcing profiles, and the nexus between changes in dietary patterns and the ecological footprint, see Galli et al., 2017.

Over the past 50 years, the composition of diet has changed significantly in Arab countries: while the percentage of calories derived from cereals has declined, the share coming from meat, dairy, and vegetable oils increased (Nigatu & Motamed, 2015). The most dramatic change is related to the increasing consumption of meat. Table 8 presents a summary of current and projected poultry and beef production and consumption, highlighting that consumption will far overtake production by 2024.

Table 8. Projected MENA meat production and consumption (1,000 MT)

	Production			Consumption		
Meat products	Average 2012-2014	Projected 2024	Growth rate (%) 2013-2024	Average 2012-2014	Projected 2024	Growth rate (%) 2013-2024
Poultry	6,511	7,504	1.3	8,324	10,303	1.9
Beef and veal	1,835	1,938	0.5	2,912	3,583	1.9

Source: Nigatu, Motamed (2015).

The need to feed a growing population and to address a growing demand for animal-derived proteins, which puts further pressure on scarce natural resources (fertile land and water), requires a better connection to be made between the topics of fish and food security and nutrition. Three fundamental aspects stand out to illustrate the importance of fish for food security and nutrition in the MENA region: the protein and nutrient content of fish as food; the role of fisheries and aquaculture activities as a source of income and livelihoods; and the relative efficiency of fish to produce/transform proteins.[12]

Despite the relative decline of cereals in MENA food consumption patterns, however, wheat remains the dominant staple grain, accounting for up to one third of the calories consumed in the region (Table 9). Economic (costs and public subsidies) as well as socio-cultural factors (religion, beliefs, food preferences, gender discrimination, education, and women's employment) all have a noticeable influence on food consumption patterns in this region. In particular, the still significant relevance of cereals in diet patterns is not only a product of their nutritional or financial properties. Due to their ties to health, customs and communal relations, these commodities continue to be omnipresent elements in everyday life, lying at the heart of social identities and functioning as an articulation of entrenched traditions and cultural idioms that develop over time (Martínez, 2018).

As a result of both demand and supply side factors, MENA countries are affected by low levels of food self-sufficiency rates for most food commodities. Regionally, import dependence is most marked for cereals, sugar, oils and fats; dairy products, meat and eggs show a

[12] To detect the potential contribution of fisheries and aquaculture in helping to improve food security both from a quantitative and qualitative point of view, please see HLPE, 2014.

higher level of self-sufficiency, while self-sufficiency has been achieved only in fruits and vegetables, and fish (Saab, 2017) (Table 10). As data shows, the food self-sufficiency ratio in 2014 did not change significantly from its level in 2005. This indicates that Arab countries as a whole did not make substantial progress in the past several years towards their strategic attempt of enhancing food security based on domestic food production.

Table 9. Projected MENA consumption for major crop commodities (1,000 MT)

	Consumption					
	Food use			Feed use		
Crop	Average 2012-2014	Projected 2024	Growth rate (%) 2013-2024	Average 2012-2014	Projected 2024	Growth rate (%) 2013-2024
Wheat	93,347	106,287	1.2	7,158	6,998	-0.2
Rice	13,505	15,815	1.4	0	0	0.0
Barley	3,071	3,533	1.3	26,251	28,327	0.7
Corn	4,252	5,108	1.7	35,407	43,751	1.9

Source: Nigatu, Motamed (2015).

Table 10. Self-sufficiency ratio in total food commodities and cereals in SEMCs (%)

	Food self-sufficiency ratio				Cereal self-sufficiency ratiose			
Country	2005	2011	2014	2019	2005	2011	2014	2019
Jordan	56.3	53.1	66.6	-	5.1	3.7	3.7	0.0
Lebanon	73.2	61.0	74.7	-	18.1	11.0	14.0	6.5
Syria	85.2	80.6	84.3	-	74.0	58.0	48.0	63.5
Palestine	81.5	72.3	79.3	-	20.0	10.1	9.5	-
Algeria	53.5	70.0	75.2	-	30.0	32.0	21.6	29.9
Egypt	84.0	79.0	88.0	-	69.6	56.3	66.0	52.2
Libya	45.0	43.1	38.3	-	11.0	7.1	9.5	6.1
Morocco	89.6	80.4	100	-	46.1	59.1	68.0	51.1
Tunisia	72.0	68.5	89.5	-	48.0	47.0	42.4	36.9

Source: Saab, 2017, Fao, Faostat, 2020.

However, food self-sufficiency constitutes only one aspect of macro food security. Even in a case of high food imports dependency, a country may still be food secure if it exports enough goods and services to finance its food imports. An indicator traditionally used to capture this side of food security is the ratio of total exports to food imports, whose values reflect the country's capacity to earn enough foreign exchange from exports to finance its imports: the higher the ratio of total exports to food imports, the higher the level of food security in a country. As data shows, this ratio is low for all Arab countries, underscoring the high vulnerability to the trends and fluctuations of international food prices and supplies (Table 11) (World Bank, 2017; Breisinger et al., 2010).

Table 11. Food trade balance and structure of merchandise exports in several SEMCs, 2016 (%)

Country	Total exports/ food imports	Merchandise exports				
		Food	Agricultural raw materials	Fuels	Ores and metals	Manufactures
Jordan	4.7	18.6	0.4	0.1	8.8	72
Lebanon	2.4	26.2	0.6	1.1	9.3	62.6
Palestine	1.2	27	0.9	0.2	8.4	63.6
Syria	8.9	-	-	-	-	-
Algeria	8.7	1.1	0	94	0.3	4.6
Egypt	6.9	21.8	2.6	16.3	4	53.9
Libya	11.1	-	-	-	-	-
Morocco	8.1	21	0.8	0.9	6.5	70.8
Tunisia	11.2	14.2	0.6	7.2	1.4	76.5

Source: World Bank, 2017.

Focusing the analysis on household and individual levels, Table 12 provides more detailed information about the micro aspects of food security in Arab countries, showing how the Global Hunger Index (GHI) has changed since 1990.[13] According to the GHI, in many SEMCs the level of hunger has decreased since the 2000s, and most of the countries are considered low or moderate hunger, ranging from 6.1 for Tunisia to 12.3 for Egypt (IFPRI, 2022). Despite these improvements, GHI scores for several countries could not be calculated due to the lack of data necessary to develop all GHI indicators. Nevertheless, the hunger and undernutrition situation in some of these countries is cause of significant concerns, particularly for Libya and Syria, where conflict and political instability have damaged supply chains, limited access to agricultural input and diminished agricultural production, not allowing the population to meet daily food needs.

Table 12. Global Hunger Index (GHI) in several Mediterranean countries

Country	2000 (1998-2002)	2007 (2005-2009)	2014 (2012-2016)	2022 (2017-2021)	% change since 2014
Albania	20.7	15.8	9.2	6.2	-32.6
Bosnia and Herzegovina	9.3	6.6	<5	<5	-
Croatia	<5	<5	<5	<5	-
Algeria	14.5	11.4	8.7	6.9	-20.7
Egypt	16.3	17.2	14.6	12.3	-15.8
Morocco	15.8	12.4	9.6	9.2	-4.2
Jordan	10.8	7.5	7.4	10.6	43.2
Lebanon	11.6	11.2	8.7	10.5	20.7
Tunisia	10.3	7.6	6.7	6.1	-9.0
Turkey	10.1	5.8	<5	<5	-

Source: von Grebmer et al., 2022.

[13] The GHI is a multidimensional index that combines three equally weighted indicators: (1) the proportion of undernourished as a percentage of the population (reflecting the share of the population with insufficient dietary energy intake); (2) the prevalence of underweight children younger than five (indicating the proportion of children suffering from weight loss); and (3) the mortality rate of children younger than five (partially reflecting the fatal synergy between inadequate dietary intake and unhealthy environments).

Achieving food security in the Mediterranean region is one of the major challenges of the coming decades. In order to tackle future food security challenges, we must understand the past.

The historical evolution of food security strategies in the Arab World

Centuries ago, the MENA region was considered the breadbasket of the Roman Empire: "From fertile, silt-fertilised farmland by the Nile, from ingeniously irrigated fields in the Tigris and Euphrates River valleys, from the rich soil of Lebanon's Bekaa Valley and from other areas in the Fertile Crescent, ancient farmers supplied much of the world with grain, vegetables and fruit" (Lawton, 1978). Today, paradoxically, the region imports about 50% of its food requirements, sadly highlighting how once fertile and food-producing countries could become the world's major food importer when conflict outbreak, adverse climatic conditions and increasing human pressure contribute to destroying strategic natural resources for food production — land fertility and water —, threatening the production of basic foodstuffs (Harrigan, 2014).

The causes of this deep transformation have their roots in the creation of that great multi-ethnic and multi-religious power known as the Ottoman Empire. During the 17th century, the agricultural production in much of the Arab world shifted towards export-oriented cash crops such as cotton, wine, silk and opium, at the expense of local food production.[14] Agricultural trade flows intensified with the progress made in the communication and transport systems that reduced trade costs and improved market access.

If during the Ottoman period food security was mainly guided by criteria of economic convenience that led to opting for the production of cash crops at the expense of food self-sufficiency, with the outbreak of the two world wars food security strategies began to be shaped on more geopolitical connotations. Trade blocs and constraints during the First and the Second World Wars, followed by the 1972-1974 world food crisis, highlighted the Arab states' geopolitical vulnerability in terms of excessive reliance on imports. Consequently, also driven by the decision by some countries at the forefront of Arab nationalism, such as Syria and Egypt, not to depend on grain exports from the United States (US), which had a monopoly on the grain sales, food self-sufficiency took the place of a trade-based strategy (Harrigan, 2014; Blanc, 2022). This change was also influenced by national policy objectives, since in Arab countries "sedentarization, land distribution, and control of water were important tools of political power and nation building" (Woertz, 2013). Large-scale water infrastructures and land reclamation projects increased in many countries. Furthermore, Arab regimes began to increase agriculture subsidies to acquire political consensus and to use trade tools such as tariff and non-tariff barriers to protect the agricultural sector from foreign competition. The higher domestic food prices resulting from agricultural protectionism were mitigated by expensive subsidy programmes.

The early 1980s saw the birth of the so-called Washington Consensus, supported by international organisations, whose vision

[14] For a more detailed analysis on the historic trajectories of agricultural development in the Middle East, see Babar and Mirgani (2014).

was based on the principles of free market.[15] In this new historical scenario, price distortions and protectionism were not considered an economically efficient way to increase farmer income and guarantee food security since other political tools could achieve the same results with less distortions and at lower costs. Particularly, in Arab countries interventions in the agricultural sector were considered fiscally costly and sub-optimal in the allocation of the scarce internal resources. The impact of economic neoliberalism resulted in a greater emphasis on a trade-based approach and a shift from water-intensive crops for domestic consumption, such as cereals, towards higher value, less water-intensive crops, such as fruit and vegetable, for both the domestic market and export. Despite a greater degree of trade openness, most Arab countries only partially shared this vision and continued to protect domestic producers from foreign competition in several strategic crops.[16]

The outbreak of the 2007-2008 and 2010-2011 global food crises forced some Arab states to adopt a more extensive approach to food self-sufficiency, resulting in what Harrigan has called "macro food sovereignty" (Harrigan, 2014). This new vision is based on a combination of domestic production and overseas land acquisitions in natural resources-rich countries in order to both mitigate states' vulnerability to the instability and volatility of international agricultural markets and reduce the pressure on internal land and water resources.[17]

Today, the fallout of the COVID-19 pandemic and the Russian invasion of Ukraine, intertwining with internal factors of vulnerability, are putting food security at further risk in several ways. Food self-sufficiency no longer seems like a plausible option. Lack of water and climate change impacts are negatively affecting domestic production potential. At the same time, as the largest grain-importing region in the world, interruptions of trade flows and food price spikes are hitting MENA countries unevenly, such as during the global food crises.

As it emerges from the approaches adopted by MENA countries to achieve

As it emerges from the approaches adopted by MENA countries to achieve food security, a strategy relying purely on one option has high costs and fails to provide an effective response

[15] The Washington Consensus policies inspired a wave of reforms that significantly transformed the policy landscape in less developed areas. These reforms were introduced and propagated through the International Monetary Fund (IMF) and World Bank Stabilisation and Structural Adjustment Programmes. In exchange for loans with very low interest rates, the IMF asks countries to institute painful economic reform policies (conditionality) that aim to cut government expenses and raise revenue so that countries can pay the IMF back relatively quickly. The Washington Consensus policies constituted a complete shift in paradigm and a completely new approach to development, the effects of which significantly affect some Arab countries where adjustment plans were engaged due to their heavy debt caused by policy failures and corruption.

[16] As Harrigan argues, this approach was influenced by both the trade theory of comparative advantage and the virtual water trade concept, a term coined by Tony Allan in the 1990s to indicate the amount of water used to produce a commodity. According to the World Bank, vegetable and fruit productions yield six times more value added per drop of water than wheat production and 10 times more than beef production. Nevertheless, because farmers do not pay for the true cost of water, 40% of irrigated land is dedicated to growing cereals in the Maghreb, 51% in the Mashreq, and 73% in Gulf Cooperation Countries (GCC) countries (Allan, 1998; Harrigan, 2014).

[17] This new political strategy has been mainly followed by the Arab states of the Persian Gulf that have acquired large tracts of agricultural land in foreign states in Africa and Asia, and particularly in Arab countries in the Nile Basin. The Gulf countries have adopted explicit policies to encourage their citizens to invest in food production overseas as part of their long-term national food security strategies. Such policies cover a variety of instruments, including investment subsidies and guarantees, as well as the establishment of sovereign funds focusing exclusively on investments in agriculture overseas (Quagliarotti, 2013).

food security, a strategy relying purely on one option has high costs and fails to provide an effective response. In most countries, food security is a complex issue influenced by social, political, economic, and environmental variables that require a multifaceted and holistic approach to be reached. The current and dramatic crises point to the need for a more resilient, local and diverse Mediterranean food system to accelerate the transition towards sustainability and to better prepare for future crises.

Towards a concept of Mediterranean food sovereignty

The challenges of the 21st century raise the question of whether the principles and objectives that shaped the Mediterranean food system in the 20th century need revision in order to simultaneously provide enough food, in quantity and quality, to meet the nutritional needs of a growing population and operate within planetary boundaries, which are the absolute environmental limits for natural resource use and emissions that need to be respected to avoid major and potentially irreversible earth system change (Rockström et al., 2009; Steffen et al., 2015).

To face these challenges, on 20 May 2020, the European Commission (EC) unveiled 'A farm to fork strategy for a fair, healthy and environmentally friendly food system', with the ultimate objective of making the EU food system a global model of sustainability at all stages of the value chain (European Commission, 2020). However, in 2020, the coronavirus crisis, and later the Ukraine war, highlighted some structural weaknesses in the EU's food supply chain, as well as on the affordability of safe and healthy food in the EU itself, and food security came to the top of the political agenda. In November 2021, the Commission presented its communication on a contingency plan for ensuring food supply and food security in times of crisis (European Commission, 2021). Along the same lines, the French Presidency of the Council of the European Union (January-June 2022) introduced sovereignty and food self-sufficiency with the purpose of achieving a more consistent definition of goals and enforcement of rules in the EU and preserve the EU's food sovereignty, including in terms of reciprocal production standards (French Presidency of the Council of the European Union, 2022).

As has been pointed out, in the MENA region governments have also started to focus on the concept of 'food sovereignty' as opposed to 'food security', highlighting their propensity to rely less on international markets for their food requirements. This approach implies both a greater level of domestic food production to be achieved by improving agricultural productivity within countries and acquiring farmland abroad in land, water and labour-abundant countries to directly source food and bypass global markets. In the coming decades, even if MENA countries significantly increase their domestic food production and their direct access to food through overseas land investments, they will still rely on imports for part of their food supply, particularly cereals. Hence, there is a need to introduce measures and tools that both strengthen their position in international food markets and reduce their vulnerability to price and supply shocks.

Against this backdrop, creating a common Euro-Mediterranean food sovereignty policy agenda, which sets a roadmap to face food system crises in the region is crucial. The idea of a concept of food sovereignty at the Mediterranean level stems from the belief that the weakness that characterises current food system is linked to the dichot-

omy between food as a biological phenomenon, food as an economic factor, and food as a fundamental right protected by the United Nations (UN) (Table 13).

Table 13. Food dichotomies

Food as a commodity	Food as a biological factor	Food as a fundamental human right
At every level, the modern food system has become a miniature version of the industrial economy. Food is considered a commodity, which is handled like any other raw material or consumer product: produced wherever costs are lowest, shipped to wherever demand is highest, managed via the same contracts, and other instruments used for other commodities, transformed by the same technologies and business models of other manufactures, and distributed via the same distribution channels of other consumer product.	For all that food system has evolved like other economic sectors, food itself is fundamentally not an economic phenomenon. Food production may follow general economic principles of food supply and demand; it may create employment, earn trade revenues, and generate profits; but the underlying product has never quite conformed to the dictates of the modern industrial model. Physically, food is so unsuited to mass production that we have had to re-engineer our plants and livestock to make them more readily harvested and processed. Furthermore, farming and food-processing methods incur such enormous 'external' costs that the long-term sustainability of the system is seriously compromised.	Despite the progress made in terms of agricultural productivity, nearly a billion people remain food insecure, and when hunger has been banished, populations struggle with the so-called diet-related diseases, such as obesity, heart disease, diabetes and hidden hunger. Furthermore, the same methods that have allowed this abundance such as intensive agriculture and breeding have degraded the productive capacity of natural systems to such an extent that we do not know how to respond in the future to an ever-growing demand for food.

Source: von Grebmer et al., 2022.

This is to say that in the case of food there are incompatibilities between system and product and that the attributes of food that our economic system tends to value and to encourage, such as mass producibility, cheapness, uniformity, heavy processing and transport over long distances, are not necessarily the attributes that work best for the people eating that food, or the culture in which that food is consumed, or the environment in which it is produced. Hence the need to develop a food sovereignty framework at the Mediterranean level which, starting from the evolution of the concepts of food security and food sovereignty, considers all dimensions of food.

A key component of such an agenda should be a vision of Mediterranean food sovereignty, which goes beyond the one-dimensional concept of food self-sufficiency or macro food sovereignty to embrace a multidimensional idea that integrates:

- food sovereignty in its double meaning: as the capacity of states to define their own food policies autonomously and as a policy option able to support small-scale agriculture;
- the right to food and the concept of food security in all its dimensions, as envisaged in the 1996 definition;
- the principle of comparative advantages as a tool to amplify synergies and complementarities between countries (Table 14).

Table 14. Definition and dimensions of food security and food sovereignty

Concept	Definition	Weakness
Food security	Food security exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. From this definition, four main dimensions of food security can be identified: physical availability of food; economic and physical access to food; food utilisation; stability of the other three dimensions over time. For food security objectives to be realized, all four dimensions must be fulfilled simultaneously (FAO, 1996).	It does not consider where and how food is produced.
The theory of comparative advantage	Comparative advantage is a key principle in international trade and forms the basis of why free trade is beneficial to countries. According to this theory, countries that specialise in their comparative advantage in free trade are able to realise higher output gains by exporting the good in which they enjoy a comparative advantage and importing the good in which they suffer a comparative disadvantage. In particular, the Heckscher–Ohlin model builds on David Ricardo's theory of comparative advantage by predicting patterns of commerce and production based on the factor endowments of a trading region. The model essentially says that countries export the products which use their relatively abundant and cheap factors of production, and import the products which use the countries' relatively scarce factors	It is a model based on strictly economic criteria even if through greater efficiency in the use of resources it can indirectly contribute to greater protection of scarcer resources.
Food sovereignty	The concept of food sovereignty originated with small-scale producers organised as the transnational social movement La Vía Campesina (LVC) and was launched globally at the 1996 United Nations World Food Summit, which focuses on the rights of people, rather than corporations and market institutions, to control how and what kind of food is produced. LVC's seven principles of food sovereignty include: food as a basic human right, the need for agrarian reform, protection of natural resources, reorganisation of food trade to support local food production, reducing multinational concentration of power, fostering peace, and increasing democratic control of the food system (Claeys, 2013). A further step toward a common international agenda for food sovereignty was the Declaration of Nyéléni, which states: "Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It defends the interests and inclusion of the next generation. It offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers.	The concept of food sovereignty, while not excluding food trade, does not attach importance to the role of food imports and exports in feeding populations.

	Food sovereignty prioritizes local and national economies and markets and empowers peasant and family farmer-driven agriculture, artisanal fishing, pastoralist-led grazing, and food production, distribution and consumption based on environmental, social and economic sustainability" (Forum for Food Sovereignty, 2007).	
The concept of macro food sovereignty	The term macro food sovereignty reflects the idea that sovereign states aim to increase their power and control over their access to national food supplies formulating food security strategies that incorporate political and social considerations rather than just economic considerations. The new Arab food sovereignty is manifest in two distinct recent policy thrusts. Firstly, a drive to produce more food domestically and, secondly, especially for the richer countries in the region such as the Gulf states, new initiatives to acquire land in third party host countries in order to directly produce food to ship home and so by-pass global food markets (Harrigan, 2014).	Both of the new approaches to macro food sovereignty are controversial. Growing more food domestically, especially cereals, does not represent a sensible use of scare economic resources such as limited water and arable land in many Arab states. Land acquisition overseas, often referred to as "land grab", is also controversial. It can involve displacing local people from their land as well as jeopardise food security in the host countries.

Accordingly, Mediterranean food sovereignty should be considered as a lever through which Mediterranean countries may improve the sustainability of both food systems and consumption patterns and achieve food security by combining sustainable, context-specific domestic food production, and effective regional cooperation strategies.

A common Euro-Mediterranean food policy agenda should apply the principles of food sovereignty and comparative advantages both at national and regional levels to ensure resilient food security for 550 million inhabitants of the region.

To put forward tangible solutions, a set of shared priorities that emerge as common to most countries in the region (what to transform) and the main actions to achieve them (how to transform) are recognised:

1. Encourage agroecological transition to preserve soil and agro-biodiversity by:

- Promoting sustainable agricultural practices (precision, organic and conservation agriculture, agroecology, etc.) to protect productive natural resources;
- Opting for more resilient species of crops, going back to species that have always been part of the Mediterranean diet and are less demanding and more nutritious in order to husband resources;
- Developing diversified farming systems such as polyculture, agroforestry, aquaponic, etc.

2. Promote the Mediterranean diet by:

- Strengthening the historical, cultural, gastronomic and food heritage, the cornerstone of a strong common cultural identity across the Mediterranean region;
- Encouraging traditional Mediterranean agriculture as a major source of traditional and local knowledge and expertise;
- Promoting neglected and underutilised crops, which have the potential

A common Euro-Mediterranean food policy agenda should apply the principles of food sovereignty and comparative advantages both at national and regional levels to ensure resilient food security for 550 million inhabitants of the region

to contribute to food security, nutrition, dietary and culinary diversification, health and income generation, as well as the provision of environmental services.

3. Support food security and sovereignty by:

- Combining in situ and ex situ seed conservation strategies to maintain total genetic diversity;
- Reducing food loss and food waste, defining measures and sharing best practices;
- Developing climate-smart agriculture and improving the resilience of the agricultural sector to climate risks through nature-based solutions (NBSs), sustainable uses of water resources, integrated agricultural systems, and drought tolerant crops;
- Promoting Globally Important Agricultural Heritage Systems (GIAHS) to favour sustainable land-use systems, improve biocultural richness, and increase landscape diversity;
- Developing urban and peri-urban agriculture and short food supply chains to provide sufficient healthy food for the urban market and strengthen the sustainability of local food systems.

4. Promote blue foods as a strategy to promote local healthy and sustainable food and improve food security and nutrition by:

- Improving sustainability of fisheries and aquaculture (including in local markets);
- Strengthening international and national regulations on environmental and social/labour standards (including labelling);
- Expanding market request for other fish varieties;
- Developing protocols to monitor and prevent pollution from aquaculture and vessels;
- Better monitoring, traceability and consumer awareness;
- Adopting a holistic approach to protect, restore and increase the productive uses of oceans and coastal resources in a sustainable way.

5. Encourage public participation in policy-making, reconnect people to the Euro-Med project, and reclaim public policies for the public good by:

- Remedying the democratic deficit in food systems and rebalancing power, and fostering multi-stakeholder partnerships at national and regional levels to build trust and commitments based on shared understanding and inclusion;
- Involving a wider range of stakeholders in designing and assessing policies, including farmers, sustainable food businesses, consumer and health groups, development and anti-poverty campaigners, environmental agencies, school officials, locally-based civil society movements, to address trade-offs between competing economic, environmental and social objectives, which often require negotiation between different communities and actors with divergent perceptions, interests, resources and power.

6. Promote Euro-Mediterranean cooperation to guarantee food sovereignty at regional level by:

- Creating interdependencies between countries through regional integration processes that take into account the complementarities between countries to increase synergies and reduce trade-offs in terms of agri-food production and trade;
- Developing a common Euro-Mediterranean response to food system crises that considers the vulnerabilities of the agri-food system at a re-

gional level but at the same time identifies tailor-made solutions;
- Introducing a Mediterranean food/diet labels to encourage local and tradi tional products;
- Creating the conditions for sustainable agriculture and rural development, involving education initiatives, agricultural research, utilisation of economic incentives, and the development of appropriate and new technologies in order to ensure stable supplies of nutritionally adequate food, access to those supplies by vulnerable groups, and production for markets; employment and income generation to alleviate poverty; and natural resource management and environmental protection;
- Encouraging an agricultural trade liberalisation process at regional and sub-regional level and assessing the full impact of free trade beyond the macro level, investigating the implications for small local producers and rural households;
- Creating a virtuous water-energy-food nexus triggered by the combined use of unconventional water and energy sources (renewable energy and desalinated water) to minimise trade-offs and maximise synergies between sectors at national and regional level.

Conclusions

Currently, the Mediterranean agri-food system is characterised by a deep structural weakness that renders it extremely vulnerable to current and future environmental stresses caused by climate change in interaction with other environmental, political and economic trends, both global and local. This weakness emerged during the global food crises of the new millennium, and, more recently, due the COVID-19 pandemic and Russia's invasion of Ukraine. In such a scenario, sustainable agriculture and food security appear of particular concern for the MENA countries. Data shows that the MENA region is the most food import-dependent region in the world, and net food imports are projected to rise even further in the future as a result of multi-factorial causes that act on both the demand (demographic growth and urbanisation) and supply (natural resources scarcity and the impact of climate change) side of the food equation. Because of the region's heavy reliance on food imports, the sharp increase in food prices has severe adverse effects, causing macreconomic problems, food insecurity, increased poverty and political instability. This challenge, coupled with the consequences of environmental degradation, water scarcity, urbanisation and climate stress, calls for the urgent need to develop sustainable agriculture and food systems. At the same time, the European countries, despite the lower vulnerability to the instability of international agricultural markets and a greater ability to adapt in times of crisis, have not shown themselves to be immune to these risks. Even if the availability of food does not jeopardise food security at a European level, the increase in the prices of essential inputs for agricultural production and the energy crisis are causing problems of accessibility to food for the weakest sections of the population.

Against this backdrop and in light of the interdependence between MENA and European economies, Euro-Mediterranean cooperation takes on particular relevance for food security. The idea is to develop a macroregional food security strategy that sets a roadmap to enable

The creation of a common Euro-Mediterranean response to food system crises is crucial to achieve food security by combining sustainable, context-specific domestic food production and effective regional cooperation strategies

transformative change by considering the concepts of food sovereignty and comparative advantages in an integrated way as a lever to improve the sustainability of both food systems and consumption patterns.

The creation of a common Euro-Mediterranean response to food system crises is crucial to achieve food security by combining sustainable, context-specific domestic food production and effective regional cooperation strategies.

References

ABIS, S., DEMURTAS, L. (2023). "The Geopolitical Aspect of Food Security in the Mediterranean Region", *MedDialogues + 2030,* Focus n. 11: IEMed.

ALLAN, J.A. (1998). "Virtual Water: A Strategic Resource. Global Solutions to Regional Deficits". *Ground Water,* 4(36): 545-546.

AMER, K. ET AL. (2016), *The Water, Energy, and Food Security Nexus in the Arab Region.* Springer.

BABAR, Z. AND MIRGANI, S. (2014). *Food Security in the Middle East:* Oxford University Press.

BLANC, P. (2022). "Nourrir la puissance. Une géopolitique de l'alimentation". In Sébastien Abis and Matthieu Brun (eds.), *Le Déméter 2022. Alimentation: les nouvelles frontières:* IRIS éditions.

BREISINGER, C., ET AL., (2010). *Food Security and Economic Development in the Middle East and North Africa: Current State and Future Perspectives.* Discussion Paper 00985. IFPRI.

BURNETT, K. (2014). "Trouble in the Fields: Fair Trade and Food Sovereignty Responses to Governance Opportunities After the Food Crisis". *Geopolitics, 19*(2), 351-376.

CANDEL, J.J.L. AND BIESBROEK R. (2018), "Policy integration in the EU governance of global food security." *Food Security,* 10(1), 195-209.

CLAEYS, P. (2013). "From food sovereignty to peasants' rights: an overview of La Via Campesina's rights-based claims over the last 20 years," in *Food Sovereignty: A Critical Dialogue* (New Haven, CT: Yale University), 1–11.

CLAPP, J. (2017). "Food self-sufficiency: Making sense of it, and when it makes sense." *Food Policy,* 66, 88-96.

DE SCHUTTER, O. (2017). "The political economy of food systems reform." *Eur. Rev. Agric. Econ., 44,* 705–731.

ESCWA, & FAO. (2017). *Arab Horizon 2030: Prospects for Enhancing Food Security in the Arab Region.* Technical Summary.

EUROPEAN COMMISSION. (2020). *A Farm to Fork Strategy for a Fair, Healthy and Environmentally-Friendly Food System* (COM/2020/381).

EUROPEAN COMMISSION. (2021). *Contingency plan for ensuring food supply and food security in times of crisis* (COM/2021/689).

FAO. (1996). *Rome Declaration on World Food Security.*

FAO. (2011). *The State of the World's Land and Water Resources for Food and Agriculture Managing Systems at Risk.* New York: Earthscan.

FAO AND CIHEAM. (2016). *Mediterra 2016. Zero Waste in the Mediterranean. Natural Resources, Food and Knowledge:* Presses de Sciences Po.

FAO, CIHEAM, AND UfM (2021). *Food systems transformation Processes and pathways in the Mediterranean. A stocktaking exercise.* FAO.

FAO AND ITPS. (2015). *Status of the World's Soil Resources (SWSR) – Main Report.*

FAO. (2016). "Food self-sufficiency and international trade: a false dichotomy?" *The State of Agricultural Commodity Markets 2015-2016.*

FAO. (2022). FAO *Food Price Index.*

FORUM FOR FOOD SOVEREIGNTY, Declaration of Nyéléni, 27 February 2007.

FRENCH PRESIDENCY OF THE COUNCIL OF THE EUROPEAN UNION. (2022). *Recovery, Strength and a Sense of Belonging. Programme for the French Presidency of the Council of the European Union.*

GALLI, A. ET AL. (2017). "Mediterranean countries' food consumption and sourcing patterns:An Ecological Footprint viewpoint." *Science of the Total Environment,* 578, 383-391.

GREEN, J. (2019). *Arab Barometer-Wave V. Topic Report: Environment.* Princeton University.

HARRIGAN, J. (2014). *The political economy of Arab food sovereignty.* Springer.

HLPE. (2014). *Sustainable fisheries and aquaculture for food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security.*

IFPRI. (2022). *2022 Global Hunger Index: Food systems transformation and local governance.* IFPRI.

LAWTON, J. (1978). "Farming in the Arab East. An Introduction." *Saudi Aramco World,* 29(3), 2-3.

MARTÍNEZ, J. (2018). "Leavened Apprehensions: Bread Subsidies and Moral Economies in Hashemite Jordan." *International Journal of Middle East Studies, 50*(2), 173-193.

MATTHEWS, A. (2020). "EU Food System Strengths and Vulnerabilities during Covid 19", *EuroChoices,* 19(3), 4–12.

NIGATU, G. & MOTAMED, M. (2015). *Middle East and North Africa Region: An Important Driver of World Agricultural Trade:* USDA.

QUAGLIAROTTI, D.A.L. (2013). "Land grabbing: Hydro-political effects in the Nile river basin, in *QA Rivista dell'Associazione Rossi-Doria,* 2, 87-108.

QUAGLIAROTTI, D.A.L. (2018). "Food security strategies in the Arab world". In D.A.L. Quagliarotti and E. Vigano (Eds.): *Mediterranean, the sea that unites. New prospects for the agri-food system.* Cisalpino: Istituto Editoriale Universitario.

ROBERTS, P. (2008). *The end of food.* Houghton Mifflin Harcourt.

ROCKSTRÖM, J. ET AL. (2009). "A safe operating space for humanity." *Nature,* 461, 472-475.

SAAB, N. (2017). *Arab Environment in 10 Years:* AFED.

SADIK A.-K., EL-SOLH, M, & SAAB, N. (Eds,). (2014). *Food security. Challenges and prospects:* AFED.

VON GREBMER, K. ET AL. (2022). *2022 Global Hunger Index: Food Systems Transformation and Local Governance.* Welthungerhilfe and Concern Worldwide.

STEFFEN, W. ET AL. (2015). "Planetary boundaries: Guiding human development on a changing planet." *Science, 347*(6223). Article 1259855.

WALLY, A., AKINGBE, O. (2021). *Egypt is able to secure a steady supply of grains during the COVID-19 pandemic.* Grain and Feed Annual Report: USDA.

WOERTZ, E. (2017), "Agriculture and Development in the Wake of the Arab Spring." *International Development Policy, 8*(1), 1-24.

WORLD BANK (2022). *World Development Indicators 2022.*

Building Resilience from (Hunger) Shocks. An Analysis of the Strategic Causes, Barriers and Pathways towards a Regional Response to Agri-Food Chain Instability and Climate Change

Tommaso Emiliani
EIT Strategic Synergies Lead, EIT Food,[18] Leuven

[18] The opinions and views of the author do not necessarily reflect those of EIT Food, of the EIT Food partners and of the EIT.

Introduction

The Euro-Med region is experiencing the worst food security crisis since the global shocks of 2007 and 2010. At the time, grain supply shortages, rising oil and fertiliser prices, and failing reserve stockpiles (among other factors) triggered the economic instability and social unrest, which would eventually give raise to the 2011 Arab revolutions (Headey & Fan, 2010). The ensuing waves of political turmoil then directly affected European Union (EU) Northern Mediterranean Countries (NMCs) through increased migration flows and a perception of incoming threats and insecurity leading to a distinctive cooling off of the Euro-Med integration process. Today, the devastating effects of Russia's invasion of Ukraine add up to the structural criticalities of the region, so much that the World Food Programme Executive Director David Bealey has called the unfolding situation "a perfect storm" (WFP, 2022).

This chapter will investigate the current crisis through a geopolitical frame against the background of an increasing competition between global and regional powers such as the United States (US), China and Russia. The states and coalition of states researched in this study – particularly EU members, and Southern and Eastern Mediterranean Countries (SEMCs) – will be considered for how they make use of (but are also affected by) the geo-economic resources they are endowed with in their quest for food security, economic prosperity and political stability. Classical geopolitics shares many of the theoretical assumptions of the neo-realist doctrine of international relations. As such, classical geopolitics understands states as the primary actors in international politics providing security and protecting the domestic space and their citizens from the threat of the chaotic international conditions. Coalitions of states are thus understood as networks where weaker 'vassal' states are induced to foster the power of the hegemonic actor in exchange for security guarantees.

This chapter nuances the hardest assumptions of classical geopolitics based on the understanding of the space and resources of a state as determinants of its behaviour in the international arena by focusing on ways in which identity is formed and maintained through socialisation to delimit conceptualisations of space across the 'ours/theirs' cleavage. Thus, the Euro-Med region discussed in the following pages is understood as both a physical space with a number of geographical features common to the states composing it, and a political construct potentially apt to deliver a regional partnership providing dividends of a different nature to participating states. The chapter will first analyse the structural factors affecting the food security of different actors in the Euro-Med region; second, add the assessment of the impacts of the Ukraine war to the complexity; third, propose three potential scenarios for a renewed Euro-Med cooperation on agriculture; fourth, address the role of different policy settings and fora for dialogues; fifth, contextualise barriers and identify pathways for deepened cooperation. The methods used for the research include a mix of consultation of primary and secondary sources and qualitative interviews with high-level EU officials, geopolitical analysts, and actors active in research and innovation in the Euro-Med area.

A conjunctural crisis with systemic causes

The table below looks at six mega factors and trends affecting the Euro-Med region through the prism of the challenge they pose to different states. Although they also present opportunities, the focus in this section is on how the factors and trends contribute to the current crisis by producing different degrees of fragility to sudden, ex-

ternal shocks. While the Euro-Med region is a mix of diverse socioeconomic realities and national geopolitical trajectories, for the sake of simplification the factors and trends are coded according to the intensity of the challenge they pose for the two broad blocks of NMCs and SEMCs.

Table 1. Structural factors and trends influencing food security in the Euro-Med region

Challenge	Intensity in SEMCs	Explanation	Intensity in NMCs	Explanation
Geography	High	Large desertic areas with scarce water resources	Low/ Medium	Fertile arable lands with sufficient water resources
Climate change	High	Extreme climate events further exacerbate geographical constrains	Medium	Rising temperatures reduce crop yields and increase resilience of plant bacteria
Demographic growth	High	Steep population increase entails structural dependence on imports of foodstuff	Low	Slow-to-no demographic growth
Urbanisation	Medium	Little interest of young, educated people in innovating agriculture	High	Old farmer workforce, generational handover at risk
Globalisation of Diets	High	Double burden of obesity and malnutrition, dependence on products not sourced locally	Medium	Diets largely based on meat proteins create dependence on calory imports
COVID-19 long wave	High	Informal agri-food economy gravely hit by lockdowns, bread subsidy programmes gravely hit by inflation and budget reductions	Low -	While issues of purchase power have raised, the performance of Single Market has limited issues to food availability

Source: Prepared by the author.

The geopolitical implications of the war in Ukraine for Euro-Med food security

The history of modern civilisation, including the case of the Common Agricultural Policy (CAP) within the process of European integration, shows that the precondition for functioning, integrated agricultural chains at the international level is peace. War in Ukraine and Russia – the 'breadbaskets of the world' – is producing a number of severe impacts on Euro-Med food security, on the geopolitical balance in the region, and on the collective imagination of the societies across

the two shores of the Mediterranean (Emiliani, 2022).

Ukraine and Russia produce together 12% of total world calories and rank among the largest exporters of cereals, sunflower oil/seeds, wheat and potash (Glauber & Laborde, 2022). Large-scale food production is so critical to the perception of Ukraine's identity that the current constraints to its production and exports imposed by Russia's aggression have been dubbed as "an attempt at Holodomor 2.0 against the world", thus referring to the famine induced by Soviet Russia that killed millions of Ukrainians in the 1930s (Gotev, 2022). In a viral video from the beginning of the war that contributed to putting the issue of global food security at the centre of the public debate, a Ukrainian elderly woman is seen confronting a Russian soldier by putting sunflower seeds in his pockets "so that sunflowers will grow from your body when you die" (The Guardian, 2022).

Similarly to the structural challenges facing Euro-Med food production, the impacts of the war on food security on the two shores of the Mediterranean are largely asymmetrical. In NMCs, the overall good functioning of the internal market and the clauses of protection included in the CAP have prevented a disastrous supply shock. As the European Commission (EC) highlighted in its assessment of the EU food security outlook shortly after the war, the issue is therefore "not one of accessibility, but one of affordability" (European Commission, 2022). In other words, the weaponisation of energy costs by Russia, together with the reduced availability of cheap fertilisers, is pushing production costs up, affecting both farmers and consumers in NMCs.

In SEMCs, the issues are even more profound and complex, given the pre-existing fragilities examined earlier. On the one hand, the sharp decrease in cereal imports blocked in Ukrainian ports has reduced the volumes of grains available in the region; on the other, the steep increase of fertiliser prices amid Russia's threats to block its own exports to the countries on its blacklist has made supply fragile and pushed many countries to take risky diplomatic choices. Indeed, the global fertiliser trade depends on an extremely volatile market. On the one hand, the production of fertilisers is highly energy-intense and easily subject to steep cost increases as the price of nitrogen, potassium and phosphorus needed to produce them increases. On the other hand, only a few countries including Russia and Belarus produce a surplus of fertilisers that they can export to countries in structural need, including Russia and Belarus. By exerting influence on the prices of natural gas on the global market while conditioning access to its fertiliser exports to maintain a non-hostile foreign policy, Russia is factually coercing a number of countries in the Middle East and North Africa (MENA) area – including some SEMCs – into acquiescence with its aggression of Ukraine. In this context, SEMCs also struggle to diversify imports, as third country exporters such as China and India have been stockpiling grain reserves since the COVID-19 pandemic to guarantee their own food security and gain an edge on future stock markets (Minter, 2022). The restriction of cereal supply on the market together with the sharp increase in energy and fertiliser prices are together the main causes for the current dramatic food price inflation in SEMCs. Inflation is particularly damaging for those countries that heavily subsidise bread, such as Tunisia, Egypt,

Morocco and Lebanon, as it reduces the power of governments to put forward effective social protection nets. Government budgets are further reduced by the sharp decrease in revenues related to tourism from Russia and Ukraine, which has contributed to putting further pressure on local currencies to the point that some SEMCs have reverted to extreme devaluation to cope with the crisis (Lester, 2022).

Given the particularly serious situation, it is not surprising that SEMCs are engaging in an extremely delicate diplomatic effort to ensure that trade channels are kept open by all main international actors. In this context, the overall strength of Euro-Med relations is indeed put to the test. Russia will continue to attempt to extract loyalty from SEMCs by spreading its own narrative on the reasons behind rising prices and increasing food insecurity in the region. According to such a narrative, the EU is solely responsible for the crisis through the export sanctions imposed on Russia and Belarus; for its 'inaction' in pushing Ukraine to the negotiation table; and for its alleged double standards applied to white/Christian/Ukrainian refugees vs. those applied to non-white/Muslim/SEMC citizens 'silently starving' in their own countries (AlArabiya, 2022). Against this background, it is all the more necessary to put forward a new agenda for renewed Euro-Med cooperation providing incentives and co-benefits for cooperation for actors on the two shores of the Mediterranean.

Strategic foresight: three potential scenarios for Euro-Med cooperation on agriculture

The objective of ensuring internal food security is at the core of the European integration project, as demonstrated by the establishment of the CAP as a means to guarantee abundant and affordable food for citizens and fair prices to producers. A duty to guarantee external food security is not inscribed in EU treaties, but external food security considerations have been gradually included in the CAP policy reforms, trade policy reviews and EU development policy. Indeed, the EU has been committing financial resources to SEMCs' food security since the beginning of the conflict, including 225 million euros from its Food & Resiliency Facility dedicated to SEMCs (European Commission, 2022). However, the EU seems somehow reluctant to accept specific commitments regarding the role it can play to foster global food security. As such, specific emphasis on food security was remarkably absent from European Commission President Von der Leyen's main 2022 State of the Union address (Fox, 2022). Short-term cooperation is mainly aimed at boosting EU food production to ease pressure on global cereal markets and provide a trade partner replacement for affected countries. For the long term, three main scenarios for a renewed Euro-Med cooperation are being discussed by experts, policy-makers and civil society.

The table below assesses the potential impact and feasibility of each scenario against two controlled variables: the geopolitical returns of Euro-Med cooperation on regional power balance and the effects different modes of cooperation might have on the common fight against climate change.

Given the particularly serious situation, it is not surprising that SEMCs are engaging in an extremely delicate diplomatic effort to ensure that trade channels are kept open by all main international actors

Table 2. Scenarios for renewed Euro-Med cooperation on agriculture

Scenario	Impacts on regional power balance	Impacts on fight against climate change	Feasibility
EU's structural food production increase to sustain SEMCs' demand	Increased diversification of SEMCs' import supply Reinforcement of EU industrial output Short-term food security gain Short-term contribution to regional political stability Increased Euro-Med geopolitical significance to counter influence of Russia, China, India, Brazil	Further intensification of EU production linked to high use of chemical fertilisers Necessity to cultivate on EU land foreseen for biodiversity protection Agro-industrial model of production increase accelerates impacts of climate adverse events	Low Limited EU land available constrains production boost High gas and nitrogen costs make agro-industrial production increase costly Climate change a real threat to yield productivity
Support to industrial intensification of SEMCs' production	Adoption of US-sponsored model based on supply of machinery and additives to SEMCs Mid-term food security gains SEMCs' increased dependency on industrial imports Limited Euro-Med geopolitical significance with increasing influence of individual EU member states, US and multinationals	Industrial intensification of SEMCs' production linked to high use of chemical fertilisers Priority for industrial practices over regenerative agriculture contradictory to SEMCs' long-term resilience	Medium High gas and nitrogen costs make agro-industrial production increase costly Climate change a real threat to yield productivity Scenario contradicts EU Farm2Fork agri-food sustainability strategy… …But it might receive support from individual EU member states and industrial interest groups

	Reduced dependence on costly fertilisers as a geopolitical asset in face of great powers' influence	Reduced use of chemical fertilisers and focus on agroecology and climate-smart agriculture positive for adaptation and mitigation of climate change	Medium
Cooperation on sustainable Euro-Med food systems for resilience	Long-term food security gains…		Need for EU internal and external policy coherence between CAP, Farm2Fork, development aid and trade
	…but further burden of investments and disruption of status quo in the short term	Valorisation of SEMCs' best practices as an enabler for progress in the fight on climate change in NMCs	Necessity for significant investments in innovation and skills-building
	Long-term contribution to SEMCs' resilience and regional political stability	Increased significance of fight against climate change as a unifying asset for cooperation	Risks of decrease of agricultural productivity in case of lack of political and financial commitment
	…but lack of short-term fix to the current crisis		
	Rise of Euro-Med construct as champion of UN SDGs		

Source: Prepared by the author.

The next sections will discuss the conditions, obstacles and pathways to achieve the third scenario analysed.

Political fora and instruments for Euro-Med cooperation in times of crisis

To date, Euro-Med dialogue on the needed transition to sustainable food systems remains limited. While all Euro-Med countries are signatories to the United Nations (UN) Paris Agreement on Climate change and participated in the 2021 UN Food Systems Summit, the room for regional action is constrained by the stalemate experienced by the framework designed for cooperation. Established in 1995 as the Euro-Mediterranean Partnership (EMP) to shape the vision for a region of prosperity and address sectoral priorities, the Union for the Mediterranean (UfM), established in 2008, has gradually witnessed its momentum being replaced by a 'Mediterranean fatigue'.[19] By the 2010s, while Arab uprisings had been facing violent repression from authoritarian states, NMCs had largely reframed Euro-Med cooperation in terms of winning support for border management

[19] Interview with Sébastien Abis, Director of Club Déméter and member of the task force FARM, online, 10 November 2022.

and fighting against terrorism in exchange for budget aid.[20] As NMCs shifted their framing of the Mediterranean area from a region of shared history and identity to a source of instability to be securitised through financial incentives and coercion, SEMCs adapted to the new reality by accepting the transactional nature of the new Euro-Med relationship lasting until today.

Negotiations on agricultural matters are now mostly held bilaterally, building on the Association Agreements (AAs) concluded between the EU and selected SEMCs at the beginning of the 1990s. Discussions on the potential establishment of Deep and Comprehensive Free Trade Agreements (DCFTAs) with Morocco, Jordan, Tunisia and Egypt have however been stalling, in some cases, for almost a decade. The main operational framework for collaboration is the southern dimension of the European Neighbourhood Policy (ENP), which is endowed with the financial Neighbourhood, Development and International Cooperation Instrument (NDICI) worth €19.32 billion for the period 2021-2027, southern and eastern dimensions combined (European Commission, 2021). The 10 SEMCs taking part in the ENP also benefit from the External Investment Plan, a new tool created in 2017 to help boost public and private investments to improve inclusive, sustainable economic and social development, in particular decent job creation. The ENP framework does not however include Turkey, as the country still formally holds the status of candidate to the accession to the EU. The 2021 Renewed Southern ENP Agenda saw the introduction of a chapter on green transition and climate resilience including a paragraph on cooperation on sustainable food systems (European Commission, 2021b). Nevertheless, such cooperation is mostly framed through North-South transferral of technical expertise, and political support for renewed cooperation is expressed in very general terms.

As the appetite for truly political initiatives has been stagnating for several years now, Euro-Med cooperation on agriculture has been brought forward through functional, sectoral programmes and initiatives. One of the oldest institutions is the Centre International des Hautes Etudes Agronomiques Méditerranéennes (CIHEAM), a Euro-Med intergovernmental organisation established in 1962 with a strong focus on research, education and training. CIHEAM has managed to establish itself as a true reference for Euro-Med cooperation thanks to its mobility exchanges allowing thousands of students and professionals to cross-fertilise and enrich the diversity of the Mediterranean agricultural know-how every year (FAO & CIHEAM, 2020). The Partnership for Research and Innovation in the Mediterranean Area (PRIMA) is a project-based multi-stakeholder network active since 2018 with an emphasis on innovative farming practices, sharing best climate mitigation and adaptation experiences, and promoting sustainable business models for small and medium sized enterprises (SMEs). The insistence on equal footing in agency among the 19 participating countries and the need to create a critical mass of actors and resources towards the alignment of Euro-Med agricultural innovation programmes and resources potentially put PRIMA in the condition to be a 'pilot' experiment for cooperation on research and innovation in other regions of the world.[21] EIT Food is the world's largest knowledge and innovation community creating connections between stakeholders to build fu-

[20] Interview with representative of the EU Delegation in Morocco, online, 26 September 2022.

[21] Interview with Angelo Riccaboni, Chair of the Italian Secretariat of PRIMA Foundation, EIT Food Annual Event in Brussels, 17 October 22.

ture-fit, environmentally sustainable food systems. The peculiarity of EIT Food lies in its holistic approach implemented through the so-called Knowledge Triangle of Innovation matrix that foresees the collaboration of actors from civil society, industry, research and development, and academia to design actions delivering co-benefits across the value chain (De Bernardi & Azucar, 2020).

While the momentum for political innovation in Euro-Med cooperation on agriculture seems to have to a large extent subsided in the last two decades, the systemic disruptions to global value chains caused by the COVID-19 pandemic and the war in Ukraine might represent a moment of truth for the hopes to relaunch the regional impetus. The COP27 taking place in November 2022 in Sharm el-Sheik, Egypt, was a make-it-or-break-it opportunity to boost collaboration. In fact, for the first time in history, both a Food Pavilion and a Mediterranean Pavilion was present at a UN Conference on climate and there were hopes that concrete negotiations on common action towards sustainable food systems would lead to joint commitments (Lieb, 2022). However, the impacts of the war in Ukraine might well further divide a Euro-Med region in dramatic need of unity of intent and strong leadership. Uncertainty regarding the future of supply chains and the perception that the survival of domestic regimes is at stake might in fact lead countries within the region to pursue less cooperative regional policies.

In Europe, Germany leads a large group of central, northern and eastern countries inclined to prioritise the energy issue over the agri-food issue on the EU political agenda. In the 2022 State of the European Union, the German President of the European Commission Von der Leyen mentioned the words 'energy', 'oil' and 'hydrogen' a total of 25 times and the words 'agriculture' and 'food (security)' once (European Commission, 2022). A different order of priorities seems to be expressed by France, which has successfully led a coalition of NMCs in securing the Council of the EU's endorsement to launch the new Food and Agriculture Resilience Mission (FARM). This initiative foresees an entire pillar dedicated to speed up the transition to sustainable and resilient food systems in the countries most affected by the crisis in Africa and the Middle East through the support to regenerative agricultural practices, the development of integrated regional markets, and the fight against food waste (IFAD, 2022).

SEMCs do not form a united front either, with a variety of geopolitical approaches to tackle the effects of the crisis

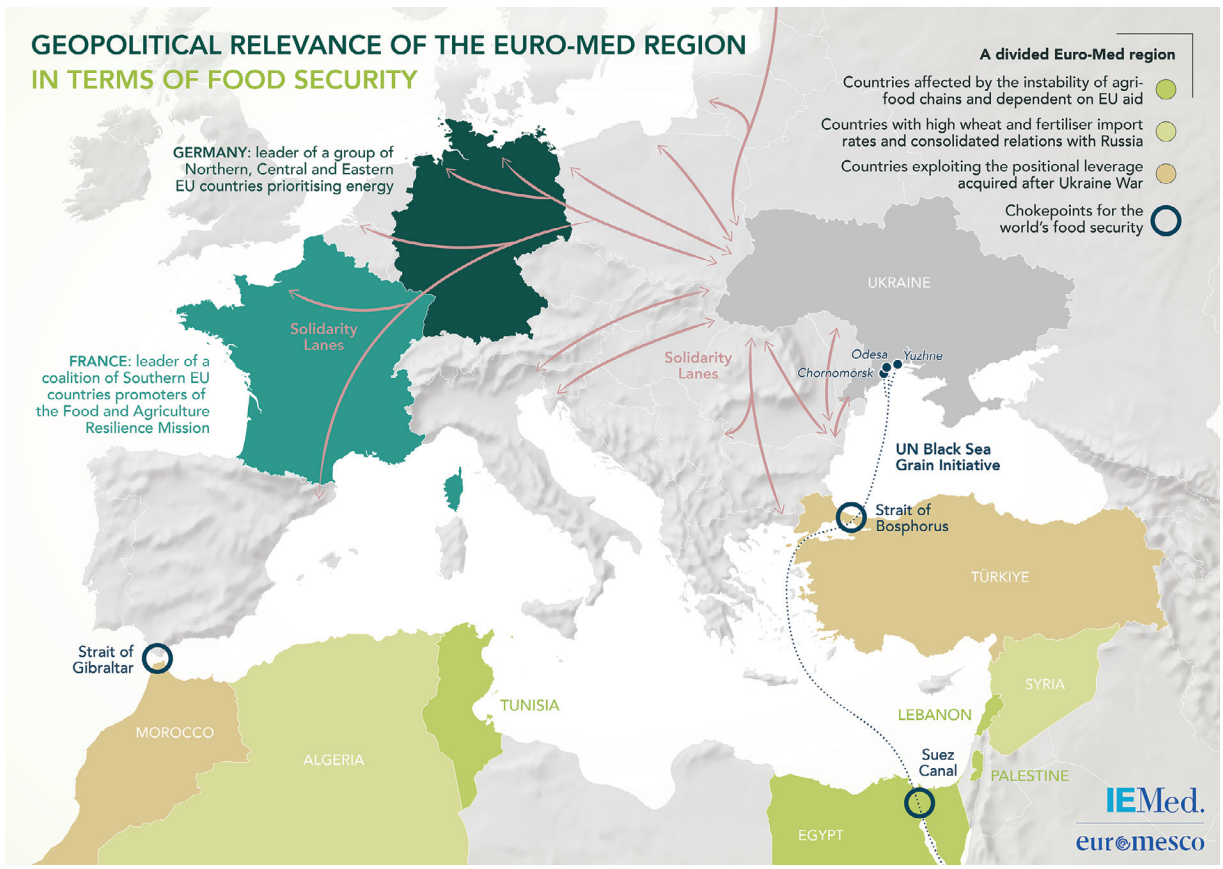
SEMCs do not form a united front either, with a variety of geopolitical approaches to tackle the effects of the crisis that reflects the diversity of natural resources, trade relations, and political path dependencies. While all SEMCs are trying to balance out their diplomatic ties with the EU, Russia, the United States (US) and China, three broad trends can be observed in this regard: a heterogeneous group of countries deeply affected by the instability of agri-food chains is increasingly dependent on EU aid looks at NMCs to diversify the provision of supplies. Lebanon, Tunisia and Palestine belong to this group, but the case of Egypt is particularly interesting. While EU-Egypt relations soured after the 2013 military coup that led President al-Sisi to power and to the assassination of trade union researcher Giulio Regeni by Egyptian police in 2016, cooperation has been recently revamped through the prism of energy trade. Indeed, at a bilateral meeting on the fringe of the September 2022 UN General Assembly, the High Representative of the European Union for Foreign and Security Policy Borrell pledged 100 million euros to alleviate the situation of highly import-dependent Egypt to the Foreign Minister Shoukry, who acted as the President of the UN COP27 taking place

in November 2022 in Sharm el-Sheik (Egypt Today, 2022). On the other hand, few among the countries with high wheat and fertiliser import dependencies are doubling down on their consolidated relations with Russia. This is the case of Syria – whose regime is closely tied to the political survival of President Putin – and, more recently, Algeria – as the abstention to the March 2022 UN General Assembly Resolution condemning Russia's invasion of Ukraine shows. Meanwhile, Algeria's dependence on French wheat has contributed to rekindling relations between the two countries, as the August 2022 meeting between the two presidents proves (Zerrouky, 2022), Russia continues to support Algeria in the Western Sahara querelle and fuels anti-French post-colonial resentment in public opinion, with Italy being one of the few NMCs able to cut through the current tensions and sign a large gas deal with Algiers (Petropoulos, 2022). The third small group is made of countries – Morocco and Turkey – that are trying to raise their geopolitical profile by exploiting the positional leverage acquired through the crisis. Morocco is on a different trajectory to most SEMCs experiencing the consequences of the war in Ukraine. The combination of a lesser structural dependence on cereal imports with the status as fourth exporter of fertilisers in the world makes it a strategic actor in the Mediterranean and a potential pivot in the contest between Russia and the West. Moroccan fertiliser giant OCP is currently building plants worth of 6 billion euros in sub-Saharan Africa as joint ventures with local stakeholders, a move that could in the long term significantly reduce the impact of Russia's weaponisation of the energy-food nexus, should Rabat decide to continue its pursuit of strategic engagement with the EU (Tanchum, 2022). On the other side of the Mediterranean Sea, Turkey has been hit hard by the food and energy crisis. Subject to a 78% dependence on Russian and Ukrainian wheat imports before the war and with an ongoing trend of hyperinflation ravaging the country, Ankara is potentially in an extremely difficult situation. However, Turkey enjoys a key geoeconomic leverage: it controls the Strait of Bosphorus, one of the eight chokepoints for the world's food security allowing the Ukrainian, Russian and Belarusian grains and fertilisers to be exported through the Mediterranean to Africa and the Middle East (Bailey & Welleisley, 2017).

Despite the many differences and contrasts within the Euro-Med region, at least two political developments of high relevance are to be registered. In May 2022, the EU started implementing the so-called Solidarity Lanes, an initiative aimed at enabling the export via land of Ukrainian cereals blocked in the country due to the ongoing war through the reinforcement of the transport infrastructure and the simplification of the administrative processes. The Solidarity Lanes have so far allowed the export of over 23 million tonnes of grains, seeds and sunflower oil mostly directed towards SEMCs and other African countries (CLECAT, 2023). The initiative represents a positive example of political solidarity and, as the EU plans to make Solidarity Lanes permanent to ease tension on the food markets, it could represent a pillar around which to develop a Euro-Med alliance on agriculture. It is also important to note that, in a context where peace negotiations between Ukraine and Russia have so far proved impossible, the only real diplomatic breakthrough so far has revolved around agriculture and has been brokered by Turkey and the UN to the main benefit of the Euro-Med region. The UN Black Sea Grain Initiative, signed by Russia and Ukraine in Ankara in August 2022 thanks to the efforts of the UN Secretary General Gutierrez and Turkish President Erdogan and renewed for 120 days in November 2022, allowed the shipping of over 11 mil-

The EU plans to make Solidarity Lanes permanent to ease tension on the food markets, it could represent a pillar around which to develop a Euro-Med alliance on agriculture

lion tonnes of grain until November 2022 through the unblocking of Ukrainian ports (UN, 2022). The initiative represents a case that the political payoff leaders can claim when investing in resolute action related to food security. Despite the great importance of such initiatives, it is however also necessary to mention the potentially problematic implications of the release of Ukrainian grain crops in the EU market that could potentially endanger the position of farmers in Central and Eastern Europe and therefore potentially weaken the EU political capital available to commit to invest in a renewed Euro-Med partnership on agriculture.



Barriers to cooperation and pathways to the unlocking of co-benefits

A realistic case for renewed Euro-Med cooperation on sustainable food systems must consider at least four dimensions: the political space; funding instruments and trade relations; investments in education, research and innovation; and the development of new, positive narratives.

Firstly, the project to revitalise the Euro-Med dialogue needs to receive the sufficient amount of political support from governments, the EU, the Arab League and civil society. The current frameworks in place — the UfM and the ENP — do not seem fit for the purpose. On the one hand, the hopes that a democratisation wave would sweep the region after the revolutions of 2011 have progressively faded away as old and new authoritarian regimes in SEMCs showed strong resilience to

A case for a renewed Euro-Med collaboration on agriculture should indeed also be made through the identification of suitable funding streams to finance green regional agri-food systems

both internal and external pressure. On the other hand, the UfM, whose impetus has been largely lost for a decade now, suffers from its original institutional design. Heavy institutional control was used by non-Mediterranean European states as a pre-condition to greenlight the project and the dispersion of EU funding, with the result that initial efforts to design and promote actions in support of the establishment of an "area of peace and prosperity" were buried under the weight of administrative procedures and diplomatic deadlocks. As such, the UfM has morphed a project designed to accompany the revolutionary waves coming from the southern shores of the region through a process of collective identity-shaping to a de facto guarantor of the status quo, where little space seems to exist for opening the chapter – revolutionary in its own terms – of a renewed regional cooperation on agriculture. The ENP, on its side, with its persisting focus on conditionality and migration management, would need a real overhaul to offer real prospects for a partnership on an equal footing suitable to initiate a new dialogue on agriculture. As per the potential offered by new political fora, the exclusion of all SEMCs but Turkey from the new European Political Community (EPC), the intergovernmental forum for political and strategic discussions on the future of Europe established in 2022 after the Russian invasion of Ukraine, feels like a missed opportunity. Israel, Tunisia and Turkey (pending Morocco) are countries associated with the Horizon Europe programme and arguably are already strategic actors shaping the future of the EU. The EU Ukraine Solidarity Lanes initiative, established in May 2021, coinciding with the launch of the EPC, could instead have been a good opportunity to involve SEMCs in a discussion on the improvement to critical agri-food transport infrastructure, logistics, supply chains and machinery needed to accelerate the region's transition to sustainable food systems.

Secondly, while the Food and Agriculture Organization (FAO) launched an initiative to improve the quality and quantity of climate finance contributions to the agricultural sectors at the COP 27 in Egypt, public funding of sustainable food systems still only counts for 3% of global climate finance (GAIN, 2022). A case for a renewed Euro-Med collaboration on agriculture should indeed also be made through the identification of suitable funding streams to finance green regional agri-food systems. The main challenge is upscaling the level of funds available to meet the urgent financing needs of the transition towards sustainable food systems. In Europe, some experts advocate for an enhanced role of the CAP as a climate policy.[22] According to this scenario, with increasing funding and a clear articulation of its external ambitions, the CAP may provide the financial and operational support to the regional transition that the Farm2Fork strategy is not able to mobilise. However, a number of factors hinder the feasibility of such a scenario: the main objective of the CAP is to protect European farmers and boost the development of rural areas. Any extension of its scope to goals of cooperation with third parties might well be considered as a stretch by influential farmers' organisations such as Copa-Cogeca and would hardly be approved in the Agri-Fish Council of the EU. Furthermore, the CAP already absorbs 386,602.8 million euros, (i.e., 33.1% of EU 2021-2027 budget) and it is unlikely that this budget will be further expanded to tackle goals considered as falling beyond the scope of the CAP remit by net-contributing member states such as Germany, Italy and France. While a direct inclusion of external sustainability objec-

[22] Interview with Sébastien Abis.

tives into the CAP might not seem realistic, strengthening the overall CAP coherence in promoting sustainability would produce important external indirect effects. In addition to CAP reform, improving the functioning of the Single Market through better transparency and coordination measures and increasing the inclusion of agri-food players from both shores of the Euro-Med region in Producer Organisations (POs) and Inter-Branch Organisations (IBOs) would also produce likely efficiency gains in the functioning of agri-food value chains. Other experts point at the modernisation of the ENP and the explicit – albeit somehow vague – mention of earmarked funding to be disbursed through the European Fund for Sustainable Development (EFSD+) including the External Action Guarantee for transition to sustainable food systems in the 2021 agenda (Hanelt, 2021). However, the idealism that characterised the early ENP days has long faded away, and today the predominant policy focus on 'stabilisation' and transactional partnerships for security leaves limited room to the imagination of a new robust framework of collaboration on agriculture and climate. In fact, the ENP budget earmarked to finance the transition of food systems is very limited.[23] Potentially, trade deals bear the most potential for an economic collaboration on an equal footing, if sustainability is made an explicit goal and that policy coherence between economic development and socio-environmental protections is respected (Rampa et al., 2020). The EU has introduced sustainability clauses in all its trade deals since the launch of the European Green Deal programme and made policy coherence a priority in the 2021 EU Trade Policy Review.[24] However, the trade deals signed between the EU and some SEMCs in the framework of the AAs date back to the early 2000s and do not by any means address the issue of the transition to sustainable food systems. The negotiations on the DCFTAs proposed to Morocco, Tunisia and Turkey – which would include new chapters on sustainable agriculture – are currently stalled ostensibly due to SEMCs' perplexities linked to the potential effects of further liberalisation of their (agricultural) markets and the potential impacts of regulatory approximation to the EU acquis in the field of sustainability provisions. Whatever the form chosen to accelerate the transition of Euro-Med food systems, progress will rely on the capacity to engage the private sector (including SMEs and large conglomerates from all across the value chain, increase use of guarantees and de-risk capital to overcome financial and non-financial barriers.

Thirdly, partnerships for research, innovation and education should be expanded and scaled in ambition and investments exploiting synergies and building on mutual strengths with the objective of empowering farmers and strengthening local agri-food markets. Existing EU working groups such as the Standing Committee on Agricultural Research on Agricultural Knowledge & Innovation Systems (SCAR AKIS) should be expanded to increase more SEMCs, as is already the case for other kind of networks. For instance, multi-stakeholder innovation platforms, such as EIT Food and PRIMA, share similar stakeholder engagement strategies and yet mobilise different ecosystems that could be activated simultaneously. EIT Food mobilises a larger,

[23] For an in-depth analysis of implications of CAP and ENP reform, see the chapter by Marko Lovec in this Policy Study.

[24] Interview with Lukas Visek, Member of the Cabinet of Executive Vice-President Timmermans for the European Green Deal and responsible for overseeing the Farm to Fork Strategy, EIT Food Annual Event in Brussels, 17 October 22.

pan-European network tackling Mediterranean challenges through the prism of the Regional Innovation Scheme (RIS) aimed at offering support to the areas with a low innovation score. On the other hand, PRIMA operates within a truly Euro-Med network and has a direct access to policymakers that can facilitate the alignment of national programmes and agendas.[25] Despite the variety of interests represented by the public, private and academic actors in the PRIMA and EIT Food ecosystems, NMCs and SEMCs can federate around innovation pathways providing co-benefits such as the fight against food waste; the digitalisation of food value chains and extension of connectivity network in rural areas on both shores of the Mediterranean; and adaptation and mitigation measures to address water scarcity in agriculture.[26] New avenues for Euro-Med discussion and research could include issues such as the development of the alternative protein market, the regulation of new genomic techniques (NGTs) as potential contributors to food security, as well as the support of Euro-Med farmers in the fight against climate change through zero-net practices such as carbon farming (EIT Food, 2021). A fundamental place in the Euro-Med research and innovation agenda should be reserved for entrepreneurial education. The European Commission labelled 2023 "the year of skills" labelled 2023 "the year of skills" (European Commission, 2022), with many opportunities for Euro-Med cooperation lying ahead for actors such as CIHEAM and EIT Food. CIHEAM supports the mobility of thousands of students and researchers every year, thus promoting cross-fertilisation of ideas, peer-learning and exchange of best practices between the two shores of the region. EIT Food focuses on bridging the skills and employability gap in RIS SEMCs by providing learners with transversal skills ranging from technical skills to business administration, leadership and communication in view of producing multiplier effects within the communities of learners. EIT Food encourages the development of skill sets that can then be complemented through the adaptation to local contexts. The focus on development of entrepreneurial mindsets rather than on knowledge transferral can be particularly suitable for replication of the model in SEMCs, if appropriate measures of customisation to the local needs are duly considered.[27]

Relaunching Euro-Med cooperation on agriculture means winning the hearts and minds of the citizens of the region

Finally, relaunching Euro-Med cooperation on agriculture means winning the hearts and minds of the citizens of the region. One of the most serious geopolitical impacts of the war in Ukraine would be the further loosening of ties between some SEMCs and NMCs due to the permeation of Russian divisive misinformation on the origins and responsibilities of the current food crisis.[28] The EU – built on the slogan 'United in diversity' — is usually strong at putting forward unifying narratives. It is now essential to engage in the production of a concerted Euro-Med discourse linking cooperation on sustainable agriculture as a vector for peace and the protection of the environment. Such discourse should, according to the Cabinet of the Executive Vice-President Timmermans, "show citizens through concrete examples that conjugating productivity and respect for the environment is feasible, in general, and

[25] Interview with Prof. Riccaboni.

[26] For an in-depth analysis of the potential of data-based tools in Euro-Med cooperation, see the chapter by Ines Gasmi in this Policy Study.

[27] Interview with Dr. Maarten van der Kaamp, Director of EIT Food Education, online, 6 October 2022.

[28] For an in-depth analysis of local developments around the concept of food sovereignty and the potential for a bottom-up Euro-Med agenda, see the chapter by Denise Quagliarotty in this Policy Study.

actually works, in practice."[29] In 2021, EU Commissioner von der Leyen launched the New European Bauhaus, a transdisciplinary movement bridging science, technology and culture to educate EU citizens about the values of sustainability, inclusivity, and quality of experience. Food plays an important role in the New European Bauhaus ethos as a connector between cultures, identities, and experiences (EIT Food, 2021b). We therefore propose the launch of a 'Euro-Med Olive Branch' initiative modelled after the New European Bauhaus, based on three powerful symbols: the olive branch, symbol of peace and prosperity in all the main religions and with distinctive Mediterranean roots; olives and olive oil, symbols of the Mediterranean diet recognised by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as Intangible Cultural Heritage and the embodiment of health and shared history; and the farmer working in the fields, symbol of the centrality of agriculture for life and prosperity and of the common fight against climate change as an enabler of — not an obstacle to — cooperation. The 'Euro-Med Olive Branch' initiative could be structured as a policy lab, an accelerator for investments and a citizen network at the same time. An interdisciplinary movement rooted in tradition but open to innovation and diversity, convening a space of encounter to recuperate and revisit sustainable agricultural practices of the past, empower the most inspiring practices of today, and design the practices of the future, at the crossroads between science, culture and community. For such an initiative to have chances of success, however, it is indispensable to energise, support and empower an alliance of 'Euro-Mediterranean activists'[30] from civil society, academia, the business sectors and public institutions, ready to embrace the diversity and complexity of the Euro-Med reality, which ultimately constitute the real beauty and uniqueness of the region.

Conclusion

This chapter endeavoured to make a case for a renewed Euro-Med cooperation through the frame of the geopolitical challenge posed to the region's food security, stability and prosperity by the weaponisation of food and energy by Russia and the increasing regional influence of other great powers. To do so, it analysed the conditions, obstacles and opportunities provided by a strategic scenario according to which cooperation on resilient food systems and partnership on the common fight to climate change are used as enablers to reinforce the geopolitical status, security and prestige of the regional actors involved.

The Euro-Med region is a construct whose shape is changing in reaction to the geopolitical challenges affecting the area. The traditional North-South conceptualisation is gradually leaving the place to a liquid East-West geography of food security connecting the Caucasus through the Black Sea with sub-Saharan Africa through Gibraltar. Euro-Med cooperation in agriculture has never been particularly strong until now, and even less so since the whole regional institutional framework of dialogue – the UfM and Southern ENP – has lost its transformative emphasis and slowly declined into a seemingly irreversible obsolescence. Among a lot

[29] Interview with Lukas Visek.

[30] Interview with Sébastien Abis.

negative factors, the Arab uprisings, which sometimes resulted in new authoritarian regimes or civil wars, have not eased this cooperation. Nevertheless, the systemic disruptions brought about by the cumulative impacts of the COVID-19 pandemic and the Russian invasion of Ukraine provide an opportunity to make a new case for cooperation. The lack of a unified vision and vast constellation of diverse interests across the region make any overly optimistic forecast very risky, but renewed Euro-Med activism can start building momentum focusing on co-benefits provided by collaboration: agriculture as an enabler for climate change protection instead of a 'problem'; support to farmer upskilling as an insurance for rural development and political stability; partnerships for innovation and education as engines for multiplication of impact; and empowerment of business, citizen and policy networks to build critical mass in the transition towards sustainable food systems.

References

ABDERRAZEK, M. B. (2022). *La Tunisie de plus en plus dépendante à l'importation des céréales. Tunisie Numérique.* Retrieved from : https://www.tunisienumerique.com/732743-2

ABOULGHATE, M. ET AL. (2021). The Burden of Obesity in Egypt. *Front Public Health,* 9, 718978.

ALARABIYA. (2022). *Putin's media blitz blaming sanctions on Africa food crisis sparks alarm in Europe.* Retrieved from: https://english.alarabiya.net/News/world/2022/07/03/Putin-s-media-blitz-blaming-sanctions-on-Africa-food-crisis-sparks-alarm-in-Europe

ALI, E., ET AL. (2022). Cross-Chapter Paper 4: Mediterranean Region. In H.-O. Pörtne et al. (eds.) *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge: Cambridge University Press.

ANTHEM, P. (2022). *WFP and FAO sound the alarm as global food crisis tightens its grip on hunger hotspots.* WPF. Retrieved from: https://www.wfp.org/stories/wfp-and-fao-sound-alarm-global-food-crisis-tightens-its-grip-hunger-hotspots

AUBERT, P-M ET AL. (2022). *War in Ukraine and food security: what are the implications for Europe?* IDDRI. Retrieved from: https://www.iddri.org/en/publications-and-events/blog-post/war-ukraine-and-food-security-what-are-implications-europe

AUSLOOS, M. AND MAHE, S. (2022). *Wildfires burn, farmers struggle as another heatwave bakes western Europe.* Reuters. Retrieved from: https://www.reuters.com/world/europe/wildfires-rage-farmers-struggle-another-heatwave-bakes-western-europe-2022-08-11/

BAILEY, R. AND WELLESLEY L. (2017). *Chokepoints and Vulnerabilities in Global Food Trade.* Chatham House. Retrieved from: https://www.chathamhouse.org/2017/06/chokepoints-and-vulnerabilities-global-food-trade-0/2-chokepoints-global-food-trade

BILO, C. ET AL. (2022). *Social protection responses to COVID-19 in MENA: Design, implementation and child-sensitivity.* Research Report No. 76,UNICEF International Policy Centre for Inclusive Growth and United Nations Children's Fund Middle East and North Africa Regional Office, Brasília and Amman. Retrieved from: https://www.unicef.org/mena/reports/social-protection-responses-covid-19-mena-design-implementation-and-child-sensitivity

CAISSE NATIONALE SÉCURITÉ SOCIALE DU MAROC (CNSS). (2020). *Rapport démographique 2019.* Retrieved from: https://www.cnss.ma/sites/default/files/files/Rapport%20d%C3%A9mographique%20et%20statistique%20CNSS%202019.pdf

CEMA. (2022). *European Commission joins Sustainable Productivity Growth Coalition.* Retrieved from: https://www.cema-agri.org/publication/articles/906-european-commission-joins-sustainable-productivity-growth-coalition

CLECAT. (2023). *EU Solidarity Lanes in Numbers.* Retrieved from: https://www.clecat.org/news/newsletters/eu-solidarity-with-ukraine-in-numbers

DE BERNARDI, P. AND AZUCAR, D. (2020). A European Food Ecosystem: The EIT Food Case Study. In Innovation in Food Ecosystems. Contributions to Management Science. Springer.

EIT FOOD. (2021). *EIT Food partners with European Carbon+ Farming Coalition to accelerate decarbonisation of food systems.* Retrieved from: https://www.eitfood.eu news/eit-food-partners-with-european-carbon-farming-coalition-to-accelerate-decarbonisation-of-food-systems

EIT FOOD. (2021b). *EIT Cross-KIC contributes to New European Bauhaus (NEB) Initiative from the European Commission*. Retrieved from: https://www.eitfood.eu/projects/eit-x-kic-contributes-to-new-european-bauhaus-neb-initiative-from-the-european-commission

EGYPTTODAY. (2022). *FM Shoukry urges EU support to Egypt to ease impacts of global food crisis.* Retrieved from: https://www.egypttoday.com/Article/1/119357/FM-Shoukry-urges-EU-support-to-Egypt-to-ease-impacts

EMILIANI, T. (2022). *Se il granaio del mondo brucia.* ISPI. Retrieved from: https://www.ispionline.it/it/pubblicazione/se-il-granaio-del-mondo-brucia-34881

EUROSTAT. (2018). *Farming: profession with relatively few young farmers*. Retrieved from: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20180719-1

EUROSTAT. (2022). *Population projection in the EU.* Retrieved from: https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=497115#Population_ projections

EUROPEAN COMMISSION. (2021). *European Commission welcomes the endorsement of the new €79.5 billion NDICI-Global Europe instrument to support EU's external action.* Retrieved from: https://ec.europa.eu/commission/presscorner/detail/ en/ip_21_1267

EUROPEAN COMMISSION. (2022). *Joint Declaration - 1 billion euro mobilised for Solidarity Lanes to increase global food security and provide a lifeline for Ukraine's economy.* Retrieved from: https://ec.europa.eu/commission/presscorner/detail/en/statement_22_6825

EUROPEAN COMMISSION. (2021). *Renewed partnership with the Southern Neighbourhood A new Agenda for the Mediterranean, JOIN(2021) 2 final, Brussels.* Retrieved from: https://eeas.europa.eu/sites/default/files/joint_communication_renewed _partnership_southern_neighbourhood.pdf

EUROPEAN COMMISSION. (2022). *Safeguarding food security and reinforcing the resilience of food systems, COM (2022) 133 final.* Retrieved from: https://ec.europa.eu/commission/presscorner/detail/en/QANDA_22_1964

EUROPEAN COMMISSION. (2022). *Short-term outlook for EU agricultural markets, DG Agriculture and Rural Development, Brussels.* Retrieved from: https://agriculture.ec.europa.eu/news/short-term-outlook-report-eu-agricultural-markets-remain-stable-despite-russian-invasion-ukraine-2022-10-05_en

EUROPEAN COMMISSION. (2022). *State of the Union Address by President von der Leyen, 2022, Strasbourg.* Retrieved from: https://ec.europa.eu/commission/presscorner/detail/ov/speech_22_5493

EUROPEAN COMMISSION. (2021). *Trade Policy Review - An Open, Sustainable and Assertive Trade Policy, JOIN (2021)2 final.* Retrieved from: https://ec.europa.eu/ commission/presscorner/api/files/document/print/en/qanda_21_645/QANDA_21_645_EN.pdf

FAO. (2022). *GIEWS - Global Information and Early Warning System, Country Brief, Lybia.* Retrieved from: https://www.fao.org/giews/country-analysis/country-briefs/country.jsp?code=LBY

FAO & CIHEAM. (2020). *FAO-CIHEAM Partnership – Advancing sustainable rural development in the Mediterranean.* Retrieved from: https://www.fao.org/3/ca7754en/CA7754EN.pdf

FEED THE FUTURE. (2015). *Webinar reviews findings of World Bank study on enabling agribusiness.* Retrieved from: https://site.caes.uga.edu/ftfpeanutlab/2016/05/webinar-reviews-findings-of-world-bank-study-on-enabling-agribusiness/

FOODNAVIGATOR. (2022). *Ukraine war detonates food security debate.* Retrieved from: https://www.foodnavigator.com/Article/2022/03/07/Ukraine-war-detonates-EU-food-security-debate-but-will-sustainability-be-collateral-damage

FOOTE. (2022). *Timmermans: Scaremongering on food security 'dishonest, irresponsible',* EURACTIV. Retrieved from: https://www.euractiv.com/section/agriculture-food/news/timmermans-scaremongering-on-food-security-dishonest-irresponsible/

FOX, B. (2022). *The Brief – Von der Leyen's missed opportunity.* EURACTIV. Retrieved from: https://www.euractiv.com/section/future-eu/opinion/the-brief-von-der-leyens-missed-opportunity/

GIJS, C. (2022). Russia threatens to limit agri-food supplies only to 'friendly' countries, POLITICO, 2022 https://www.politico.eu/article/russias-former-president-medvedev-warns-agricultural-supplies-restricted-to-friendly-countries/

GLAUBER, J. AND LABORDE D. (2022). *How will Russia's invasion of Ukraine affect global food security?* IFPRI. Retrieved from: https://www.ifpri.org/blog/how-will-russias-invasion-ukraine-affect-global-food-security

GLOBAL ALLIANCE FOR THE FUTURE OF FOOD (GAIN). (2022). *Untapped Opportunities: Climate Financing for Food Systems Transformation.* Retrieved from: https://futureoffood.org/wp content/uploads/2022/10/climatefinancereport-english.pdf

GODEFROID, M. ET AL. (2019). "Xylella fastidiosa: climate suitability of European continent." *Scientific Reports* 9, 8844, pp. 1-10.

GOTEV, G. (2022). *The Brief – Holodomor 2.0.* EURACTIV. Retrieved from: https://www.euractiv.com/section/europe-s-east/opinion/the-brief-holodomor-2-0/

THE GUARDIAN. (2022). Ukrainian woman offers seeds to Russian soldiers so 'sunflowers grow when they die. YouTube. Retrieved from: https://www.youtube.com/watch?v=L17Bi7zBJHI

HANELT, C. (2021). *The European Neighbourhood Policy 2021: New impulses for the south.* Bertelsmann-Stiftung. Retrieved from: https://www.bertelsmann-stiftung.de/en/ our-projects/strategies-for-the-eu-neighbourhood/project-news/the-european-neighbourhood-policy-2021

HEADEY, D. AND FAN S. (2010). *Reflections on the global food crisis How did it happen? How has it hurt? And how can we prevent the next one?* IFPRI. Retrieved from: https://www.ifpri.org/publication/reflections-global-food-crisis

IFAD. (2022). *Joint statement by the International Fund for Agricultural Development (IFAD) and France on the Food and Agriculture Resilience Mission (FARM) initiative.* Retrieved from: https://www.ifad.org/en/web/latest/-/joint-statement-by-ifad-and-france-on-the-farm-initiative

INDEXMUNDI. (2022). *Wheat Imports by Country in 1000 MT.* Retrieved from: https://www.indexmundi.com/agriculture/?commodity=wheat&graph=imports

JOINT RESEARCH CENTRE OF THE EU. (2022). *Summer drought keeps its grip on Europe.* Retrieved from: https://joint-research-centre.ec.europa.eu/jrc-news/summer-drought-keeps-its-grip-europe-2022-08-22_en

KATKHUDA, N. (2020). *Food Security in the Middle East.* EcoMena. Retrieved from: https://www.ecomena.org/food-middle-east/

LE MOUËL, C. ET AL. (2015). *Afrique du Nord - Moyen-Orient à l'horizon 2050 : vers une dépendance accrue aux importations agricoles.* Inra. Retrieved from: hal-02945422v2

LESTER, A. (2022). *WFP Chief Economist: Gulf Countries Should Step Up.* Foreign Policy, Retrieved from: https://foreignpolicy.com/2022/10/13/food-crisis-wfp-chief-economist-gulf-countries-economy/

LIEN, T. (2022). *How COP27 became the food systems COP.* Greenbiz. Retrieved from: https://www.greenbiz.com/article/how-cop27-became-food-systems-cop

LINS, N. (2022). *Letter from EP AGRI Committee to Mr Janusz Wojciechowski Commissioner for Agriculture.* POLITICO. Retrieved from: https://www.politico.eu/wp-content/uploads/2022/03/10/STAMPED_D20227683_Lins-Wojciechowski_Ukraine.pdf

MENEGAT, S. ET AL. (2022). "Greenhouse gas emissions from global production and use of nitrogen synthetic fertilisers in agriculture." *Scientific Reports,* 12.

MINTER, A. (2022). *One reason for rising food prices?* Chinese hoarding. Bloomberg. Retrieved from: https://www.bloomberg.com/opinion/articles/2022-01-05/one-reason-for-rising-food-prices-chinese-hoarding

PETROPOULOS, V. (2022). *Algeria's Foreign Policy: Facing a Crossroads.* Washington Institute. Retrieved from: https://www.washingtoninstitute.org/policy-analysis/algerias-foreign-policy-facing-crossroads

PRIMA. (2020). *Future Scenarios for EuroMed Agrifood*. Retrieved from: http://www.primaitaly.it/wp-content/uploads/2020/10/Report-en-web-3.pdf

RAMPA, F. ET AL. (2020). *Eu trade policy for sustainable food systems,* IPES-Food. Retrieved from: https://ipes-food.org/_img/upload/files/Brief_EU%20trade%20policy_ICDPM-IPES%281%29.pdf

SCHIAVO, M. ET AL. (2021). *An agroecological Europe by 2050: What impact on land use, trade and global food security?* IDDRI. Retrieved from: https://www.iddri.org/en/publications-and-events/study/agroecological-europe-2050-what-impact-land-use-trade-and-global-food

TANCHUM, M. (2022). *Morocco counters Russia's weaponization of the food-energy nexus.* Middle East Institute. Retrieved from: https://www.mei.edu/publications/morocco-counters-russias-weaponization-food-energy-nexus

TANCHUM, M. (2021). *The Fragile State of Food Security in the Maghreb: Implication of the 2021 Cereal Grains Crisis in Tunisia, Algeria, and Morocco.* Middle East Institute. Retrieved from: https://www.mei.edu/publications/fragile-state-food-security-maghreb-implication-2021-cereal-grains-crisis-tunisia

UNICEF. (2019). MENA Generation 2030: An Opportunity to act now. Retrieved from: https://www.unicef.org/mena/reports/mena-generation-2030

UNITED NATIONS. (2022). *Black Sea Grain Initiative Joint Coordination Centre.* Retrieved from: https://www.un.org/en/black-sea-grain-initiative/vessel-movements

WAX, E. AND ANDERSON, E. (2021). *The transatlantic relationship descends into a food fight.* POLITICO. Retrieved from: https://www.politico.eu/article/farm-to-fork-europe-united-states-food-agriculture-trade-climate-change/

ZERROUKY, M. (2022). *In Algeria, Macron extends hand of reconciliation.* Le Monde. Retrieved from: https://www.lemonde.fr/en/le-monde-africa/article/2022/08/26/in-algeria-macron-extends-hand-of-reconciliation_5994858_124.html

ZUBEL, K. AND APPRIOUAL, A. *Agriculture and food security in climate sensitive areas in the Mediterranean.* IEMed. Retrieved from: https://www.iemed.org/publication/agriculture-and-food-security-in-climate-sensitive-areas-in-the-mediterranean/

An Elephant in the Room: The EU's Common Agricultural Policy and Food Security in the Euro-Mediterranean Region

Marko Lovec
Associate Professor at the University of Ljubljana,
Faculty of Social Sciences

Introduction

The Russian aggression against Ukraine triggered unprecedented food, energy and fertiliser price spikes, building on the already high prices due to COVID-19 related disruptions in supply chains and underinvestment. The Southern shore of the Mediterranean, one of the world's largest importers of wheat to feed growing urban population has been particularly affected due to macroeconomic pressures, political instability and constrained natural conditions for food production, including scarcity of water and fertile land, aggravated by climate change. Agricultural producers, mainly represented by smallholders, faced various vulnerabilities. Across Europe, farmers and consumers also faced pressures of growing food and input prices that especially impacted those in a weaker socioeconomic position. In Southern parts of Europe there were reports of shortages of some of the basic commodities imported from outside the European Union (EU).

The recent crisis is not the first to have raised the importance of food security for human security, i.e. political and socioeconomic stability and progress in the Euro-Mediterranean region; this happened already during food and energy price spikes in the 2006-2008 period and again in the early 2010s. At the time, global players such as China and India attempted to ensure their own food security by interfering with trade and creating stocks, thus 'externalizing' food insecurity. Strong interdependencies and certain leverage in the Euro-Mediterranean region (e.g. individual big exporters of food, fertilisers and energy) called for a strategic and coordinated response.

While food security in the Euro-Mediterranean region has periodically received increased political attention, this has been insufficient to support strategic cooperation on agriculture and food. Occasionally, fingers have been pointed at the EU's Common Agricultural Policy (CAP), an agricultural subsidy programme that still accounts for over a third of the EU budget which has, since its inception in the 1960s, supported production in the EU and contributed to import dependence of South Mediterranean countries. Since the late 1980s, in the context of multilateral trade liberalisation and of overproduction in Europe, the CAP has been reformed; most distorting price and production supports have been replaced with direct payments and a stronger focus has been put on environmental and social issues. In parallel, attempts were made to deepen trade in agriculture in the region and support policy initiatives mirroring the CAP developments. However, due to a lack of political will to address structural challenges, the progress was limited. The role of other players in the region grew. Eventually, the process of regional integration in agriculture stalled. The recent food security crises triggered pressures to reverse the CAP reforms and intensify production in the EU to 'feed the region'. While this could potentially, but not necessarily, increase availability of food on the short run, it goes against the strategic need to strengthen the CAP reforms to better address socioeconomic and environmental challenges and better use available resources to support sustainable production development in the South Mediterranean.

The chapter is divided into two parts. The first part revisits the role of past CAP reforms and liberalisation of trade in agriculture in the region by building on existing literature and research. The second part presents original document and report-based research of how the recent food security crisis feeds into mid- and short-run CAP developments. Key conclusions and recommendations are presented in the final section of the chapter.

The impact of CAP reform and trade liberalisation on food security in the Euro-Mediterranean region

The CAP, a broad socioeconomic policy that was an essential part of European integration since its inception in the 1960s[31], resulted in overproduction in the 1980s and the need for reform that went in parallel with multilateral trade liberalization in agriculture. Since the latter impacted long established ties in trade in agriculture in the region, the EU proposed to liberalise agricultural trade and support regional development initiatives. The process, however, largely fell short of expectations due to a lack of prioritisation and political blockades. This section revisits CAP reforms, trade liberalisation and their impact on food security.

CAP reforms

The price and production support measures of the early CAP, which were especially strong for northern/temperate zone products such as cereals, stimulated production growth. In the 1980s when the European Economic Community (EEC) became self-sufficient, growing budget funds were required to remove product from the market to prevent pressures on prices. Overproduction was often dumped on global markets using export subsidies. This triggered tensions between net budget receiving and net contributing countries as well as with other food exporting countries. Ideas of curbing price supports were resisted by countries with smaller farms. Environmental concerns about the impact of intensive production also became increasingly salient. Due to veto-based decision making, the CAP was difficult to change which led to several budgetary crises and temporary policy solutions such as the introduction of production quotas.

The game changer was the Uruguay round of trade negotiations under the General Agreement on Tariffs and Trade (GATT), launched in 1986, that involved the liberalisation of trade in agriculture. In 1992, the "MacSharry" reform replaced part of the price supports of key commodity groups with compensatory payments, thus anticipating the Uruguay Round Agreement on Agriculture (URAA) signed in 1994 which prohibited the most trade distorting measures ('red box') and limited other types of distorting supports ('amber box'), while allowing compensatory measures ('blue box') and measures de-linked from price or production ('green box'). In 1999, to further curb overproduction and get the CAP in line with the evolving trade regime, the "Agenda 2000" reform replaced remaining price supports with compensatory payments. In 2003, soon after the Doha Development Round (DDR) was launched under the World Trade Organization (WTO), the "Fischler" reform introduced direct payments that were decoupled from production (i.e., farmers were no longer required to produce food to be entitled to those payments). In 2008 the Health Check reform brought the remaining market supports (including to Mediterranean products) into direct payments schemes. Later, despite a standstill in the multilateral trade negotiations, the EU remained committed to international trade rules, apart from some

The game changer was the Uruguay round of trade negotiations under the General Agreement on Tariffs and Trade (GATT)

[31] CAP was an essential part of the agreement between Germany and France on the European Economic Community (EEC), which is sometimes considered as a tariff union with the CAP, and for a long time was the only fully 'communitarized' policy that accounted for the bulk of the total EEC expenditures.

recoupling of supports during the 2013 reform.[32]

Simultaneously, growing awareness of negative impact of intensive agricultural production on the environment and concertation of the CAP subsidies with big farmers and landowners triggered policy reorientation towards new sustainability objectives. The 1999 reform introduced the CAP Pillar II to co-fund structural measures as a part of the national rural development programmes and introduced various environmental measures. The 2003 reform conditioned direct payments upon compliance with Good Agricultural and Environmental Conditions (GAEC) and introduced modulation (transfer) of a 5% part of individual direct payments above €5,000 to Pillar II. The 2008 reform increased modulation to 10% and introduced degressive capping by 4% of largest individual payments above €300,000. The 2013 reform introduced per area payments and conditioned 30% of direct payments to larger farms with implementation of green measures such as keeping existing permanent grasslands, crop diversification and introduction of ecologic focus areas (EFAs).

COMMON AGRICULTURAL POLICY (CAP)
REFORMS AND REFORM DRIVERS

	1990s *1992 MacSharry and 1999 Agenda 2000*	2000s *2003 Fischler and 2008 Health Check*	2010s *2014-2020 Greening reform*
Market measures (CAP Pillar I)	Reduction	Phase out	Safety net, some recouping
Direct supports (CAP Pillar I)	Compensatory payments	Direct payments decoupled from production, conditionality, different payment scheme	Area-based payments, convergence and greening
Co-funded structural supports (CAP Pillar II)	Introduced	Modulation and degressive capping	Flexibility to switch funds between the pillars
Trade	Uruguay Round Agreement on Agriculture	Doha Development Round	
Budget		Multiannual Financial Framework (2000-2006; 2007-2013)	Multiannual Financial Framework (2014-2020)
New objectives		Environmental-social objectives	
Voting rules and procedures	Qualified Majority Voting	Qualified Majority Voting	Co-decision

IEMed.
euromesco

Source: Prepared by Marko Lovec based on Lovec (2016).

[32] Parallel to the CAP reforms, to prevent disagreements on the CAP from resulting in blockades of the EU budget negotiations causing implementation delays, Multiannual financing Frameworks (MFFs) were introduced in the late 1980s. MFFs increased transparency of CAP costs and competition over other EU funded programs thus helping to curb expenditures growth, e.g. in the context of the planned Eastern enlargement. At the same time, status-quo bias of veto-based MFF negotiations enabled conservative countries to block changes in distribution, thus slowing down the reform. The increased diversity and blockades in the process made CAP increasingly flexible in terms of support schemes and payment levels.

Despite those changes, the CAP payments (approximately €50 billion a year) continued to heavily subsidize individual (large) producers in the EU as well as certain intensive practices. Capitalization of payments in land prices hindered restructuring and generation renewal. Critics argued that payments should account for actual costs of conditionalities and provision of public goods and that Pillar I and parts of Pillar II should be abandoned.

Introduction of the qualified majority vote (QMV) to CAP in the 1980s and the change in European Commission (EC) nomination procedures strengthened its ability to push for more ambitious reforms (Pokrivcak et al., 2006), hence "MacSharry" and "Fischler" reforms, named by Commissioners of Agriculture. Environmental groups, challenging exclusive role of farm lobbies, and path dependency of the reform process also played a role. In contrast, the co-decision procedure brought by the Lisbon Treaty of 2009 enabled the European Parliament and Council to change the EC's proposals more easily, thus (along with weaker external pressures due to multilateral trade negotiations stalling) slowing down the reform in the 2010s and after (Crombez et al., 2012).

Euro-Mediterranean trade and cooperation in agriculture and food

In 1995, parallel with the URAA and the 1990s CAP reforms, the EU launched the Barcelona process which within the Euro Mediterranean Partnership (EMP) aimed to establish a free trade area by 2010 through bilateral agreements between EU and individual Mediterranean Partner Countries (MPCs) (the Association Agreements [AAs]) and between MPCs themselves.[33] Trade liberalisation would be based on the asymmetry principle to account for different development levels and would include development aid targeting sustainability objectives, corresponding to evolving CAP objectives. In the area of agriculture and food, the process aimed to "modernise, restructure, integrate rural development, promote environmentally friendly practice, water management and fight against desertification" based on "exchange of experiences, know-how, technical assistance and training" (Barcelona Declaration, 1995). In 1996, the Mediterranean Development Aid (MEDA) facility was adopted to provide financial aid.

However, the process went slowly and mostly targeted the existing trade ties that were impacted by multilateral trade liberalisation. In the EU, trade liberalisation was opposed by Southern members and farm lobbies acting through the European Parliament's Committee of Agriculture (COMAGRI) due to increased competition in Mediterranean products that were, within CAP, unequally supported, while Northern members that were already net CAP budget contributors refused to provide additional funds (García et al., 2002, p. 401, 410). On the Southern shore, individual MPCs faced pressures due to preference erosion (Tangermann, 1997) and decline in fiscal revenues from tariffs (García et al., 2002, p. 412) while their exporters still faced complex non-tariff barriers (NTBs), issues with lack of stor-

[33] After the establishment of the EEC in the 1950s several South Mediterranean countries enjoyed some form of preferential access to the Community market. Up until the 1990s, the EU was the main trade partner of South Mediterranean countries. Most of the trade was from Maghreb (Morocco, Algeria, Tunisia) to Italy, Spain and France and concentrated on individual products. The EU mostly exported subsidized northern products such as wheat and imported southern products such as fruits, vegetables, and olive oil (Abis, 2011).

age and logistics infrastructure (ibid., p. 405). Meanwhile, in the MEDA facility (just under €1 billion per year in the period 1996-1999) only 2% was allocated to agriculture (most of which went to northern products) (García et al., 2002, p. 410-411) – in sharp contrast with hundreds of billions of euros allocated to EU farmers in the same period.

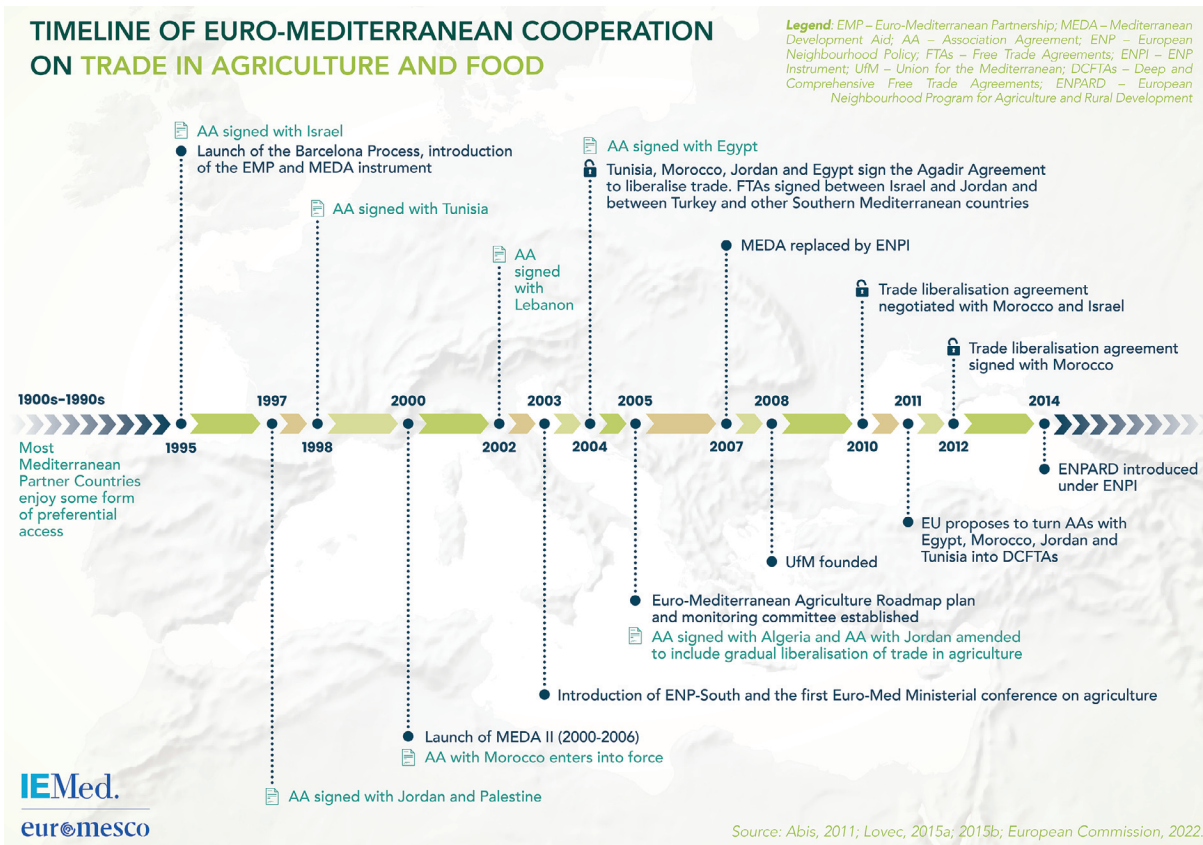
By the early-2000s, AAs were signed with most of the MPCs but with limited progress on trade liberalisation in agriculture. In 2003, the EMP was integrated into the European Neighbourhood Policy (ENP)-South. MEDA-II for the period 2000-2006 had a budget of €5 billion, which was similar to MEDA-I. In 2003, agricultural ministers from the Euro-Mediterranean region met in Venice. They saw DDR, EU enlargement and the CAP reform of 2003 as opportunities to strengthen agricultural ties to meet liberalisation objectives by 2010 (Euromed ministerial, 2003). Ideas discussed involved a shift towards quality, environment and rural development (Euromed ministerial, 2003), reflecting concerns over NTBs and CAP developments at the time. The same year, the Agadir agreement was launched, involving Jordan, Egypt, Morocco and Tunisia, with the intention to integrate and strengthen fragmented South Mediterranean market.

The EU still proposed to turn AAs with Morocco, Jordan, Tunisia and Egypt into Deep and Comprehensive Free Trade Agreements (DCFTAs), but with slow to no progress

In 2005, at the Barcelona Process anniversary conference in Barcelona, the Euro-Mediterranean Agriculture Roadmap, the new 5-year work plan, was adopted to liberalise agricultural and food trade, based on the asymmetry principle, excluding products EU considered sensitive. Its implementation was to be monitored by a special committee. However, the food and energy price spike caused reluctance on the side of the MPCs. The period brought the new ENP Instrument (ENPI) to run in the period 2007-2013 but without any additional emphasis on agriculture and food. The Union for Mediterranean (UfM), established in 2008, did not list agriculture and rural development as one of the priorities. The joint declaration did refer to food security, climate change, desertification, water management and food safety as partnership themes. Later, Ministers for Foreign Affairs identified four themes to achieve progress in agricultural cooperation: sustainable development of rural areas, promotion of quality products and geographical indications (GIs), strengthening sanitary and phytosanitary (SPS) standards and coordinating agricultural research and training. Meanwhile, countries such as US, Russia, Ukraine, Canada, Argentina and Brazil strengthened their position in the regional agriculture and food markets (Abis, 2011).

The global financial and economic crisis turned attention towards domestic issues. It increased divisions within and between both parts of the shore which, frustrated by the Barcelona Process, turned towards turned alternative partners and strategies.

The EU still proposed to turn AAs with Morocco, Jordan, Tunisia and Egypt into Deep and Comprehensive Free Trade Agreements (DCFTAs), but with slow to no progress. In 2010, the EU and Morocco reached an agreement on progressive liberalisation of trade in agriculture and food that would leave quotas only for a handful of the most sensitive products and involved the GIs. Following opposition from the farm lobbies backed by COMAGRI, agreement was blocked and only adopted by the European Parliament's plenary in 2012 after additional safeguards were introduced. NTBs such as SPS measures and standards were identified as topics relevant to the EU's aid. Still, there was limited action to address those challenges.



In the 2014-2020 CAP reform there were elements that could advance regional cooperation such as those on regional market transparency, supply and demand management (including through regional producer organisations (POs) and inter-branch organizations (IBOs)) geared towards quality, learning from structural measures and the Eastern experience on coexistence of small and large farms, LEADER, NGO involvement and public research cooperation (European Innovation Partnership-EIP) (Compés et al., 2013). The new ENP (2014-2020) established the European Neighbourhood Programme for Agriculture and Rural Development (ENPARD) to run by 2020 with two axes corresponding to the CAP: modernisation and rural development, in addition to a horizontal component. However, the opportunities for cooperation were overshadowed by the economic crisis, changing geopolitics and lack of finance. With limited funding (relative to CAP), the ENPARD was an empty shell (Compés et al., 2013).

Impact of the CAP and trade liberalisation on food security in the region

The impact of domestic policy on food security is not easy to assess because of many interrelated policies and factors, such as agriculture, trade, aid, macroeconomic policy, as well as different impacts on net food importing and exporting countries, on consumers and producers, and different short- and long-term effects, among other things.

The EU is in general not considered food insecure due to the size of its production,

The CAP reforms have positively contributed to global food security

production potential and reliable imports (Zahrnt, 2011). The CAP reforms have positively contributed to global food security since the removal of most trade distorting measures such as export subsidies increased competitiveness and investment in agriculture in developing countries and rural areas where most of the poor and food insecure live. Bureau and Swinnen (2017) note that some question the positive impact of export-oriented agriculture on food security and development but argue that this is essential to divert from self-subsistence farming related to underdevelopment and rural poverty. Meanwhile, the remaining coupled supports and poor targeting of payments still support production in the EU (and related controversial impacts such as environmental degradation and biodiversity loss). To address food security concerns, this money could be better spent on more targeted measures, including development initiatives in these third countries (Driouech et al., 2014; Matthews, 2014).[34]

Simultaneously, the EU has significantly opened to imports from the less developed countries, including through initiatives that grant asymmetric access such as Everything But Arms (EBA). In the case of the individual South Mediterranean countries this may have had adverse effects depending on previous preferential positions. Importantly, some constraints to trade remain in place such as import quotas and restrictions on sensitive product groups. On the other hand, standards and requirements that are often seen as an obstacle to trade are there to prevent the spread of diseases in animal products and protect the consumer and can be an opportunity for additional employment of skilled labour (Bureau & Swinnen, 2017). While trade can generate a negative impact for the environment by incentivising production in places with weaker regulation, the EU's trade policy means that preferential access is conditional on implementation of international conventions including those on environmental protection (Blanco, 2018).

Apart from agriculture and trade policy, cooperation in other policy areas is also important concerning functioning of the agricultural and food systems. According to Malorgio and Solaroli (2012), development of sustainable food systems in the region would require further policy coherence, especially on water, land use, biodiversity, food safety and nutrition. While trends show some convergence between the EU and Southern Mediterranean countries, policies such as protection of traditional products, diets and standards are poorly developed on the Southern shore (Malorgio & Solaroli, 2012). The EU should thus combine with trade liberalisation support policies on education, healthy diets, contractual forms of supply, market transparency, quality, GIs, and rural development (Malorgio & Solaroli, 2012). The problems of small farms and inefficiency could be addressed via financial mechanisms such as supply of targeted financial services to rural areas and promotion of agro-industrial and research clusters (Mori, 2017).

The new mid-term policy amidst the food security crisis

The war in Ukraine brought disruptions in supplies and triggered price increases that

[34] Meanwhile, other domestic policies such as biofuel support and food aid policy have had some controversial effects. Biofuel policy which is intended to reduce greenhouse gasses has been due to its impact on food prices and the environment revamped through tightening of standards (Bureau and Swinnen, 2017).

added to the existing disruptions caused by the COVID-19 pandemic. Arguments were put forward for the EU to reverse CAP reforms and boost domestic production and exports by removing environmental requirements. Such proposal, while potentially increasing supplies in the short term, could have a negative impact on the long-term socioeconomic and environmental sustainability of the agriculture and food systems. The purpose of this section is to evaluate the medium-term CAP developments and the proposed responses to the current food security crises.

The CAP 2023-2027 and the new ENP South

In 2017, the EC published its strategic paper "The Future of food and Farming" followed by the publication of proposed new CAP legislation for the period 2021-2027 in 2018 (European Commission, 2018a). The main novelty was that member states would now have more flexibility in defining CAP measures on the operational level. At the same time, to make sure EU taxpayers' money is used in responsible ways, member states would have to programme spending for both pillars within the national strategic plans. The second major novelty was the new green architecture that would include voluntary ecological Energy Complaint Obligation (ECO) schemes to replace greening that was criticized for bureaucracy and poor impact by farmers and environmental NGOs, and a new GAEC that included better targeted conditionalities, such as protection of wetlands and peatlands. The proposal also increased flexibility to switch funds between Pillars I and II and increased national cofounding of Pillar II due to expected reduction of funds available in the post-Brexit MFF. Further steps in decoupling, convergence, capping of largest payments and redistribution towards smaller and mid-sized farms were also foreseen.

The several hundred pages long impact assessment (European Commission, 2018b) attached to the proposal mentioned food security 31 times, with most references occurring in the first 'political' part of the text and in the part on policy coherence. In contrast to the global impact assessment that was part of the 2014-2020 CAP proposal, the assessment attached to the latest proposal recognized the relevance of the CAP for the Policy Coherence for Development (PCD), a commitment introduced by the Lisbon Treaty (art. 208). Reference was made to the 2015 Paris Agreement on climate change and Sustainable Development Goals (SDGs), with food security, poverty and equality being explicitly recognized as relevant for the CAP.[35]

Still, rather than the CAP itself, the impact assessment highlighted trade (open rules-based trade, preferential access) and aid policy (support for GIs and participation of Africa in Horizon programme) as key policy mechanisms concerning PCD. While reiterating compliance of the reformed CAP with the multilateral trade rules, the assessment recognized a strong distortive effect of the remaining (voluntary) coupled support (currently part of the blue box and expected to move in the amber box in the future negotiations). It also recognized that some of the proposed changes in the risk management measures, such as increased crop insurance, would make those instruments qualify as amber box supports, along with the existing emergency market measures but also stated that the EU was

The main novelty was that member states would now have more flexibility in defining CAP measures on the operational level

[35] According to Candel and Biesbroeck (2018) food security crisis created a significant push for policy coherence that impacted political and instrument level, but the progress was unequal between different fields and through time.

still much below its ceiling of total aggregate support (€72 billion). While asserting the non-distorting role of the decoupled payments, accounting for the bulk of the CAP's subsidies, the assessment argued that some variations of the proposed ECO schemes could contradict the green box criteria for failing to compensate only for the additional costs or income foregone. Thus, at least implicitly, the text recognized that the CAP supports should be better targeted to avoid ongoing distortions.

Table 1. Production distortive effect of proposed CAP 2023-2027 policy interventions

Policy intervention	Distortive effect
Decoupled direct support	0
Coupled support	--
Risk management tools	-
Eco-scheme	0/-
Market measures	0/-

Source: European Commission, 2018b

The legislative proposal was criticized for the lack of ambition, as the strategic plans will reiterate the existing shortcomings of the programming of the Pillar II while keeping the controversial instruments (Lovec et al., 2020). The strongest criticism referred to the lack of sufficient attention to the negative impact of agriculture on climate and biodiversity loss, which made agriculture itself increasingly vulnerable.[36] The issue of trade and PCD was not very salient in the debates. Several member states who are big producers of agricultural products opposed further decoupling. Due to delays in Brexit, budget negotiations were also delayed, and EU member states and the European Parliament were reluctant to engage in CAP negotiations until financial issues were settled. Introduction of the new CAP was postponed to 2023 and the existing CAP (2014-2020) was extended for two years. Following the 2019 European Parliament elections, the EPP and S&D coalition lost its majority and was joined by ALDE-Renew, which in the past supported more progressive CAP reforms. The Greens also strengthened their position in Parliament. The new EC led by Ursula von der Leyen has put the European Green Deal (EGD) – sustainable transformation agenda – at the centre of its programme presented in 2019. In the field of agriculture, two specific strategies were published in 2020: Farm to Fork and Biodiversity strategy, which introduced targets to increase the share of organic farming to 25% of lands, halving pesticides and antimicrobial resistance (AMR) risk, reduce fertilizer application by 20% and devote 10% of agricultural lands to biodiversity conservation (European Commission, 2020a; 2020b). The EGD also considered trade measures to prevent export of environmental degradation to countries with looser regulation (European Commission, 2019).

[36] Agriculture accounts for 10% of total GHG, two thirds of which are contributed by animal production and nitrogen-based fertilizers. This number does not account for land. Covering 40% of lands in the EU, agriculture is the main contributor to land use related climate change and biodiversity loss, including due to production of feedstock and biofuels. Thus, CAP should be used to reduce GHG, environmental degradation and biodiversity loss, especially by abandoning supports for intensive animal production, supporting extensive grazing, restoration of habitats and soils, carbon farming and rural areas (Recanati et al. 2019; Pe'er and Lakner 2020).

However, member states and the European Parliament voiced concerns due to lack of impact assessment and their involvement in the process of drafting those two strategies and said any inclusion in CAP instruments would have to be based on passing the legislation first (with co-decision giving the European Council and the European Parliament a veto right). Meanwhile, the Recovery and Resilience Facility (RRF) designed to boost post-pandemic recovery provided additional funds also for CAP Pillar II and for horizontal objectives such as research.

The final agreement on the new Multi-annual Financial Framework (MFF) 2021-2027, reached in Summer 2020, provisioned €387 billion in total, €291.1billion for Pillar I (EAGF) and €95.5billion for Pillar II (EAFRD) (RRF/Next Generation fund included), thus preserving the CAP budget in nominal terms. In autumn 2020, European Council and European Parliament adopted their positions on the proposed new CAP legislation, followed by trialogues that were concluded by June 2021 and by formal adoption of new regulations on 2 December 2021 (FRS, 2021).

In the package deal over MFF and CAP and in the co-decision procedure, strategic planning requirements were further relaxed (see Regulation EU 2021/2115) compared to the initial proposal by the EC. The EGD-related targets included in the strategic plans would not be part of the EC's assessment. Voluntary ECO schemes were set at 25% of direct payments and included a broad array of measures such as organic farming, agro-environmental and climate measures, and animal welfare. Agreement introduced a compulsory redistribution of 10% of funds to smaller and medium sized farms, an increase in support for young farmers, conditionality with respect to labour laws and attention to gender equality concerns. Those progressive but still rather symbolic elements were added following insistence by the European Parliament (FRS, 2021). The EC's proposal of further decoupling was rejected. Fruit, vegetable and wine sectors and POs received additional supports. The crisis reserve was set at €450 million.

The final agreement was criticized by environmental NGOs. While failing to address major issues, the agreement did introduce some progressive steps towards better targeting of CAP payments and better targeted instruments to address environmental and social sustainability. This could improve incentives for trade and production in the Southern shore of the Mediterranean and support development and transfer of certain sustainability-oriented practices and technologies.

While failing to address major issues, the agreement did introduce some progressive steps towards better targeting of CAP payments and better targeted instruments to address environmental and social sustainability

In 2021 (2020 marked the 25th anniversary of the Barcelona Process), the EC and the High Representative for Common Foreign and Security Policy, as a part of its trade policy review, presented the new ENP South policy agenda titled *A Renewed Partnership with the Southern Neighbourhood – A New Agenda for the Mediterranean* (European Commission, 2021a) and the economic and investment plan for the Southern neighbours (European Commission, 2021b).

Agriculture was referred to in the section on climate and energy transition (European Commission, 2021a, p. 3). The text proposed a reduction of NTBs and implementation of trade agreements, referring to the existing framework of DCFTAs with Morocco and Tunisia and dialogues with others, including on issues of investment, sustainable development and, "when relevant", also "agriculture" (European Commission, 2021a, p. 10). The section on "sustainable food systems" referred to

"strengthened cooperation on sustainable management" and "preservation of natural production factors to strengthen food security", in the form of trade and policy development support (proposals on supply and value chain management were spelled out in the section on fisheries) (European Commission, 2021a, p. 20). However, the investment plan which aimed to concretize the strategy only made a few remarks on agriculture and food, mostly in terms of the existing initiatives.[37]

EU's response to the recent food security crisis

The Farm to Fork and biodiversity strategies faced strong criticism from the farming community

In the context of the COVID-19-related disruptions in the supply chains and growing food security concerns, the Farm to Fork and biodiversity strategies faced strong criticism from the farming community. The impact assessments of Farm to Fork and biodiversity strategy (Barreiro et al., 2021; Beckman et al., 2020; Henning and Witzke, 2021) projected that their full implementation would result in strong declines of supply by 10-20% in key EU sectors such as cereals, dairy, beef (vegetables and permanent plants would be less affected), increases in prices of up to 17%, a 20% reduction of exports and a decline in farm incomes. Globally, reduced supply resulting from the implementation of those two strategies would trigger price increases of 9%, increasing food insecurity for 22 million (Beckman et al., 2020). As a result, concerns were voiced by development NGOs (Dekeyser and Woolfrey, 2021). At the same time, greenhouse gas reduction of 100 million tonnes of CO2 equivalent per year, 30-50% would be leaked, while the remaining 50% would account for a positive impact on land use and land use change (LULUC), which is related to methodological issues (Barreiro et al., 2021; Henning and Witzke, 2021; Ducros, 2022).

However, the impact assessments attracted criticism for narrow assumptions, e.g., for not taking into account gradual phase-in period which would support adaptation via innovation, for treating pesticide risk reduction the same as pesticide reduction and for not accounting for the marginal impact of fertilizers reduction (e.g. 20% reduction means 5-10% reduction in productivity), as well as for not considering upscaling of certain sustainable practices such as impact of availability of fallow land on the increase in extensive production (Zimmer, 2020). Also, the proposed new trade rules would prevent externalization and promote application of similar standards and innovation elsewhere.

In the context of war in Ukraine, the EU's farm lobbies pushed for extraordinary measures to enhance production on fallow land and on EFAs, relax GEAC and allocate temporary market support from the crisis reserve fund. Proposals were supported by COMAGRI rapporteurs. In March 2022, the AGRIFISH Council also proposed temporary derogation from certain greening obligations while maintaining the full level of the payment. Conservative actors took advantage of the war in Ukraine context to also call for reviewed targets and a time plan for Farm to Fork and biodiversity strategy. In response, the EC proposed to make available €500 mil-

[37] The references included the FLAGSHIP 4 project on green, circular and blue economies listed investment in agriculture and fisheries in Algeria (European Commission, 2021b, p. 3) and Jordan as a part of the initiative on the energy-water-food nexus (European Commission, 2021b, p. 6). The FLAGSHIP 13 on sustainable food systems, agriculture and rural development listed investments in productivity, better use of resources including protecting the environment and addressing demographic challenges, referring to Morocco's Green Generation initiative (European Commission, 2021b, p. 8).

lion in emergency aid from the crisis reserve (in total €1.5 billion, together with member state top up) to support farmers and small and medium enterprises (SMEs) affected by input price rises and in 2022, allowed derogation of certain green obligations to bring additional land into production and increased levels of advanced direct payments. At the same time, the EC also said it will increase incentives to prioritize investment to reduce energy and fertilizer dependencies and sustain environmental ambitions such as investment in sustainable biogas production, and precision and carbon farming.

While derogations could potentially bring additional food to the markets in the coming year(s) (so far, this has not proven to be the case), this would come at a price of long term sustainability risks (Ducros, 2022). The EU itself was not food insecure; cereals self-sufficiency was 112% but as much as 61% were used for animal feed (Ducros, 2022). Use of 4% of fallow land for production due to lower productivity would disproportionally increase fertiliser intensity. The EU's emergency aid was used to support the livestock sector (e.g., in France) or to purchase fertilisers (e.g., in Poland), thus contributing to the increase in (global) cereal and input prices, reducing efficient use of those commodities and negative environmental impact (Ducros, 2022). The expected decline of agricultural and food prices in the coming years would add socioeconomic sustainability risks. Instead, it would be much better to strengthen market transparency and deploy strategic stocks such as those by the World Food Programme (Ducros, 2022), by increased funding if needed. Additionally, subsidies for production of biofuels could be abolished and fallow land used to produce protein crops used for feed and to grow sunflowers that require little nitrogen. Currently, only 1% of agricultural land in the EU is devoted to producing protein feed, which is in most part imported (with limited regulation to keep low input prices for animal sector) and often results in sustainability pressures in other parts of the world (Willard, 2022).

Meanwhile, big countries, such as France, Germany, Spain and Italy, are far from reaching targets relevant to Farm to Fork and biodiversity strategies, such as on organic farming, extensive grazing and biodiversity and carbon rich wetlands and peatlands considered essential to address long term sustainability risks (Willard, 2022; Schebesta & Candel, 2020). Extensification, which is key for soil protection and making land available, including for biodiversity conservation, should be further pursued, e.g. via livestock density limits (Willard, 2022). Measures should also be introduced to reduce food waste and meat consumption (Ducros, 2022).

Conclusion: how to make the CAP better deliver better on food security in the region

The purpose of this chapter was to explore the important but often neglected impact of the EU's CAP on cooperation on agriculture and food security in the Euro Mediterranean region.

Research demonstrates that, in the context of multilateral trade liberalisation, during the last 30 years, the CAP underwent substantial reforms during which (most) trade distorting price and production supports were largely replaced by direct payments whose orientation has been shifting towards new environmental and social expectations. In parallel, initiatives were launched to deepen trade in the region and support policies that would mirror new CAP objectives and instruments. However, the attempts fell short of expectations due to political blockades and failures to address structural challenges. Within the CAP, a

persisting issue is that part of the payments that remains coupled to production and there is poor targeting of support. To address food security in the region, it would be better to remove those payments and invest money in sustainable practices both within and outside EU. The CAP could also be engaged in the management of value chains via regional producer and inter-branch organisation and quality enhancement schemes, and to transfer experience from the Eastern enlargement of balancing between big and small farms and rural development.

The decision-making on the CAP 2023-2027 demonstrated steps towards evidence-based policy on environmental and social sustainability, but also ongoing political constraints due to veto-based budget negotiations and co-decision CAP legislation procedure

The decision-making on the CAP 2023-2027 demonstrated steps towards evidence-based policy on environmental and social sustainability, but also ongoing political constraints due to veto-based budget negotiations and co-decision CAP legislation procedure. The EGD and additional funds from the RRF enabled to set the stage for stronger sustainability transformation in agriculture and food. However, the food security crises brought pressures that stalled and even reversed the policy trend by raising arguments for intensifying production in the EU. While this could potentially (but not necessarily) positively impact supplies in the short run, it brings long term risks such as unsustainable production in the EU and lack of investment in production outside the EU. Instead, in line with the EGD, what should be done is to, strengthen targeting of climate and biodiversity as well as socioeconomic concerns within CAP, parallel with trade measures to prevent the 'externalisation effect'. The EU should support regional cooperation on standards, market and value chain management (producer and inter-branch organisations, quality schemes) and practices mirroring the CAP. Priority areas should include source-efficiency, extensive production models, rural development and sustainable energy production on farms. For Southern shore participants, EU instruments such as EIP, LEADER and various Pillar II measures could be co-funded by ENP-South. The horizontal role of the EU's sustainable transformation and enhanced geopolitical agenda, decoupling of CAP from the MFF negotiations and increased public awareness of the role of European Parliament in the process offer some opportunity for such a reform.

References

ABIS, S. (2011). *Liberalisation of agriculture trade and food security cooperation*. Euromed survey.

BARREIRO, H. ET AL. (2021). *Modelling environmental and climate ambition in the agricultural sector with the CAPRI model.* Publications Office of the European Union. Luxembourg.

BECKMAN, J. ET AL. (2020). *Economic and Food Security Impacts of Agricultural Input Reduction Under the European Union Green Deal's Farm to Fork and Biodiversity Strategies.* U.S. Department of Agriculture, Economic Research Service.

BLANCO, M. (2018). *The impact of the Common Agricultural Policy on developing countries.* European Parliament. Directorate-General for External Policies.

BUREAU, J.-C. AND SWINNEN, J. (2017). EU Policies and Global Food Security. *Foodsecure Working paper, 58.*

CANDEL, J. J. L., BIESBROEK. R. (2018). Policy integration in the EU governance of global food security. *Food Security, 10, 195–209.*

COMPES LOPEZ, R. ET AL. (2013). CAP reform and Euro-Mediterranean partnership: lessons for a new agenda of cooperation. *CIHEAM Watch Letter no 27.*

CROMBEZ, C. ET AL. (2012). Reform of the common agricultural policy under the codecision procedure. *Intereconomics, 6,* 336–342.

DEKEYSER, K., WOOLFREY, S. (2021). A greener Europe at the expense of Africa? Why the EU must address the external implications of the Farm to Fork Strategy. *ECDPM brief, 13.*

DRIOUECH, N. ET AL. (2014). Exploring linkages between the Common Agricultural Policy and food security in the Mediterranean region. In: Kowalski, A., Wigier, M., Dudek, M. (eds.) *The new EU agricultural policy - continuation or revolution?* pp. 183-211.

DUCROS, E. (2022). Global food crisis: Europe must choose between retreat and responsibility. *European Issue 627.* Fondation Robert Schuman.

EURO-MEDITERRANEAN MINISTERIAL CONFERENCE ON AGRICULTURE. (2003, November 27). Conclusions of the Euro-Mediterranean Ministerial Conference on Agriculture. Retrieved from: http://www.iamb.it/share/img_new_med-it_articoli/364_02lacirignola.pdf

EUROPEAN COMMISSION. (2018a). Proposal of Strategic plans regulation, Horizontal regulation and CMO regulation. COM/2018/392 final - 2018/0216 (COD).

EUROPEAN COMMISSION. (2018b). Impact Assessment Accompanying the Proposals for a Strategic plans regulation, horizontal regulation and CMO regulation.

EUROPEAN COMMISSION. (2019). The European Green Deal. COM/2019/640 final

EUROPEAN COMMISSION. (2020a). Farm to Fork Strategy for a fair, healthy and environmentally friendly food system. COM/2020/381 final.

EUROPEAN COMMISSION. (2020b). Biodiversity Strategy for 2030 Bringing nature back into our lives. COM/2020/380 final.

EUROPEAN COMMISSION. (2021a). Renewed partnership with the Southern Neighbourhood A New Agenda for the Mediterranean {SWD (2021) 23 final}, Brussels.

EUROPEAN COMMISSION. (2021b). Renewed Partnership with the Southern Neighbourhood Economic and Investment Plan for the Southern Neighbours Accompanying the document SWD (2018) 301 final Brussels.

EUROPEAN COMMISSION. (2022). The EU's agricultural trade with countries in the southern region of the European Neighbourhood Policy (ENP).

FONDATION ROBERT SCHUMAN (FRS). (2021). The Common Agricultural Policy 2023-2027: change and continuity. *European issues, 607.*

GARCÍA-ÁLVAREZ-COQUE J.-M. (2002). Agricultural Trade and the Barcelona Process: Is Full Liberalisation Possible? *European Review of Agri-cultural Economics, 29*(3), 399-422.

GARCÍA-ÁLVAREZ-COQUE J.-M. (2006). The Mediterranean in the WTO Negotiations. *AgriMed Report,* 1-30.

HENNING, C. AND WITZKE, P. (2021). *Economic and Environmental impacts of the Green Deal on the Agricultural Economy: A Simulation Study of the Impact of the F2F-Strategy on Production, Trade, Welfare and the Environment based on the CAPRI-Model*. EuroCare, Bonn.

LOVEC, M. (2015a). The European Union's Common Agricultural Policy Reforms and the Sustainability of Agro-food systems in the Euro-Mediterranean region: How to get Trade and Development Back on the Agenda? In M. C. Paciello (ed.), *Building sustainable agriculture for food security in the Euro-Mediterranean area. Challenges and policy options,* pp. 229-250. Rome: Edizioni Nuova Cultura for Istituto Affari Internazionali.

LOVEC, M. (2015b). In search of a new balance between agricultural trade and development in the Euromediterranean. *Euromesco brief 55*.

LOVEC, M. (2016). *European Union's Common Agricultural Policy reforms: Towards a Critical Realist Approach.* Palgrave Macmillan.

LOVEC M. ET AL. (2021). New CAP Deliver model, Old issues. *Intereconomics 55*(2), 112-119.

MALORGIO, G. AND SOLAROLI, L. (2012). Policies and regulations in the Mediterranean: complementarity and coherence. *MediTERRA*, 443-464.

MATTHEWS, A. (2014). An updated look at the impact of the EU's Common Agricultural Policy on developing countries. *The Institute for International Integration Studies Discussion Paper Series 454.*

MORI, M. (2017). Pursuing Sustainability in the Euro-Mediterranean Area: The Role of Agricultural Finance. *Athens Journal of Mediterranean Studies 3*(3), 235-250.

PE'ER, G. AND LAKNER S. (2020). The EU's Common Agricultural Policy Could Be Spent Much More Efficiently to Address Challenges for Farmers, Climate, and Biodiversity. *One Earth, 3*(2), 173-175.

POKRIVCAK, J. ET AL. (2006). The status quo bias and reform of the common agricultural policy: impact of voting rules, the European commission and external changes. *European Review of Agricultural Economics, 33* (4): 562–90.

RECANATI, F. ET AL. (2019). Assessing the role of CAP for more sustainable and healthier food systems in Europe: A literature review. *Science of The Total Environment,* 653, 908-919.

SCHEBESTA, H., AND CANDEL, J. J. L. (2020). Game-changing potential of the EU's Farm to Fork Strategy. *Nature Food,* 1: 586-588.

TANGERMANN, S. (1997). Access to EU Markets for Agricultural Products After the Uruguay Round and Export Interests of the Mediterranean Countries. Study prepared for UNCTAD, Geneva, UNCTAD International Trade Division.

WILLARD, M. (2022, March, 22). *Food Security: Are the CAP Strategic Plans up to the Task?* ARC 2020.

ZAHRNT, V. (2011). Food security and the EU's CAP: Facts Against Fears. *ECIPE working paper 1.*

ZIMMER, Y. (2020, December, 12). EU Farm to Fork Strategy: How reasonable is the turmoil predicted by USDA? *CAP reform blog.*

Climate-Smart Agriculture: Challenges and Enabling Policies for Catalysing Euro-Mediterranean Cooperation

Dr. Ines Gasmi,
Project Officer at the Centre for Mediterranean Integration, CMI-UNOPS

Introduction

According to the World Bank report on Climate-Smart Agriculture (CSA), agriculture and land use account for almost 25% of global emissions, making them substantial contributors to the climate issue. If average temperatures rise by 2°C, harvests may decline by up to 20% by the middle of the century if agricultural resilience is not strengthened and no concrete actions are taken (Xiaoyue et al., 2016). Increased temperature-related risks are exacerbated by irregular rainfall and the subsequent droughts that could result in food insecurity or even famine. Meanwhile, agriculture can significantly help with food security for the world's growing population, but it can also make poverty worse, contribute to climate change, and degrade the environment if we do not make changes to the way we plan for and invest in agricultural growth and development. However, there is a significant risk of misallocating financial resources by creating agricultural systems that cannot ensure food security and, thus, escalating land degradation.

The United Nations (UN) Food and Agriculture Organization (FAO) predicts that to produce enough food to feed the world's population in 2050, annual agricultural and livestock production must rise by 60% from 2006 levels. Augmenting arable land will only provide 20% of the increase needed in developing countries; the remaining 80% will need to come from greater crop yields and crop intensities (Lipper et al., 2018). Climate change is anticipated to significantly impact the different aspects and determinants of food security by lowering the productivity of rainfed crops and forage, reducing water availability and modifying the severity and distribution of crop and livestock diseases. Climate change-related factors, such as rising temperatures, intense weather, water scarcity, sea level rise, ecosystem disruption and biodiversity loss, will profoundly influence food security. Besides, the survival of substantial portions of the world's population hinges on agriculture's ability to adapt to climate change, which is one of the largest contributors to greenhouse gas emissions. Today, the challenge facing policy-makers is ensuring that agriculture contributes to solving problems like food security, development and climate change. Producers – and smallholders in particular – need technology and legal measures that will increase their capability and reduce their vulnerability to do this. Thus, CSA aims to create universally valid concepts to manage agriculture for food security in the context of climate change. The concept has undergone adjustments since it was first introduced in 2009 because of feedback from and conversations with different stakeholders. CSA might serve as the foundation for suggestions and assistance for policy from multilateral organisations like the UN's FAO. CSA strives to promote food security, resilience and climate change adaptation in addition to lowering greenhouse gas emissions.

The CSA methodology and guiding principles were starting to take shape by the time of the second international CSA policy conference, which was held in Hanoi in 2012. These included creating a suitable evidence base to assess trade-offs and synergies among the three main objectives (FAO, 2018): creating a better policy environment required directing investments; connecting to climate funding; and combining agricultural and climate change policies. According to the FAO (2018), better management decisions, and eventually better policy decisions, depend on three essential factors: timely and reliable data on climate variability and its impact on yield and cost estimates; a scientific understanding of the agroecological system on the farm scale; the inclusion of those two factors in information products that meet

the needs of growers and policy decision-makers. Data technology can be applied to link farm-level management decisions and behavioural changes to site-specific biophysical data and analytical tools, assisting science-based policy and sustainable management of agricultural landscapes. With the increased usage of mobile and precise agriculture technologies and improving data management software, there is an increasing possibility for an integrated data platform.

Climate change is a dynamic process characterised by unforeseen shocks that can generate significant short-term losses and leave some regions economically unviable. The development of climate-smart policies will result in the development of systems for monitoring the weather and other variables, assessing the situation, and being ready to adjust to changing circumstances. These policies will become a part of a larger set of regulations aimed at sustainable development to make sure that the current generation continues to experience greater food security and that the next generation does not fare any worse. Besides, to enable better farm-level decision-making, climate-smart policies will emphasise incentives and skills.

Improving knowledge systems to address climate concerns would require investment in infrastructure that enables spatial data collection on climatic conditions, agricultural performance, and economic conditions at different scales. To increase our ability to react, we must invest in our analytical skills and the nascent understanding of weather patterns, as well as the application of the data for corresponding behavioural and agroecological purposes. The foundation of adaptive capability is made up of investments in and rewards for innovation. Access to new technology requires the development of institutions and regulations to minimise regulatory and intellectual property rights constraints. Local research and outreach capabilities are needed to adjust technologies and management strategies to local conditions. Thus, in this study, key findings, best practices and innovations from the execution of various projects and initiatives are synthesised with simplified recommendations. Discussions with key stakeholders involved in strategy implementation were held in addition to desk research. By becoming more widely used, these recommendations will enable a better understanding of CSA-enabling policies in the Euro-Med region.

The chapter is divided into five parts. The first three parts review existing research on the CSA position in the Mediterranean region and the impact on food security and the different existing policies and regulations. The rest of the chapter highlights the importance of filling data gaps in scaling up CSA and the measures taken by European and Southern Mediterranean countries to integrate CSA.

CSA approach and challenges

CSA is a novel approach to boosting agricultural production while managing land sustainably. Considering the evolving realities of climate change, it is a plan for modernising agriculture and addressing the need for global food security. With CSA, ecosystem services could be improved, food production could be sustained, resilience could be raised, greenhouse gas emissions could be decreased, land degradation could be halted, and agriculture could gain ecological advantages. CSA

CSA is a novel approach to boosting agricultural production while managing land sustainably

appreciates the importance of continuing education and tactical adaptation to new knowledge and circumstances. It emphasises the need for adaptation to the likelihood of more extreme events while acknowledging that more radical changes in technologies and practices may be required to address the effects of climate change.

CSA has several challenges related to theoretical understanding, practical application, political environment, and finance of the plan. The following list of challenges call for immediate action:

- **Lack of practical understanding of the CSA holistic concept.** The CSA strategy is undoubtedly appealing and convincing in theory, but it still needs to be implemented in light of the Mediterranean's many agroecologies, extremely different farming systems, socioeconomic conditions, and policies.
- **At the local and national levels, there is a lack of pertinent information, expertise, and analytical tools.** For many Euro-Mediterranean countries, such as Tunisia, Algeria, Morocco, Spain, France and Italy, there are no long-term climate and landscape strategies available. As a result, decision-makers are unaware of the implications on resource management, food security and agricultural practices. Due to a lack of information, inadequate institutional and human capacity, and a dearth of evidence-based research, decision-makers are unable to concentrate CSA implementation on the regions that are most in danger and to execute appropriate funding strategies.
- **Insufficient national/regional funding and significant upfront costs associated with CSA investments at the farm level.** According to one of our respondents, the Southern Mediterranean region has a dearth of infrastructure investment. Women farmers, in particular, do not have easy access to the financial resources that would allow them to invest in CSAs and have a limited amount of assets to invest in their own. In the Mediterranean region, there are not many documented instances of CSA approaches, and those that do exist tend to concentrate on conservation of agriculture and water resource management.
- **Policy frameworks that are poorly integrated, enabling, and supporting.** Climate change will affect agriculture in three important ways: altering temperature, greenhouse gas concentrations in the atmosphere, and irregular rainfalls. Even though it is highly expected that temperatures and CO2 concentrations will continue to rise in the Mediterranean region during the 21st century, the Intergovernmental Panel on Climate Change (IPCC) asserts that there is little confidence in projections of the length, total amount or distribution of rainy seasons. The execution of CSA necessitates cooperation across institutions and programmes as well as the development of favourable frameworks and policies to ensure the harmonisation of efforts.
- **Inadequate women's and youth's empowerment.** The Mediterranean region is losing out on a tremendous opportunity to create economic growth. The lack of stable land tenure reduces women farmers' capacity to use the land as collateral for long-term, affordable financing. CSA techniques often require more money upfront when investing in infrastructure that is climate resilient, such as irrigation systems. Women farmers currently do not have access to short-term finance for the pur-

chase of fertiliser and other agricultural inputs; therefore it will be much more difficult for them to secure affordable financing for agriculture that is climate-resilient. For instance, women farmers are less likely to participate in long-term sustainable land management practices because of the uncertainty surrounding their land tenure; even relatively straightforward CSA practices like agroforestry or native tree planting require a 5–7-year investment. Finding the long-term, inexpensive funding necessary for agriculture that is climate resilient may be even more difficult for women farmers who do not currently have access to short-term financing. Climate change may also make women farmers insecure under the strain of unpaid domestic and care duties.

- **Insufficient availability of appropriate and innovative financing methods and efficient risk-sharing mechanisms.** In addition to the huge risks posed by climate catastrophes, farmers in the Mediterranean region must also handle risks associated with the high costs of implementing new technologies. Many countries currently do not have funding plans in place to promote the use of CSA. However, new investments are required to transition to agricultural growth strategies that are climate smart.
- **From the standpoint of farmers and policy-makers, difficulties managing trade-offs.** In the agricultural sector, there is usually a disconnect between farmers and policy-makers when it comes to identifying priorities for resource management. Varying key players, notably farmers, political figures and policy-makers are likely to place different priorities on CSA's main goals.

Status of the Euro-Mediterranean climate-agriculture nexus

Most Mediterranean countries still have economies that are heavily reliant on agriculture; therefore the region's development has significant implications for both food security and the eradication of poverty. The repercussions of climate change have already been seen throughout the region, according to the United Nations Framework Convention on Climate Change (UNFCCC). Meanwhile, the Mediterranean region must place a high priority on developing adaptation techniques to counteract the negative impacts of climate change. Millions of smallholder farmers, especially women, still experience unstable land tenure, and other issues like declining soil fertility, degraded ecosystems, limited market access, insufficient funding, and inadequate infrastructural development continue to impede agricultural development in the region. The Mediterranean region is distinguished by a shortage of arable land resources, with 95% extensively farmed. The sustainability of Mediterranean agriculture and its commitment to food security depends in particular on the protection of vulnerable lands endangered by climate change, unsustainable exploitation, and population growth (MedECC, 2019).

The sustainability of Mediterranean agriculture and its commitment to food security depends in particular on the protection of vulnerable lands endangered by climate change, unsustainable exploitation, and population growth

There is a general lack of a long-term, comprehensive and integrated vision in their implementation, even though most of the countries of the Southern Mediterranean had already established national plans and strategies to drive a transition toward the sustainable management of natural resources. Our interviewees claim that management policies are frequently sectoral, dispersed and

prone to applying pre-made solutions to intricately interconnected problems, omitting the bigger picture. To increase water use efficiency in agriculture, it is not enough to just switch to drip irrigation from surface irrigation; a broader strategy must be adopted that addresses infrastructure management and maintenance, water distribution, access to technology, farmer education, pricing regulations, monitoring, and assessment of the implemented measures. Additionally, a long-term holistic vision should consider concerns relating to food security and the socioeconomic aspect of soil and water management. Based on our survey and interview data, we determined the factors impeding the adoption and implementation of an integrated agriculture and food security vision: a lack of awareness and knowledge among involved stakeholders, very limited availability of current data, the absence of monitoring and evaluation procedures, the division of duties and a lack of coordination between various authorities, also a lack of financial and human resources.

Soil conservation and restoration are typically not among the top priority on politicians' agendas, owing to limited knowledge about the issue's relevance and scope. Sometimes, local stakeholders, including farmers, fail to consider long-term economic and environmental benefits when the short-term narrative centred on productivity and rentability is dominant. Additionally, our interviewees stated that there is insufficient communication among stakeholders about good practices, particularly sustainable soil management. Farmers generally lack a culture of water resource scarcity awareness. They may be aware of how climate change is affecting the resource's availability, but they lack the knowledge and resources to adapt or switch to more sustainable ways (Mahafdah & Sathiamurthy, 2022). According to the survey responses, water users typically anticipate government entities to meet their needs by expanding the water supply rather than taking into consideration a shift in their usage patterns.

Sustainable land management is also based on localised institutional support, participatory techniques, and collaborations at all scales. As a result, policy-makers must actively participate in the stewardship of natural resources in response to climate change. Despite substantial advancements, mostly in European nations, the management of agricultural soils, water resources, agroecology and food security are still not properly decentralised. Several Mediterranean countries, including Morocco and Algeria, have decentralised water management to the level of water basins to achieve integrated management of the resource that goes beyond ineffective administrative boundaries and reflects the unique and various demands of each basin. By integrating a variety of stakeholders on their boards, basin organisations were established and given responsibility for the planning and quality control of water resources. When relying on independent public service providers, private operators, or Public-Private Partnerships (PPP), water supply and sanitation are typically assigned (as is the case in Tunisia). However, local authorities, like municipalities, frequently lack decision-making authority and have only limited authority over the management of water in public areas. Furthermore, several countries cannot afford the expensive infrastructure and maintenance projects that are often associated with water management.

Decentralised authorities frequently struggle to provide water and agriculture enforcement because they lack educated staff. Several conditions must allow the Mediterranean to reap the potential benefits of CSA: institutional arrangements must be developed to support, apply and scale out the practice from the farm to the basin level; trade-offs between the perspectives of farmers and policy-makers must be managed; technical, analytical and implementation capacities must be strengthened; and wider adoption of appropriate technologies by farmers must be encouraged, facilitated and financed.

Supporting research and cooperation in the field of agriculture: filling the knowledge gap

To support scientific research, inform policy-making, and, most importantly, make it possible to precisely track the negative impacts of climate change and predict significant climatic risks, the sustainable and integrated management of agricultural soils and water resources must be based on relevant, current and harmonised data. This is important to know how to develop adaptation strategies that are specific to local conditions for soil degradation and growing water scarcity. However, as evidenced by the interviews, surveys and some recent research, data on land and water resources, along with eco-innovative farming practices, are frequently inadequate, outdated, fragmented or difficult to obtain in most Southern and Eastern Mediterranean countries. Even when trustworthy data sources are acquired, some of our respondents pointed out that they are frequently gathered in collaboration with donors and are therefore only available in English, a language that not everyone speaks, especially on the southern and eastern shores of the Mediterranean.

The European Union (EU)'s Copernicus programme and the agricultural European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) are two of its most important activities. The EU funds several research and development projects through its main funding streams, which include Horizon 2020, LIFE+, Interreg and Climate KIC. To gain a better knowledge of effective adaptation techniques in European agriculture, we must increase monitoring and evaluation of all the many adaptation alternatives available through these instruments. The European Climate Adaptation Platform (Climate-ADAPT) is an essential resource for users to gather data and exchange cutting-edge, continuously developing information about adaptation. By combining these factors, choices and policy development can benefit from both regional and European perspectives.

The Copernicus Climate Change Service (C3S) makes essential climate data and indices available through its Climate Data Store. It provides historical, current and forecast climate data, as well as tools for businesses and policymakers to utilise in establishing climate change mitigation and adaptation plans. For the agricultural sector, C3S offers opportunities to improve European agriculture's resilience to climate change. Examples include the Global Agriculture Sectoral Information System project and the Agricultural Climate Advisory Services (AgriCLASS) initiative. The European Economy Area (EEA) regularly maintains and updates a set of indicators that provide data on historical and future climate change, as well as the effects of that change on ecosystems, socioeconomic sectors, and human health.

Data on land and water resources, along with eco-innovative farming practices, are frequently inadequate, outdated, fragmented or difficult to obtain in most Southern and Eastern Mediterranean countries

Climate change adaptation in the agriculture sector in the Euro-Med region

The case of Europe

The agricultural industry will need to reduce emissions if the EU is to fulfil its emission reduction targets for 2030 and 2050

The European agriculture industry has already been heavily impacted by climate change. Climate change in the future might potentially affect the industry in various ways. It is anticipated that there would be more climate extreme events that have an impact on agriculture in Europe. Though it seems likely that there will not be a problem with food or fodder security in the EU, rising food consumption may put pressure on food prices in the future. According to the EU agriculture strategy for 2021-2027, the agricultural sector is given priority in national adaptation strategies or national adaptation plans (European Environment Agency, 2019). The newly suggested single agriculture plan could help collect money for sector-specific adaptation initiatives.

Agriculture in Europe produces a variety of food, feed and residual biomass products in addition to carrying out other essential duties, including preserving the environment, stimulating rural development, and promoting tourism. Additionally, energy is produced using biomass, primarily in the transportation sector. More than 90% of the bioethanol used in the EU is produced from feedstock that is sourced from within the EU; the remaining 10% is derived from sources outside the EU. The EU's agricultural sector has opportunities to adapt to climate change according to its agricultural policy and adaptation strategy. Every member state expressly identifies the agriculture sector as one of their priority sectors based on the Monitoring Mechanism Regulation's results for 2019.

According to the EEA, agriculture is responsible for 10% of all greenhouse gas emissions in the EU. Methane emissions (CH4) from enteric fermentation account for the largest portion (38%). The sector has a great potential to reduce greenhouse gas emission levels that are not brought on by the release of carbon dioxide by altering the types of land cover and managing soils. This could entail switching to conservation tillage, reducing the nitrogen fertiliser used on crops, altering how livestock and manure are managed, and planting grass or trees. Depending on their expenses, potential earnings, and other financial incentives provided by climate policy, farmers may implement these practices to varying degrees. Between 1990 and 2016, greenhouse gas emissions from agriculture in the EU decreased by about 20%, and beyond 2020, emissions are anticipated to remain stable. The agricultural industry[38] will need to reduce emissions if the EU is to fulfil its emission reduction targets for 2030 and 2050. Between 1990 and 2016, ammonia emissions declined by 18%, mostly because of livestock decrease and the decrease in the use of nitrogen fertilisers. To lower greenhouse gas and ammonia emissions, the sector must reduce emissions from livestock, manure storage and fertilisers. There will not be enough reduction in emissions from new farming practices alone. By

[38] Anything that is produced or raised for human consumption is included in the agricultural industry. This involves raising animals, growing flowers and harvesting plants for sale. One of the earliest industries in the world, agriculture has been around for thousands of years.

changing diets and halting food losses, further reductions would be attained.

The survey results[39] indicate that the agriculture industry in Europe will likewise experience major upheaval. Agriculture's contribution to greenhouse gas emissions is anticipated to remain constant in the absence of new mitigation incentives or modifications to the quantity and type of agricultural goods produced. Meat and dairy products are among the things with the highest carbon emissions. Thus, the European Commission (EC) adopted a long-term strategic plan for a prosperous, modern, competitive, and carbon-neutral economy by 2050. Several interviewees reported that low carbon and energy transformation routes were investigated to assist the strategy for long-term greenhouse gas emission reductions. This required modelling and research on the effects of various industries and technological advancements on these emissions. The scenarios that have been taken into consideration cover the expected range of reductions needed throughout the EU to assist efforts to achieve a 1.5 °C temperature change and to contribute to the Paris Agreement's temperature objectives of far below 2 °C. This leads to a reduction in greenhouse gas emissions of between 80% and 100% in 2050 compared to 1990 (achieving net zero emissions). The EC unveiled its ambitious signature plan for the European Green Deal, the "Farm to Fork Strategy", in 2020. The overall transformation project has made significant progress, which is further highlighted by Europe's climate obligations and the specific strategy for the food system. With the conflict in Ukraine and its direct effects on the security of food and energy in Europe, however, a lot has changed. In addition to changing things in and for Europe, the EU Green Deal and "Farm to Fork Strategy" also aim to support a worldwide transition to more sustainable food and land use systems. This includes decarbonising European productive sectors. The EU has considerable influence and has an impact on production and decisions in other nations as a result of its participation in global agricultural trade (Caprini, 2020). In addition to having significant environmental challenges, several Euro-Med countries are enduring dietary and nutritional changes that have an impact on the health of their populations. To ensure food security and nutrition in the Mediterranean region, it is imperative to address the rising demands for water in agriculture, the ability to sustain local food production, and the region's growing reliance on food imports. The MEDINA-Study Group created a "fork-to-farm" multi-scale approach, starting with existing dietary practices and looking at potential ways to make these practices more nutrient-dense (Verger et al., 2018).

Technical mitigation strategies and consumer food preferences are crucial for agriculture. Examples include using selective breeding programmes to reduce CH4 emissions from livestock caused by enteric fermentation during the digestion process; utilising anaerobic digestion to reduce manure emissions, which produces biogas that can, for example, be used to power farms; and maximising fertiliser application rates,

[39] In the framework of this study, a survey and a series of interviews were conducted to learn more about CSA in the Euro-Med region. We targeted mainly project consortium coordinators, stakeholders and researchers. The respondents requested that their responses remain anonymous, and data collected from their responses will be used to support existing literature. However, we got seven responses to the survey and four face-to-face interviews.

such as through precision farming, to reduce fertiliser runoff. Numerous initiatives taken at the farm level are either expansion of current methods for managing climate risk or efforts to increase output in response to an anticipated change in the climate risk profile. The farm advice system is an opportunity to streamline the agriculture sector's adaptation to climate change. Such systems are mandated by the Common Agricultural Policy (CAP), so it should be considered whether the material should include adaptation information. Furthermore, Europe, which has taken legislative action to reduce waste at the distribution and consumption stages, must now quickly modify the actual regulations in place to enable new genomic technologies (NGT) to contribute to reducing crop production losses. It all comes down to how resilient our agriculture will be in the future and how we can protect our capacity for output.

Future CAP strategic plans should prioritise multi-objective adaptation measures with various benefits

Assuring food security for Europeans, one of the tenets of the CAP and the EU makes this adaptation of the European genetically modified organism (GMO) regulation a strategic problem. The EU cannot forbid farmers from using these new biotechnologies without running the danger of losing its food sovereignty and, with it, its economic sovereignty. In order to meet everyone's requirements, we must take action on every factor that may have an impact on the production and consumption of food products as the world's population is predicted to rise to 10 billion in 2050. One of the reasons why there is less food available is waste. The FAO estimates that, each year, one third of the food created for human consumption is lost or wasted (European Seed, 2022).

The CAP in place today already integrates adaptation (2014-2020). The Omnibus Regulation for 2017-2020 stipulates that EU members may offer linked support based on results from a previous reference period. Such regulations should be dropped in the future as they could encourage crop production in areas where it is no longer feasible economically. Even with a policy framework that encourages adaptation, farm-level adaptation may be negligible. This is caused by a variety of factors, including the use of voluntary measures (i.e., those that farmers are not forced to employ), a lack of investment funds, the need for adaptation on the part of the government, and institutional capability. When drafting the measures that will be delivered, future CAP strategic plans should prioritise multi-objective adaptation measures with various benefits. Due to competing environmental objectives, future CAP strategic plans should favour multi-objective adaptation techniques with several benefits.

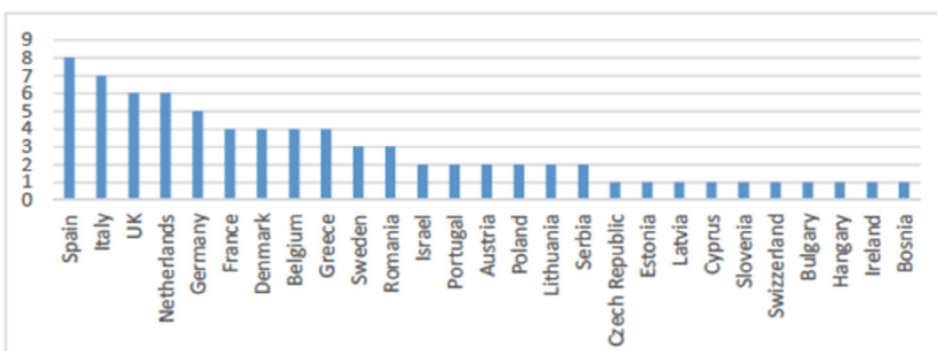
The 1962-established CAP is based on direct farmer subsidies and the growth of rural areas. The promotion of resilient, sustainable agriculture founded on research and innovation is the current priority of the EC. In fact, by emphasising the benefits of CSA, it motivates member states to make investments in it.

With the help of our interviewers and an extensive internet search, we were able to identify several European-based projects. ECHORD PLUS PLUS, SWEEPER, VINEROBOT, FIGARO, SYMPHONY, AGROIT, FOODIE, AUDITOR, 4D4F, IoF 2020, RECAP, SMART AKIS, among others (Table 1, and Figure 1). The programme's beneficiaries are European farmers and breeders, local communities, and small and medium-sized enterprises (SMEs) that use their activities to maintain biodiversity and boost local economies.

Table 1. Description of EU CSA projects

Project Abbreviation	Project Title	Description
ECHORD PLUS PLUS	European Clearing House for Open Robotics Development Plus Plus	robotics for vegetable harvest
SWEEPER	Sweet Pepper Harvesting Robot	robotics for vegetable harvest
VINEROBOT	Vine Yard Robot	robotics for wine production
FIGARO	Flexible and Precise Irrigation Platform to Improve Farm Scale Water Productivity	Irrigation technology, DSS
SYMPHONY	Integrated System Based on Photonic Microresenators and Microfluidic Components for Rapid Detection of Toxins in Milk and Dairy Products	sensors for dairy producers
AGROIT	Advanced Farm Management	virtual platform, app
FOODIE	Farm-oriented Open Data in Europe	cloud computing
AUDITOR	Advanced Multi-Constellation EGNSS Augmentation and Monitoring	GNNS ground based augmentation system
4D4F	Internet of Food and Farms 2020	mapping, sensor for agri-food
IoF 2020	Data Driven Dairy Decisions for Farmers	technology for breeders
RECAP	Reinforcing CAP	big data to improve CAP, respect of law
SMART AKIS	Smart Farming Thematic Network	information about technology in agriculture

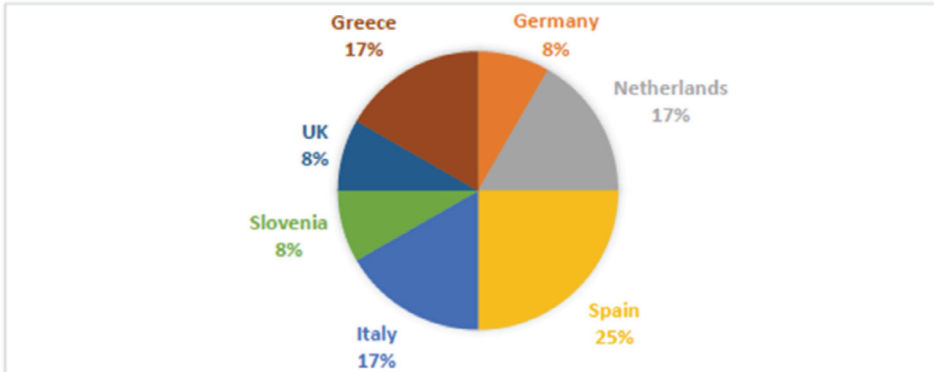
Figure 1. Countries involved in the EU CSA projects



Source: Fusco et al., 2020

Italy produces almost one-fifth of the entire added value of the EU agricultural sector, making it the top country in Europe in terms of added value. The Netherlands is the leading European exporter of agricultural products. Due to its economy's dependence on the primary sector, Greece was able to avoid incurring substantial rates of unemployment in its rural areas during the 2008 financial crisis. Before Brexit, which is anticipated to change the future of farmers, the United Kingdom (UK) was among the top five recipients of European direct payments. Slovenia's family farming system is an excellent example of both the country's strengths and vulnerabilities in terms of market stability, social inclusion and the expanding digital divide.

Figure 2. Countries involved in the coordination of EU CSA projects



Source: Fusco et al., 2020

The EU's economy requires innovation to advance and become smarter, more sustainable and more inclusive in a changing world. The EU has introduced the Innovation Union as part of its growth plan, EU 2020, with the goal of assisting all EU nations in supplying their citizens with a more competitive economy, more and better jobs, and a higher standard of living. EIP-AGRI promotes sustainable, competitive farming and forestry that "achieves more and better from less." It helps to maintain a consistent supply of food, animal feed and biomaterials by expanding its activities in conjunction with the vital natural resources that support agriculture. In order to support the EU's "Europe 2020" plan for smart, sustainable and inclusive growth, the EIP-AGRI was established in 2012. One of the five primary goals of this strategy is to strengthen research and innovation. It also supports a new participatory method of innovation called European Innovation Partnerships (EIP). At the EU level, the EIP-AGRI brings together innovation actors in agriculture and forestry, including farmers, advisors, researchers, enterprises, non-governmental organizations (NGOs), and others. Together, they create an EIP network that spans the entire EU. EIP Operational Groups, Multi-Actor Projects, and Thematic Networks are all important building pieces in this network. While Multi-Actor initiatives and Thematic Networks are financed by the Horizon Programme, Operational Groups are funded by the Rural Development Programmes. EIP-AGRI Operational Groups focus on a particular (practical) issue or opportunity that might spur innovation. They are project-based. The Operational Group method maximises the application of many types of knowledge (practical, scientific, technical, organisational, etc.). The Support Facility Innovation & Knowledge Exchange | EIP-AGRI, under the European CAP Network,

replaced the EIP-AGRI Service Point as of July 2021. The Support Facility provides a wide range of resources and services that might assist you in developing your concepts and undertakings. Additionally, it promotes networking through conferences, focus groups, workshops, seminars, and publications; this improves communication, information sharing and exchange.

The case of the Southern Mediterranean region

The special relationships that the EU has with its neighbours in the Mediterranean reflect centuries of shared history as well as economic and cultural contact insured by the Union for the Mediterranean (UfM). In addition, the Mediterranean region should be given top priority for taking climate action. It has been identified as a "hotspot" for climate impacts by the IPCC due to its high susceptibility to climate change. As a result of the enormous rise in energy consumption, urbanisation and population expansion, greenhouse gas emissions are climbing quickly (UFM, 2016). The EU's regional collaboration with Southern Mediterranean countries is centred on the European Neighbourhood Policy (ENP) and its financial tools, and the UfM has long incorporated climate mitigation and adaptation into this cooperation. The updated plan for the EC's collaboration with its partner nations in the Southern and Eastern Mediterranean region was adopted in 2015. The updated agreement includes a separate chapter on climate and energy for the first time in order to represent the Paris Agreement and reflect this focus on climate cooperation. Our upcoming financial and policy assistance for climate action in the southern neighbourhood will be built upon it (UfM, 2016). So, if investments are made in a supportive ecosystem, the Southern Mediterranean region has tremendous potential to capitalise on advancements in climate-smart solutions. The region's water efficiency and crop productivity can be further improved through research, technology development, and transfer from Europe to the southern med-region. Providers of digital agriculture solutions, including agri-tech firms and mobile operators from Europe, must have a clear value offer and a clear route to commercial sustainability to draw investment and scale up climate-smart solutions on the southern shore of the Mediterranean.

We were unable to easily identify completed CSA projects in the Mediterranean region, but we were able to pinpoint one Euro-Med project that had just begun and was Partnership for Research and Innovation in the Mediterranean Area (PRIMA)-funded. Spain served as the project's coordinator, and a group from Algeria, Germany, Turkey and Egypt made up the consortium. CICLICA is a research and innovation project that focuses on two streams. First, a smart system for water management is created by combining modern water-saving technologies that have already been verified in labs; second, a system that involves the application of various biotechnology and agricultural solutions for irrigation modelling, enhanced agronomic management, and genetic adaptation of substitute crops. The project will concentrate on creating and researching integrated on-farm practices to deal with the two types of abiotic stresses – water and salinity– while applying those practices under two different business models of farming systems: i) the common farming system, which produces traditional Mediterranean crops like olives, citrus and tomatoes; and (ii) alternative crops farming systems, which include the introduction of new crops to improve the

The Mediterranean region should be given top priority for taking climate action

farming system's ability to deal with abiotic stresses.

Meanwhile, Morocco plans to create 1.5 million new jobs and triple the value added in the agri-food sector. In 2008, Morocco unveiled the Plan Maroc Vert (PMV), a long-term agriculture policy. The PMV attempts to make it simpler for small farmers to access technologies and services. Support for small farmers has become even more crucial as a result of climate change because they have limited technical and financial means to withstand the environment's growing unpredictability. The PMV and the associated National Irrigation Water Saving Programme promote improved water distribution and the use of more efficient irrigation techniques in irrigated areas. Four million people are employed in agriculture in Morocco, which contributes roughly 13% of the Gross Domestic Product (GDP). The monarchy enacted the PMV in 2008, which enables access to suitable funding, to expand this important economic sector and, in particular, to facilitate the renovation of small and medium-sized family farms in underprivileged areas. Crédit Agricole du Maroc (CAM) has profited from several lines of credit marked with the Agricultural and Rural Finance Guarantee Programme (AGREENFI) logo in this regard. This label is a device developed by the French Development Agency (AFD) to encourage agricultural and rural finance. Despite the risks associated with their operations, 7,000 small farms profited from bank loans set up with AFD's assistance between 2015 and 2018.

Thus, smart farming is a government goal in Morocco. The government's Green Generation 2020-2030 policy, which was released in 2020, lists "the introduction of new technology and the digitalisation of agricultural services" as one of its aims. The plan seeks to put in more than 100,000 solar irrigation pumps. AgriEdge is an agri-tech startup that stands to gain from this push to digitise the industry. The business uses a precision agriculture platform to analyse a variety of data, including weather, satellite and drone photographs, to determine the ideal amount of fertiliser and water for each crop. Meanwhile, the business sector is a major force behind smart farming initiatives in Egypt. An app called IrriWatch, created in the Netherlands, aids farmers in optimising irrigation by employing "virtual sensing" technology, which analyses signals from several thermal satellites to identify soil moisture and water potential. Composting, which can cut the amount of water needed by 30%, is how Egyptian startup Baramoda plans to address the water shortage. Leading mobile phone provider Vodafone Egypt is using its reach and size in rural areas to offer agricultural advice to smallholder farmers via a daily SMS. For the "Egyptian Farmers" service, Vodafone and the Ministry of Agriculture worked together.

For the first time, in Tunisia, stakeholders from the public and private sectors came together with the support of the African Development Bank in 2018 to share information and best practices related to the use of drones in the planning, management and evaluation of agricultural projects. The ability of Mediterranean agriculture to respond to escalating challenges more effectively and efficiently will be significantly improved by this pilot project. According to our Tunisian respondents, the use of drones in the agricultural industry will soon make it possible to greatly improve the labor-intensive tasks that Tunisian farmers must perform. "This gadget is cool! It is useful to assume an increase of 80% in man-day output!" It will enable farmers to decide with certainty and relevance how best to manage their land. The drone can now measure the nitrogen levels coming from the agricultural field it is flying over

owing to a camera with RGB[40] technology. The gathered data will be evaluated and interpreted. The decision to disperse additional nitrogen doses required for the crops' photosynthesis and, consequently, their growth, will be decided after discussion with the farmer to boost one or more sections of the plot. This will enable the addition to be delivered with an accuracy of a few centimetres thanks to the drone's extremely accurate mapping of the areas with fertiliser shortages. By focusing solely on the deficiency areas, the farmer will increase production while saving significant amounts of nitrogen.

It is no longer an option to consider environmental preservation in agriculture. As the region is vulnerable to global warming, Tunisians, and the Mediterranean as a whole, must take on this duty. Indeed, there have been more and more drought events in recent years. The efficient use of water is consequently crucial. The drone's algorithm can topographically map the ground and simulate the irrigation system that feeds it thanks to picture recognition. The options for balancing water distribution are then described, such as using channels to maximise the flow rate. Thus, only what is necessary is consumed by the resource. The farmer can control the yield of his crop, which he de-correlates from rainfall, to strengthen its resilience to drought episodes.

Several Tunisian survey respondents identified a Tunisian startup active mainly in West Africa but not in Tunisia or any Mediterranean country, which poses a lot of questions about enabling this kind of initiative in the region and having direct benefits from it. The 'Agri-tech Tunisia' initiative, created by the Tunisian enterprise STECIA International, provides startups with the knowledge, motivation and networking required to expand internationally and sell their technological know-how and agricultural solutions to West Africa, starting with Senegal and the Ivory Coast. This initiative is financed by Innov'i - EU4Innovation, an EU-funded initiative run by Expertise France that seeks to improve, structure, and commercialise Tunisia's ecosystem for innovation and entrepreneurship. 'Agri-Tech Tunisia' offers established agri-tech businesses with solutions in the commercialisation phase marketing assistance and individualised coaching. To meet the needs of West African agricultural and agribusiness companies, the project's ultimate goal is to promote Tunisia, a "Startup Act" country, as a source of high-tech agricultural solutions.

It is no longer an option to consider environmental preservation in agriculture

In the case of Algeria, the increase in global food demand is accompanied by supply-side challenges related to land and agricultural inputs. By 2050, it is predicted that there will be 10 billion people on the planet. Algeria will be one of the countries most impacted by climate change, and we have already noticed it due to the recent severe water stress. To adapt to these changes, agriculture needs to undergo a digital transformation made possible by connectivity. To assist farmers in using resources more effectively and sustainably, certain solutions already exist. These new technologies can facilitate better decision-making, allowing for better risk and variability management to maximise yields and boost economics. Startups like AITECH help to create agricultural systems in Algeria and put them into practice on a local level. In addition to preventing the country from lagging further behind, we hope that they will increase in number so that Algeria's agricultural indus-

[40] The RGB colour model is an additive model in which the red, green, and blue primary colours of light are added together in various ways to reproduce a broad array of colours.

try can take the lead in driving the country's self-sufficiency in food production.

Conclusion and recommendations

A long-term, integrated perspective of the management of natural resources must be adopted by national, local and regional authorities

A long-term, integrated perspective of the management of natural resources must be adopted by national, local and regional authorities. Their actions must consider all pertinent relationships and aspects of the problems, including socioeconomic ones, rather than concentrating on just one technique, one sector or one remedy. As an illustration, even though managing the water supply is always a top priority, it is vital to further expand on agricultural water demand management to incorporate more complicated and consistent policies that will promote the long-term development of technical skills. Similarly, water management should address concerns affecting rainfed agriculture, which makes up most of the agriculture and greatly contributes to food security in Mediterranean countries, as well as irrigated agriculture.

Given the potential and development constraints, agricultural transformation through CSA will necessitate taking several steps to support livelihood systems that are climate resilient, promote food and nutrition security, and use natural resources sustainably. These top-priority result-driven solutions also reflect the issues emphasised in this study:

- **Youth engagement.** It is essential to engage youths and give young agri-entrepreneurs the tools they need to make wise investments in their farms and businesses in order to fulfil many of the Sustainable Development Goals (SDGs). Youths are the key to ensuring everyone has access to food in the future but, due to the numerous obstacles they must overcome, many young people do not see a career in agriculture. High rates of youth unemployment necessitate determined policy responses to promote inclusive economic development, particularly in rural areas.
- **Encourage context-driven, climate-smart ideas, and solutions.** Investments in ecosystem-based methodologies, cutting-edge technology, and a supportive environment will be required to enhance and facilitate CSA adoption. Campbell et al. (2014) claim that understanding agroecological approaches to sustainable intensification and development of agriculture is crucial for CSA.
- **Adapt water management to promote food security in the context of CSA.** To adapt water management to climate change, four fundamental pillars are required. One of them is assessing water resources and the risk they bring to agricultural productivity. Others include rethinking water storage, promoting rainfed agriculture, using additional irrigation to manage climatically-related water variability, and boosting resilience through the adoption of more sophisticated agricultural and water management technologies.
- **Improve policy coordination and strengthen local national and regional institutions to assist CSA implementation.** CSA-related developments may be adding too much pressure for smallholder farmers. Strong institutional support is required to promote diversity in decision-making and improve information transmission. The adoption of CSA can be strongly encouraged by farmers (and farmer associations), among other institutions and stakeholders. The funding of CSA strategies and technologies must be coordinated across national governments.

- **To boost smallholders', governments' and private sector entrepreneurs' access to funding is required to develop and implement CSA, and novel financing schemes should be developed.** These schemes should engage the help of cooperative banks, and national banks. Building a pipeline of investments is necessary to advance CSA. The public sector's funding for adaptation and mitigation is anticipated to be the largest source of climate finance for CSA in developing countries. Potential funding sources include bilateral donors, global financial institutions, the Global Environment Facility (GEF), and the Green Climate Fund. Through national policy instruments like National Adaptation Programmes (NAPs) and Nationally Appropriate Mitigation Actions (NAMAs), the UNFCCC can allocate funding to NAPs. Meanwhile, development partners should also agree on implementation plans for specific investments based on their comparative advantages; synergies should be identified, and cooperative plans should be formed.
- **Increase national investments in agriculture.** Investments in CSA interventions need to be more deliberately channelled and dispersed, with larger and more coordinated investments. If there are national policies and frameworks for action for CSA, farmers will adopt technologies more frequently. Furthermore, carbon financing could help farmers in the early phases, before the trees in agroforestry systems start to provide a profit.

References

AGENCE FRANÇAISE DE DÉVELOPPEMENT. (2021). *AGREENFI : pour une finance agricole et rurale plus verte.* Retrieved from: https://www.afd.fr/fr/actualites/agreenfi-finance-agricole-rurale-plus-verte

BLÖSS-WIDMER, I. (2022). *Make Way for Numbers: The Age Race in the Mediterranean.* IEMed. Retrieved from: https://www.iemed.org/publication/make-way-for-numbers-the-age-race-in-the-mediterranean/

CAMPBELL, B.M. ET AL. (2014). Sustainable intensification: What is its role in climate-smart agriculture? *Current Opinion in Environmental Sustainability,* 8, 2014, 39-43.

EUROPEAN COMMISSION. (2021). *Climate Smart Agriculture: Solutions for Resilient Farming and Forestry.* Retrieved from: https://ec.europa.eu/eip/agriculture/ sites/ default/files/eip-agri_brochure_climate-smart_agriculture_2021_en_web_final.pdf

EUROPEAN ENVIRONMENT AGENCY. (2019). *Climate change adaptation in the agriculture sector in Europe.* Retrieved from: https://www.eea.europa.eu/publications/cc-adaptation-agriculture

EUROPEAN SEED. (2022). Europe Must Embrace New Genomic Technologies (NGT) to Safeguard its Food Sovereignty. Retrieved from: https://european-seed.com/2022/02/europe-must-embrace-new-genomic-technologies-ngt-to-safeguard-its-food-sovereignty/

FAO. (2023). *Climate Smart Agriculture.* Retrieved from: https://www.fao.org/climate-smart-agriculture/en/

FUSCO, G. ET AL. (2020). How to Improve the Diffusion of Climate-Smart Agriculture: What the Literature Tells us. *Sustainability,* 12(12).

GROUPE DE LA BANQUE AFRICAINE DE DÉVELOPEMMENT. (2019). *Moderniser l'agriculture africaine en partageant l'expérience réussi des drones en Tunisie.* Retrieved from : https://www.afdb.org/fr/news-and-events/press-releases/moderniser-lagriculture-africaine-en-partageant-lexperience-reussie-des-drones-en-tunisie-32298

HOU, X. ET AL. (2016). *Climate-smart agriculture: successes in Africa. Report.* World Bank Group. Retrieved from: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/622181504179504144/climate-smart-agriculture-successes-in-africa

LIPPER, L. ET AL. (eds.). (2018). Climate Smart Agriculture. Building Resilience to Climate Change. *Natural Resource Management and Policy,* 52. Cham: Springer.

MAHAFDAH, M. S. AND SATHIAMURTHY, E. (2022). Perception of farmers on irrigation water management in semi-arid region impacted by climate change-a case study of southern dead sea area, Jordan. *The Seybold Report Journal,* 17(09), 2058–2075.

MEDITERRANEAN EXPERTS ON CLIMATE AND ENVIRONMENTAL CHANGE (MEDECC). (2019). *Risks Associated to Climate and Environmental Changes in the Mediterranean Region: A Preliminary Assessment by the MedECC Network Science-Policy Interface - 2019.* Retrieved from: http://www.medecc.org/wpcontent/ uploads/2018/12/MedECC-Booklet_EN_WEB.pdf

TRICARICO, D. (2021). *The Opportunity for Smart Farming in the Middle East and North Africa.* GSMA. Retrieved from: https://www.gsma.com/mobilefordevelopment/programme/agritech/the-opportunity-for-smart-farming-in-the-middle-east-and-north-africa/

UFM. (2016). *Key players' perspective on climate change in the Mediterranean.* Retrieved from: https://ufmsecretariat.org/wp-content/uploads/2016/11/UfM_SectoralReport_2016_EN_web1.pdf

VERGER E. O. ET AL. (2018). *A "Fork-to-Farm" Multi-Scale Approach to Promote Sustainable Food Systems for Nutrition and Health: A Perspective for the Mediterranean Region.* Frontiers in Nutrition. Retrieved from: https://www.frontiersin.org/articles/10.3389/fnut.2018.00030/full

List of acronyms and abbreviations

AA	Association Agreements
AFD	French Development Agency
AGREENFI	Agricultural and Rural Finance Guarantee Programme
CAM	Crédit Agricole du Maroc
CAP	Common Agricultural Policy
CH4	Methane
CIHEAM	Centre International des Hautes Etudes Agronomiques Méditerranéennes
COP	Conference of the Parties
COVID-19	Coronavirus Disease 2019
CSA	Climate Smart Agriculture
C3S	Copernicus Climate Change Service
DDR	Doha Development Round
DCFTAs	Deep and Comprehensive Free Trade Agreements
EAFRD	European Agricultural Fund for Rural Development
EC	European Commission
EEA	European Economic Area
EFSD+	European Fund for Sustainable Development
EFSI	European Fund for Strategic Investments
EIP	European Innovation Partnership
EIP-AGRI	European Innovation Partnership for Agricultural Productivity and Sustainability
EMFF	European Maritime and Fisheries Fund
EMP	Euro-Mediterranean Partnership
ENP	European Neighbourhood Policy
ENP-South	European Neighbourhood Policy-South
ENPARD	European Neighbourhood Programme for Agriculture and Rural Development
ENPI	European Neighbourhood and Partnership Instrument
ENP	European Neighbourhood Programme
FAO	Food and Agriculture Organization
FARM	Food and Agriculture Resilience Mission
G20	Group of Twenty
G7	Group of Seven
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHI	Global Hunger Index
GIAHS	Globally Important Agricultural Heritage Systems
GIs	Geographical Indications
GMO	Genetically Modified Organism
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
INTERREG	EU funding program for regional development and cooperation
IPCC	Intergovernmental Panel on Climate Change
LEADER	Liaison Entre Actions de Développement de l'Économie Rurale (French for "Links between the rural economy and development actions")
LIFE+	EU funding program for environment and climate action

LULUC	Land Use and Land Use Change
MEDA	Mediterranean Development Aid
MENA	Middle East and North Africa
MPCs	Mediterranean Partner Countries
MT	Metric Ton
NAMAs	Nationally Appropriate Mitigation Actions
NAPs	National Adaptation Plans
NDICI	Neighbourhood, Development and International Cooperation Instrument
NGO	Non-Governmental Organization
NBSs	Nature-based solutions
NTBs	Non-tariff barriers
ODA	Official Development Assistance
PMV	Plan Maroc Vert
POs	Producer Organisations
PRIMA	Partnership for Research and Innovation in the Mediterranean Area
PPP	Public-Private Partnerships
RRF	Recovery and Resilience Facility
SDGs	Sustainable Development Goals
SEMC	Southern and Eastern Mediterranean Countries
SEMCs	Southern and Eastern Mediterranean Countries
SPS	Sanitary and Phytosanitary
UfM	Union for the Mediterranean
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
URAA	Uruguay Round Agreement on Agriculture
US	United States
WEF	World Economic Forum
WFP	World Food Programme
WTO	World Trade Organization

euromesco
Policy Study

IEMed.
European Institute of the Mediterranean

Co-funded by
the European Union