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FOOD SECURITY IN THE MEDITERRANEAN REGION: AN ENTREPRENEURIAL PERSPECTIVE FROM EGYPT, TUNISIA AND LEBANON

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1 OVERVIEW

Food security is becoming one of the most debated topics whenever the eminent challenges of the South Mediterranean region are discussed. The latest IPCC report highlights the scenarios which are expected to amplify the current pressures on local ecosystems, economies and human well-being in the Mediterranean Basin (IPCC, 2022). Overall, reduced crop yields and fishery landings, combined with other factors such as rapid population growth and urbanisation, increasing competition for water, as well as changing lifestyles, are impacting food security in North Africa and the Middle East (Jobbins and Henley, 2015), further exacerbated by economic and social unrest, COVID-19 and the Ukraine crisis.

The international community agrees on the fact that countries in the region need urgently to develop more effective adaptation measures for the agriculture sector (Gaaloul, Eslamian, and Katlane 2020). Based on the most recent FAO analysis, given this current situation, the region is unlikely to achieve zero hunger (SDG 2) by 2030 (FAO et.al 2023). On the other hand, the Mediterranean region is characterised by a vibrant and growing young generation, increasingly skilled, that could contribute to changing the region's food security pathways through innovative entrepreneurial projects.

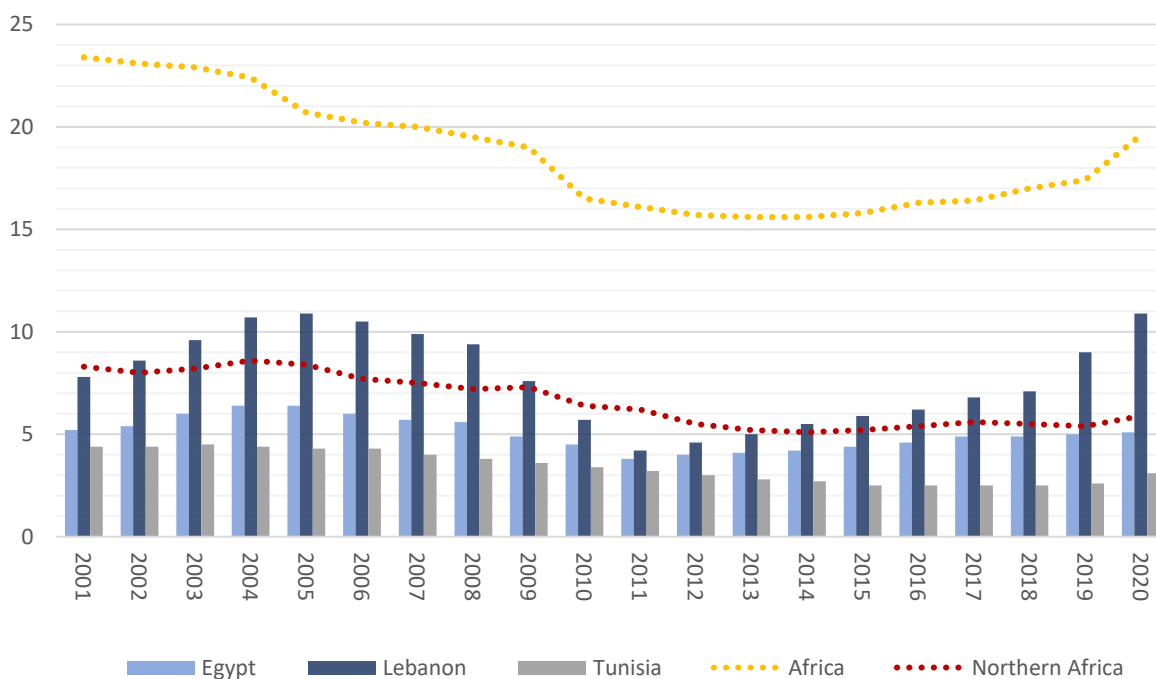
This paper aims at understanding the current state of food security in Egypt, Lebanon and Tunisia, the relative strategies put in place, and to look at the situation from an entrepreneurial viewpoint, thanks to a focus group discussion carried out with entrepreneurs from the INVESTMED¹ project. Finally, it provides targeted policy recommendations, from an entrepreneurial perspective, on food security.

¹ INVESTMED (InNoVativE Sustainable sTart-ups for the MEDiterranean) is a project co-funded by the European Union under the ENI CBC Mediterranean Sea Basin Programme 2014-2020 and aims to address both economic and environmental challenges, by supporting new, sustainable business opportunities for young people and women in three Mediterranean Partner Countries: Egypt, Lebanon and Tunisia.

2 THE STATE OF FOOD SECURITY

Food Security (FS) is a multidimensional and complex concept (See Box.1). Whilst the availability of food is only one key component of FS, the lack of availability and access to food is still a major issue globally. *Hunger*, traditionally measured through the *prevalence of undernourishment (PoU)*, has declined during recent decades but started to increase again in recent years. Particularly in the aftermath of the COVID-19 pandemic, the PoU throughout the world rose sharply, from 8% in 2019 to around 9.8% in 2021, when between 702 and 828 million people were estimated to be affected by hunger². Estimated hunger is particularly worrisome in Africa, where the prevalence of undernourishment is around 20.2% (278 million people, 2021 FAO estimation)³.

Figure 1 - Prevalence of Undernourishment (%): target countries and regional comparison (2001-2020)



Source: Author’s elaboration based on data from FAO Sustainable Development Goal Indicators, available at <https://www.fao.org/sustainable-development-goals/indicators/211/en/> , consulted on 01/04/2023.

Note: European Union levels of undernourishment are <2,5% for all the period.

² See <https://www.fao.org/hunger/en/> , consulted on 01/04/2023.

³ *Idem.*

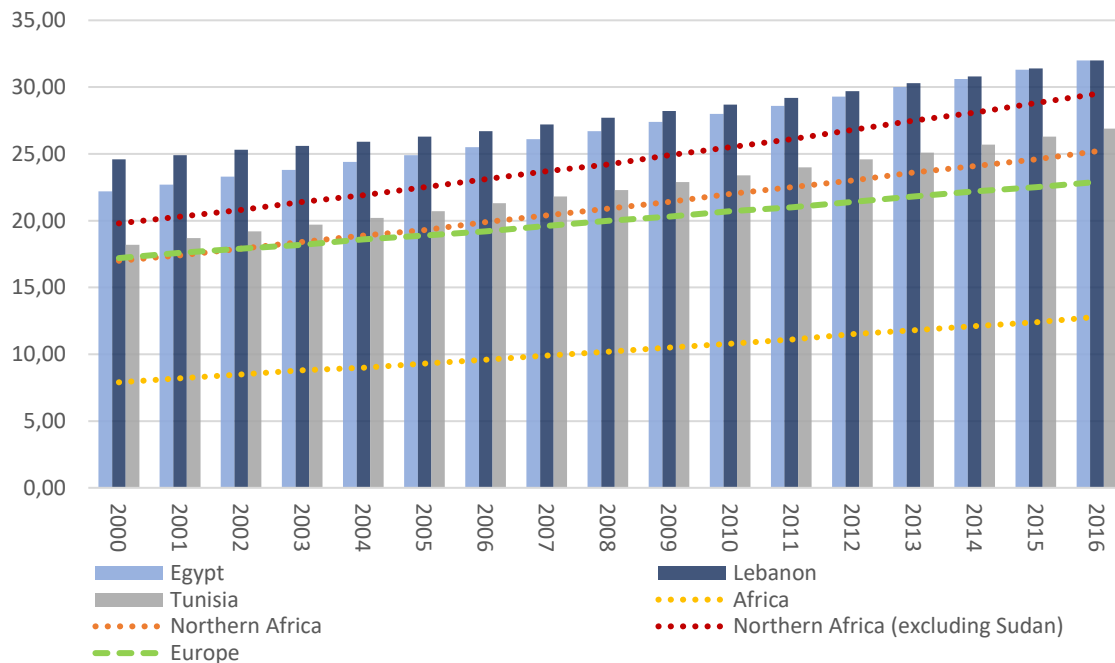
Figure 1 shows that the target countries (Egypt, Lebanon, and Tunisia) follow the same trend of the Northern Africa and Africa region with a decline of PoU in the early 2000s that started to increase again after 2011. The PoU in the Northern Africa region is mostly less severe than in Africa, and the increasing trend less acute. Amongst the target countries, Lebanon is showing worrisome levels of PoU, much higher than Egypt, Tunisia and the regional average. Moreover, the country reached a PoU of around 10% in 2020, much higher than the levels observed over the last two decades, denoting a fast and worrying deterioration.

On the other hand, *obesity*, is also increasing. Obesity amongst adults has risen dramatically during recent last decades, nearly doubling globally from 8.7% in 2000 to 13.1% in 2016 (FAO et al. 2022). In Africa, obesity increased less sharply than in other regions but is reaching levels close to 15% (2016). Northern Africa exhibits an obesity trend that is sharply increasing (particularly when excluding Sudan, where undernourishment is still particularly severe), moving from around 20% in 2000 to almost 30% in 2016 (Fig. 3). Whilst Tunisia shows an increasing trend, albeit below the regional average, Egypt and Lebanon show obesity levels above the regional average. Several countries in the region are, indeed, experiencing the *double burden of malnutrition*, since they show the co-existence of both undernourishment and obesity. In the case of Tunisia, the double burden of malnutrition is due to the socio-economic condition together with other factors, like poor variation of diet, physical inactivity and poor eating habits, often with overreliance on wheat-based foods, with women being more affected than men⁴. On the other hand, Egypt is facing a *triple burden of malnutrition*, with a consistent presence of undernutrition, overnutrition and micronutrient deficiencies.⁵

⁴ See <https://www.wfp.org/operations/tn02-tunisia-country-strategic-plan-2022-2025>

⁵ See <https://www.fao.org/egypt/programmes-and-projects/food-nutrition-security/zh/#:~:text=The%20coexistence%20of%20both%20forms,of%20economic%20and%20human%20costs>

Figure 2 - Prevalence (%) of obesity in the adult population (18 years and older): target countries and regional perspective (2000-2016)



Source: Author’s elaboration based on data from FAO Sustainable Development Goal Indicators, available at <https://www.fao.org/sustainable-development-goals/indicators/211/en/>, consulted on 01/04/2023.

Note: European Union levels of undernourishment are <2,5% for all the period.

FAO defines FS as *moderate* when people face uncertainties about their ability to obtain food and have been forced to compromise on the quality and/or quantity of the food they consume, and *severe* when people run out of food and, at worst, have gone a day (or days) without eating⁶. In Africa, 57.9% of people experienced moderate or severe food insecurity in 2021, the highest level estimated in the world, followed by Latin America and the Caribbean (40.6%) and Asia (20%)⁷. Indeed, beyond the quantity of food, its nutritional and healthy component is also key. In this respect, FAO estimates that people not able to access a *healthy diet* in 2020 increased globally, a trend particularly high in Asia (78 million more people than in the previous year), followed by Africa (25 million more people than in the previous year) (FAO et al. 2022). FAO estimates that, in Egypt in 2019, around 27.8% of the population was experiencing moderate or severe food insecurity, whilst in Tunisia this figure was 25.4%.

⁶ See <https://www.fao.org/in-action/voices-of-the-hungry/fies/en/>, consulted on 01/04/2023.

⁷ See <https://www.fao.org/interactive/state-of-food-security-nutrition/en/>, consulted on 01/04/2023.

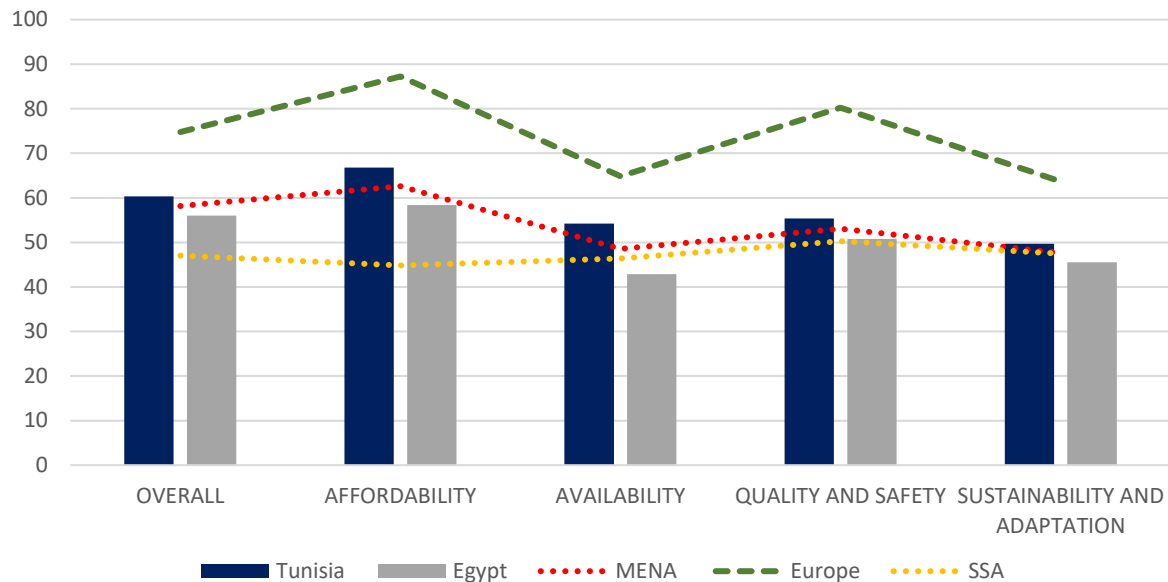
BOX 1 - Food Security: a multidimensional concept hard to measure.

In the aftermath of the Second World War, Food Security (FS) was mainly referring to hunger and undernourishment. Particularly after the international food crises during the 70s, the FS definition started to be related to the issue of food supply and price volatility management. Some years after, during the 80s, Amartya Sen highlighted the need to consider the definition and for the analysis of FS relations, poverty and capabilities, since food availability alone (the supply side, mainstream interpretation of FS at that time) did not automatically imply the access to food for a huge part of the population (Sen 1981). In 1996, the World Food Summit on Food Security defined food security (FS) as a condition *when all people at all times have physical and economic access to sufficient, safe, and nutritious food that meets dietary needs and food preferences for an active life*, officially adopted by FAO as the FS definition in 2006. Beyond the mere supply of food, its quality and the capability of people to have access to it, started to play a central role in the FS debate and its understanding. Several international organisations, particularly after the 2007-2008 crisis, began working on the monitoring and analysis of the complex components of FS, in order to provide policy recommendations to build better, safer and more just access to food for all. The process is ongoing and there is no unique indicator or set of globally accepted indicators. Pangaribowo et al. (2013) proposed a framework which classified a heterogeneous array of indicators collected from a large set of sources, classifying the indicators into three categories: FS outcomes, risks and main drivers /determinants of FS and basic conditions linked to FS (i.e., infrastructures and policy interventions). These were also differentiated between short and long-term because they underlined that food and nutrition security could be a short-term phenomenon or a structural one, persisting for a long time and, perhaps, with some intergenerational outcomes (indicators are also targeted at the individual, household and macro levels) (Pangaribowo, Gerber, & Torero, 2013). Most recently, the Food and Agriculture Organisation of the United Nations (FAO) identifies four dimensions to clarify and monitor FS (FAO, 2017): Availability of food, the provision, supply or existence of food supplied through the production of the country or imports; Access to food, presence of sufficient economic resources, and physical facilities, so that people can acquire food that is available to meet their needs;

Utilisation, or the analysis of biological use and consumption accounting for the micro and macronutrients fundamental for the body to be fed in a healthy way; and Stability of all the elements that contribute to guaranteeing food security, and then by all the factors that may affect each dimension. Each dimension is monitored through several indicators handy for measuring the state of FS, but a lack of more comprehensive analysis of FS, which includes possible social, environmental and economic links at different levels, is needed to better assess the right policies. The Economist Intelligence Unit went some steps towards designing and constructing - with Corteva Agriscience - the Global Food Security Index (GFSI). The index accounts for the dimension of affordability, availability, quality and safety. During recent years, the EIU added the natural resources and resilience category and created many qualitative indicators, many of which related to policy, with the aim of accounting for different drivers of food security, which are not currently measured in any other dataset. In March 2022, a review of the index assessed the framework, considering modifications to the index's indicators and alternatives for indicators with data constraints. Finally, there have been several recent attempts to better monitor FS, exploring new ways of aggregating indicators, capturing FS dimensions and comparing FS levels amongst countries and communities (Borman et al. 2022)(Cafiero, Viviani, and Nord 2018).

The Global Food Security Index (GFS) is a composite indicator measuring FS and some of its key dimensions (See Box 1). Fig. 3 shows the level of each FS dimension and the overall GFS Index score for the target countries (unfortunately there is no data for Lebanon at the time of writing) and puts them in comparison with MENA and other regions. From Fig. 3, we see that the MENA region only performs better than the Sub-Saharan African Region, overall and for all the FS dimensions. Europe is the best-performing region along all the dimensions, whilst the Sub-Saharan African Region is the region with the lowest food security score (below 50 out of 100). Tunisia performs better than Egypt and the MENA average in all the FS dimensions. Both Tunisia and Egypt follow the trends of the other regions, showing the highest scores in the Affordability of food, followed by the Quality and Safety of food.

Figure 3- Global Food Security Index in Target Countries: regional comparison (2022)



Source: Author's elaboration based on data from GFS Index 2022

<https://impact.economist.com/sustainability/project/food-security-index/download-the-index>

Looking more granularly at the GFSI dimensions' components⁸, one of the indicators under the *Affordability* dimension scoring worst is *Agricultural trade* (weighted average of the indicators of agricultural import tariffs and trade freedom), more negatively for Egypt than for Tunisia. The *Availability* score for Egypt is strongly negatively affected by the indicator of *access to agricultural inputs* in Egypt, whilst the *agricultural research and development* indicator is very low in both Egypt and Tunisia. Under the *Quality and safety* dimension, the indicator of *nutritional standards* is very low in both Egypt and Tunisia, whilst Egypt is also very low in *dietary diversity*. The *Sustainability and adaptation* negative score is mainly driven by the *water* indicator in both Egypt and Tunisia. Finally, whilst Egypt scores very badly in the *political commitment to adaptation* indicator, Tunisia scores very negatively in the *disaster risk management* indicator.

Furthermore, amongst the major risk factors for regional food security are *water scarcity and the food import dependency*, making them particularly exposed to global price surges.

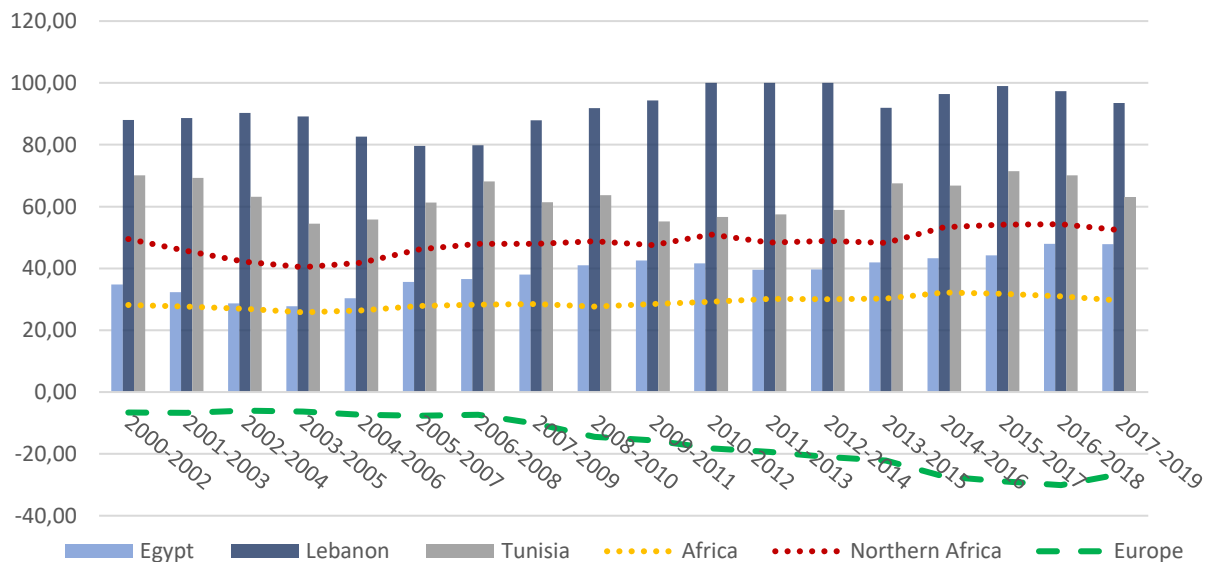
Fig. 4 shows that Northern Africa has been highly dependent on cereal imports, much more than Africa on average. Cereal import dependency is particularly high in Tunisia and much more so in Lebanon, around 50% more than the regional average. Whilst the COVID-19 pandemic led to a

⁸ GFS Index 2022 <https://impact.economist.com/sustainability/project/food-security-index/download-the-index>

deterioration in both the supply and demand side of food security (Albanese et al. 2020; Dina Atef Mandour 2021), the most recent Russia-Ukraine war placed more stress on regional food security, since several countries in the region import more than 50% of their cereal needs, especially wheat, from Ukraine and Russia (Ben Hassen and El Bilali 2022). In Egypt and Tunisia respectively, 19% and 13% of calories are imported from countries with conflicts, whilst about 15% of the calories needed in both countries are threatened by export restrictions⁹. In Lebanon, around 30% of the calories needed by the population are imported from countries affected by conflicts, whilst about 29% are threatened by export restrictions¹⁰.

Moreover, due to the critical consequences of the war and hampered by the effects of climate change, several countries started banning the export of basic food, contributing to the increased risk of food insecurity generating an increase in prices, a huge loss in calories traded, as well as increasing panic amongst consumers, leading to irrational consumption behaviour. Indeed, the region is particularly vulnerable both from a socio-economic point of view and from a climatic one, with climate change negatively impacting the national capability of satisfying food demand (Gaaloul, Eslamian, and Katlane 2020).

Figure 4 - Cereal import dependency ratio (% , 3-year average): target countries and regional perspective (2000-2019)



⁹ Data from the IFPRI Food Security Portal, available at <https://www.foodsecurityportal.org/node/1950>, consulted on 1/05/2023.

¹⁰ Data from the IFPRI Food Security Portal, available at <https://www.foodsecurityportal.org/node/1950>, consulted on 1/05/2023.

Source: Author's elaboration based on data from FAO Suite of Food Security Indicators, available at <https://www.fao.org/faostat/en/#data/FS>, consulted on 01/04/2023.

Climate change in the region is causing persistent dryness, dramatically affecting its cereal harvest capacity (FAO 2022). The Mediterranean Basin is considered a “climate change hotspot”, an area with a high level of vulnerability for both human societies and ecosystems, whilst also being critically exposed to changes related to climate change, in particular: a strong likelihood that the region will experience higher temperatures, less rainfall and a continued rise in sea levels (Cozannet et al. 2022). During the summer of 2021, multiple intense fires burned thousands of hectares of land in North Africa, damaging orchards and affecting livestock. In Tunisia, fires destroyed 100 hectares of forest and hundreds of hectares of land (WMO, 2022). Some countries in the region, like Tunisia, are below the water scarcity threshold set by the FAO, whilst Egypt is particularly exposed, with several coastal cities at a risk of inundation and, in all countries, climate warming is damaging people's health, as well as agriculture and sealife, further impacting emissions.

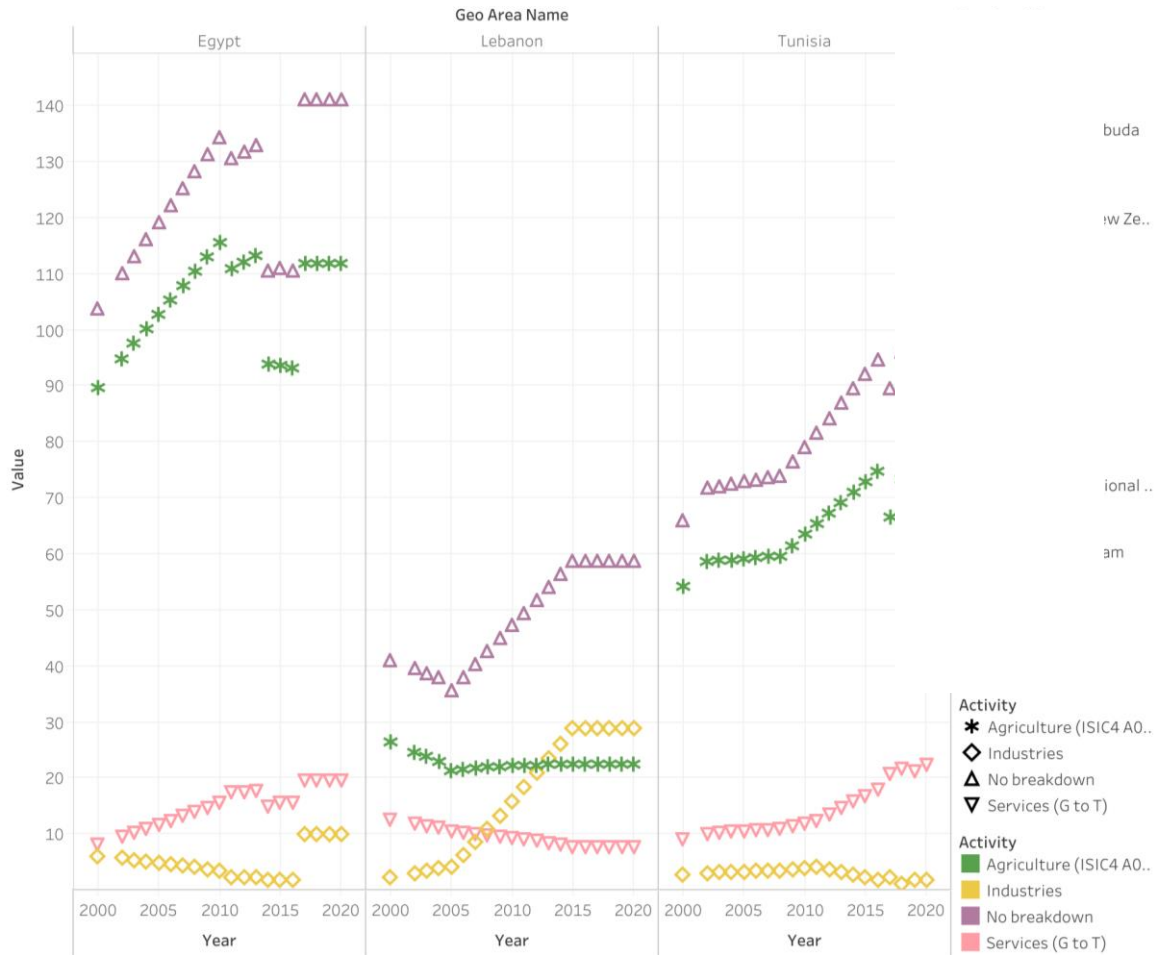
Fig. 5 shows the level of water stress in target countries by economic activity over the period between 2000 and 2020. The overall water stress level is clearly high and particularly worrisome in Egypt, where the level of water stress already went above 100% in the early years of 2000, peaking at 140% during the last five years.

Looking at SDG monitoring, whilst at a global level the SDG Indicator for water stress (SDG6.4.2) has been maintained at a safe level (18.6%), there are substantial regional variations, with North Africa being amongst the regions exhibiting the most worrisome level¹¹. In 2019, Northern Africa had critical water stress of 120.5% and, whilst the global water stress level increased by 0.3 percentage points between 2015 and 2019, at the regional Northern Africa level it registered an increase of 12.7 percentage points¹². With this in mind, it is clear that countries in the Mediterranean region should rapidly adopt robust measures to save water and to increase the efficiency of water use.

¹¹ See <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/642-water-stress/en>

¹² Idem.

Figure 5 - Water Stress in Target Countries (2000-2020)



Source: generated by the Sustainable Development Goals’ Dashboard of the Food and Agriculture Organisation of the United Nations (FAO), retrieved on 20 May 2023, available at <https://www.fao.org/sustainable-development-goals/indicators/642/en/>

Note: The level of water stress shows the freshwater withdrawal as a proportion of available freshwater resources. It is the ratio between total freshwater withdrawn by major economic sectors and total renewable freshwater resources, after consideration of environmental water requirements. This indicator is also known as water withdrawal intensity and measures progress towards SDG Target 6.4.

As already mentioned, Mediterranean and African countries show severe structural and systemic vulnerabilities, aggravating the socio-economic effects of the COVID-19 pandemic (Ayadi, Forouheshfar, and Ronco 2022). Most of them exhibit fragile economies, conflicts are endemic and political uncertainty is the norm. The sharp decline in oil prices in the aftermath of the pandemic placed

further pressure on the fiscal position of exporting oil countries, who are key players in the area. Furthermore, high debt levels, border closures and trade-restrictive policies are challenging the already precarious state of food security across all African and Middle East fields (Ritchie et al. 2020). The relatively weak economic capacity is hampered by various socio-economic issues, making the countries more vulnerable (i.e., high level of poverty and inequality, lack of social protection and high levels of unemployment and informality). All the challenges and the vulnerability of the region are jeopardised by the sharp increase in food and agricultural commodity prices between 2022 and 2023, particularly affecting the most vulnerable populations, who are already spending 40% or more of household income on food and who have been the most affected by the COVID-19 pandemic (Berkhout, Bergevoet, and van Berkum 2022). Food inflation is particularly alarming in Lebanon, as a result of the currency and banking sector crisis, which stands at about 350% (54.7% in Egypt and 15.6% in Tunisia)¹³ and the increased threat it poses to more vulnerable people at a high risk of food insecurity.

3 KEY RECENT POLICIES IN EGYPT, LEBANON, AND TUNISIA

Key Initiatives at National Level: National Strategies

On September 2022, the WHO country office in Egypt organised a workshop to review and finalise the national food and nutrition strategy 2022–2030¹⁴, given that the last national strategy, specifically targeting food and nutrition security in the country, dated back to 1994¹⁵. Nevertheless, in 2017 Egypt established the *National Food Safety Authority (NFSA)* by law, an independent service authority affiliated to the Presidency of the Republic and headed by the Prime Minister. NFSA is currently developing its first strategy for the period (2023-2026) “which aims to enhance planning and strict implementation of food control programmes and systems by keeping pace with the digital transformation of services supporting the control system, e.g. smart inspection and digitisation of Export Health Certificates (EHCs), in addition to strengthening the analysis laboratory system through electronic connectivity to ensure the effectiveness of operations, and the accuracy and reliability of results supporting decision-making in order to continue achievements, and increase the production rates of safe food for consumers and hence increase the access of Egyptian food exports to the global

¹³ Data from the IFPRI Food Security Portal for March-April 2023, available at <https://www.foodsecurityportal.org/node/2432> , consulted on 15/06/2023.

¹⁴ <https://www.emro.who.int/egy/egypt-news/towards-launching-the-national-strategy-for-food-and-nutrition-2022-2030-mohp-who-egypt-and-other-un-partners-convene-a-multisectoral-workshop.html>

¹⁵ <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC208225/>

markets, and support Egypt's leadership, whether regional or global"¹⁶. Moreover, Egypt has emerged as a regional leader in implementing the 2030 Agenda through its sustainable development strategy, *Vision 2030*, a framework for the country's economic, social and environmental development priorities up to 2030, a "roadmap for maximising competitive advantage to achieve the dreams and aspirations of Egyptians in a dignified and decent life" (Sustainable Development Strategy (SDS) - Egypt Vision 2030, 2016). Most recently, in 2022, Egypt issued a key policy for food and nutrition, the Egypt National Climate Change Strategy (NCCS) 2050¹⁷. Whilst the core of the strategy specifically addresses environmental protection measures (i.e. emissions reduction, energy efficiency etc.) to increase agricultural production, the Strategy proposes: (1) the development of different varieties and hybrids of strategic crops (i.e. highly productive and tolerant to adverse weather conditions); (2) to allocate new agricultural land to increase the agricultural area; and (3) to rationalise water consumption in agriculture and reuse of agricultural wastewater. Moreover, in order to increase food security, the Strategy proposes: (1) to provide sources of proper nutrition in the poorest areas with a focus on vulnerable groups; (2) to use more efficient technologies to reduce food waste; (3) to preserve natural resources as an essential source of food; (4) to promote education about the risks and negative impacts of climate change on food security.

Lebanon issued its *National Nutrition Strategy and Action Plan 2021-2026*, adopted with the Resolution No. 485/1 of 2022¹⁸. The Strategy focuses on five strategic areas that aim at responding to key strategic objectives: (1) strengthen multi-sectoral nutrition governance, accountability and information management; (2) align health systems to provide universal coverage of essential nutrition services (health systems) (3) develop and promote sustainable, resilient food systems for healthy diets (supply) (4) develop and promote a safe and supportive environment for nutrition at all ages (environment) (5) develop and promote social protection for nutrition to ensure economic availability of safe food (social protection). Whilst the responsibility for the implementation of the plan rests with the Ministry of Health, an Internal Committee is responsible for the implementation and monitoring of the plan. Another important policy recently issued by Lebanon is *Lebanon's Economy for Sustainable Development*, a nationwide multi-sectoral document directed towards transforming Lebanon's economy from a rentier economy affected by external influences to a specialised and integrated economy (industry, agriculture, services), that can produce high-quality competitive goods, built on the industrial and agricultural sectors. Indeed, one of the pillars is focussed on agriculture and includes certain policy measures, like the development of agricultural roads and irrigation systems, improving the controls on agricultural product safety in the Lebanese markets to make them compliant

¹⁶ <https://www.nfsa.gov.eg/en-gb>

¹⁷ <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC213202>

¹⁸ <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC216968>

with domestic and external standards and market requirements, the adoption of agricultural traceability and labelling, rationalising the use of agricultural pesticides and fertilisers, reducing soil pollution and desertification, conserving biodiversity and ecosystems (forests, pastures, water, fisheries etc.)¹⁹.

The most recent policy implemented by Tunisia relating to food and nutrition security is the *Guidance Document for Development Plan 2016-2020*, issued in 2016²⁰. In particular, it is designed to help eliminate hunger, food insecurity and malnutrition, with the Plan focussing on (1) raising farmers' incomes and improving living conditions in rural areas; (2) supporting and creating new cooperative structures that enable small producers to control the production and marketing chain; (3) working on reducing production costs; (4) stimulating agricultural activity by introducing new technologies and supporting agricultural research and training; (5) intensifying agricultural production within the irrigated areas, supporting large-scale farming, rehabilitating agricultural land and protecting it from flooding; (6) encouraging the use of renewable energies to pump water and exploit it in farming activities in the areas not supplied with electricity. Moreover, the Plan foresees a lot of action to deal with water scarcity via rationalisation, reuse and desalinisation of water, amongst other measures.

Key initiatives at regional level: ARLEM proposals

Whilst the region has always attracted international concern about food security, this has particularly increased in the aftermath of the Ukraine Crisis. In early 2022, FAO published a report called "Addressing food security challenges faced by Near East and North Africa region due to the Ukraine Crisis" proposing some short and long-term recommendations. Amongst the long-term recommendations, it is worth mentioning that FAO highlights the need to develop and commit to implementing national and regional food and nutrition security strategies and suggests building the strategies on the *Zero Hunger Initiative of the League of Arab States* (FAO 2022b). Indeed, in 2017, the League of Arab States (LAS) established a sub-committee for *Hunger Eradication, Food Security and Sustainable Agriculture in the Arab Region* to follow up on the implementation of the 2030 Sustainable Development Goals in the Arab region, particularly Goal 2 (Zero Hunger), whilst advancing FAO's Zero Hunger Initiative in the region (FAO 2022c). As at 2022, the project numbers several small achievements but is still far from being fully implemented by countries.

On the other hand, the *Euro-Mediterranean Regional and Local Assembly (ARLEM)* (the assembly of local and regional representatives from the European Union and its Mediterranean partners) has recently published the new *Action Plan 2023-2025*, recognising the re-thinking of the

¹⁹ <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC214071/>

²⁰ <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC171226/>

agri-food system as a priority. To tackle it, ARLEM will “rigorously follow up the related recommendations in the report on *Agriculture and food security in the context of climate change in the Mediterranean*” adopted in February 2021 (ARLEM, European Committee of the Region, 2022). The first set of recommendations they propose is linked to the promotion of the Mediterranean diet, recalling that the Mediterranean diet has already been classified by UNESCO as part of an intangible cultural heritage. One of the key actions they promote is to develop local seed registers and local seed banks, whilst also encouraging traditional Mediterranean agriculture as a major source of knowledge in reinstating ancient and resilient Mediterranean crops. Secondly, ARLEM also suggests promoting sustainable agricultural practices through initial and lifelong training, in order to enhance the added value of resilient and diversified farming activities, talking about food products, as well as bio-economy opportunities, production of renewable energies likened to agricultural production, and agritourism. Interestingly, they also propose to divide Mediterranean agronomy into systems suited to their specific environment. Moreover, they suggest opting for more resilient species of crops and growing cereals adapted to the desert region. The third set of recommendations relates to preserving water resources and managing them more efficiently. It includes making irrigation more efficient, improving water governance, reducing and re-using wastewater, and developing AI and related technologies. Finally, ARLEM suggests supporting food security and food sovereignty. Here again, the creation of *local seed banks* is seen as crucial, together with *regional databases* of all local producers, in order to promote short distribution chains and to step-up food storage policies and promote *Globally Important Agricultural Heritage Systems (GIAHS)*. Moreover, ARLEM highlights the need to introduce new measures for the preservation of coastal areas and fisheries management, to support local farmers in climate change adaptation and mitigation, and to reinforce regional integration that develops strategic partnerships for food security through Mediterranean trade and cooperation agreements. They suggest revising Economic Partnership Agreements (EPAs) between Mediterranean and African countries, to make them more favourable for the development of local production chains.

It is also worth mentioning the key initiatives ARLEM wants to put in place, in order to guarantee food security in the context of climate change in the Euro-Mediterranean region:

- Organise a meeting of Union for the Mediterranean (UfM) with agriculture, environment and health ministers, focussing on food security and adapting Mediterranean farming systems to changing climate conditions;
- Draw up a Charter for Euro-Mediterranean food sovereignty, with a common policy declaration and targets for signatory countries and Local Regional Authorities (LRAs);
- Lay the political groundwork for the creation of a common Euro-Mediterranean response to food system crises, with an Emergency Plan and an Agricultural Solidarity Fund;

- Set up a Euro-Mediterranean observatory for agricultural markets, resilient agri-environmental practices and sustainable food systems;
- Boost human capital developing initial/lifelong training programmes, interactive research workshops and a technical advisory bureau for agri-industrial businesses, professional agricultural organisations/cooperatives on climate disruption, agro-ecology, water/soil management, circular economy, food waste, urban agriculture;
- Develop a “Mediterranean product” or “Mediterranean diet” label, with a specific set of criteria and a broad communication plan;
- Launch “Grow well, eat well” awareness-raising campaigns, in line with the new European Farm2fork and Biodiversity 2030 strategies, including sustainable/resilient agriculture, agronomic R&D (agritech), bioeconomy and food security/sovereignty in the Mediterranean region within the European programmes and funds.

International Key Initiatives: Food System Dialogues

One of the most interesting initiatives promoted recently at the international level is the *Food System Dialogues*²¹. This is an initiative launched in 2018 by EAT, the Food and Land Use Coalition (FOLU), the Global Alliance for Improved Nutrition (GAIN), World Economic Forum (WEF) and World Business Council for Sustainable Development (WBCSD) and, with time, became the key base preparation for the Food System Summit²². The Food Systems Summit Dialogues represent a framework for enabling systematic and inclusive opportunities for stakeholders to be engaged in food system discussions, elaborating pathways for defining national strategies.

Both Egypt and Tunisia organised a Food System Dialogue between 2020 and 2021, leading to interesting proposals and engagements for the management and enhancement of food and nutrition in their respective nations.

Egypt launched its food system dialogue in 2020. The final official feedback report highlighted that “the key challenges and threats to Egypt food systems and their transformation towards sustainable forms of production and consumption include water scarcity, population growth, urbanisation, persistent food safety and quality problems and the prevalence of unhealthy consumption patterns leading to concerning levels of malnutrition”²³. After the Food Systems Summit, the convening team from Egypt highlighted that they wanted to establish a *multi-stakeholder*

²¹ <https://summitdialogues.org/overview/>

²² <https://www.un.org/en/food-systems-summit>

²³ <https://summitdialogues.org/dialogue/30933/official-feedback-30933-en.pdf?t=1628772311>

mechanism for national food systems coordination (UN, 2022), even though at time of writing it is not clear whether this idea is going to materialise.

Tunisia organised a food system dialogue in 2021, focussing on three key thematic: Promoting regional food models that encourage access for all to healthy and nutritious food; Moving towards sustainable consumption and production patterns; Building resilience to vulnerability, shock and stress²⁴. One of the key points stressed in the report is the willingness to strengthen partnerships between relevant stakeholders along the food chain in the Mediterranean area and to better document the history, benefits, and regional and local specificities of the Mediterranean diet, whilst further developing the labelling of health-promoting Tunisian products, providing clear information on the products based on the Codex Alimentarius²⁵. Digitalisation and blockchain technologies are also present as key tools, both for the education and promotion of healthy diet and for the improvement of the efficiency and safety of the food chains.

Whilst Lebanon did not organise a dialogue, it hosted, in Beirut, an independent dialogue convened by the Economic and Social Commission for Western Asia (ESCWA), the Food and Agriculture Organization (FAO) and the Arab Youth Dialogue on Food Systems²⁶. The identified dialogue resulted in some interesting suggestions, summarised below:

- Raise awareness on the effects of malnutrition and its cost on health
- Let people better understand the food chain and the importance of reducing waste (whilst subsidising initiatives to re-use food waste to make compost, energy and for animals)
- Give equal rights to women and men in accessing resources, stop child forced labour and promote youth-led economic empowerment programmes to reduce high unemployment rates
- Review land and water tenure modalities to ensure equitable access to resources and allow land access to nomad Bedouins, make available different sets of food pricing to enable access to cheap food for the most deprived and ensure access to basic food as a basic right for all
- Build capacity to improve use of green technologies that are affordable, use water saving technology to help farmers and promote use of non-conventional water resources
- Promote research, use of technology and renewable energy, use climate resilient crops that require less amounts of water and save local seeds and improve agro-diversity
- Shift to plant-based protein consumption and reduce meat consumption

²⁴ <https://summitdialogues.org/dialogue/31069/official-feedback-31069-fr.pdf?t=1625660506>

²⁵ Codex Alimentarius, a set of standards and guidelines developed by FAO in collaboration with the World Health Organisation (WHO) in 1963, for the purpose of harmonising food quality standards and the rules to follow in the production of them
<https://www.fao.org/fao-who-codexalimentarius/en/>

²⁶ <https://summitdialogues.org/dialogue/7085/official-feedback-7085-en.pdf?t=1617356615>

- Reduce import dependency by diversifying trade partners and increase trade on food products between Arab nations
- Return to local food traditions instead of globalised ones, given the local foods are the ones most adapted to local climatic conditions
- Subsidise environmentally friendly agriculture practices (permaculture) and follow scientists' recommendations on climate change issues and other hazards

Most of the policy recommendations are targeting policymakers. Nevertheless, entrepreneurs could play a key role in the development and promotion of food and nutrition. Indeed, entrepreneurship can create solutions through the development of technologies and innovative projects involving farmers and citizens, promoting best practices and new approaches. Most of the points raised in the strategies and plans, analysed in this section, are actions or solutions that can be provided by the entrepreneurial environment. The next section delves into the entrepreneurial perspective, to better understand the entrepreneurial contribution to food and nutrition security in the region.

4 CHALLENGES AND OPPORTUNITIES: EVIDENCE FROM INVESTMED ENTREPRENEURS

In May 2023, EMEA launched a survey of entrepreneurs participating in the INVESTMENT project. In the survey, the entrepreneurs were asked about the role of their businesses in promoting food security, either directly or indirectly.

Only 30% of those surveyed considered it their business to contribute to food security. Amongst those who recognised they were making a contribution to FS, 50% thought their business contributed to the Availability dimension of FS, 25% to Utilization, 13% to Stability and 12% to Access. Interestingly, whilst 50% of the answers came from green businesses, the remaining 50% was divided into CCI and blue businesses. These results suggest a multi-sector approach to FS. This issue has been further explored via a focus group, together with the motivations to start a business agri-food-related, as well as to explore the main challenges and opportunities they see in their countries.

The participants invited to the focus group were selected from the entrepreneurs participating in the INVESTMED project and receiving the grants. Amongst all the INVESTMED entrepreneurs, only those operating in the agri-food sector were chosen, including businesses in the green and blue economies and in the CCI sector. Not all the entrepreneurs selected were able to participate. Finally, five participants took part in the focus group, four being based in Lebanon and one in Tunisia. The size and the composition of the focus group cannot be considered significant to establish a clear

understanding of the region. Nevertheless, we think that it raises many interesting points to reflect upon, that could be further investigated with more research, interviews and focus groups. Moreover, the principal scope of the study is to understand the perspective of the entrepreneurs involved in the project.

The questions guiding the discussions were divided into three key groupings related to a specific objective of the research, as reported below:

Objective 1: Understand the motivations driving entrepreneurs to start a business in the agri-food-related sector.

- Why and when did you become attracted to the agri-food-related sector? Is it a more personal/cultural/education-driven choice? casual choice/opportunity?
- Do you see the young generation attracted by the agri-food sector? Why yes/now? Do you think Needed? How to increase their participation?

Objective 2: Understand their view on food security.

- What do you know and how about food security? What's food security for you?
- How do you see your business impacting food security?
- What do you think about the collaboration amongst sectors (like cultural/green businesses) to promote food security?

Objective 3: Understand key challenges and opportunities encountered.

- What are 2 challenges and 2 opportunities that have been fundamental in developing your idea/ your actual job?
- Are these related to agri-food sector-specific characteristics/country characteristics/skills/education issues/information/funds?
- What do you expect about the possible impact of your business for your country/region?

The discussion was divided into three sessions, to better focus on the relative three objectives of the research. The discussion was guided by one moderator and her assistants, with key points being annotated live on a digital wall, using Mural. Annexe 1 reports the three walls created on Mural during the discussion, summarising the notes taken during each session of the focus group and highlighting the major issues raised.

The analysis of the focus group reveals that most of the entrepreneurs' decision to start a business in the agri-food sector was related to personal background. In most of the cases, the entrepreneurs developed the interest in the agri-food sector because their parents or grandparents were involved in agri-food activities or living with them in rural areas. In many cases, having experienced rural life, made the entrepreneurs aware about the critical conditions of farmers in rural areas and their need to find new solutions to survive. In all the cases, sustainability and climate change awareness played a key role in the development of the business. Indeed, most of the entrepreneurs developed projects to help farmers resist droughts and water crisis, which are increasingly impacting all the countries in the region. In one case in particular, an entrepreneur reported that a determinant in the development of the business was the lack of availability of healthy, pesticide-free food in his country and the fears of badly feeding its children.

Quality and quantity of food production is seen as one of the key problems for food security in the target countries. Farmers in rural areas tend to rely on traditional farming and are reluctant to adopt new technologies or new ways of developing their business. It seems that there is a generalised **risk aversion amongst farmers**, which is seen as a key obstacle in increasing agriculture productivity, which is certainly driven by the socio-economic crisis the countries are facing, but also because of a lack of awareness, information and access to empirical peer evidence. On the other hand, as largely reported by our previous desk research, one of the key challenges for food security highlighted in the focus group is **water scarcity**. This is hampered by **increasing energy costs and the large use of pesticides**. The high energy costs affect the capacity of farmers to pump water in the traditional way, requiring a lot of energy and increasing the cost of transport needed from remote areas where farmers are usually based, to the grocery stores and costumers in urban areas. Over a period of years, the use of pesticides negatively impacts soil productivity and increases the risk of water pollution; moreover, with the current pesticide crisis generated by the war in Ukraine, rising global pesticide prices are further increasing the cost of production for traditional farmers who largely rely on pesticides. Even so, increasing costs of energy and pesticides generated some positive trends for farmers who started looking for renewable solutions for irrigation and organic solutions for pesticides. Nevertheless, it seems that this trend is still low and driven by the crisis of the moment and farmers are still not aware of the importance of moving towards a sustainable transition in agriculture, mostly because they don't understand the benefits. **Awareness, knowledge and technology** needed by farmers can't be provided by governments because they lack financial resources, particularly in the aftermath of the COVID-19 pandemic. Indeed, most of the help comes from NGOs and international organisations. Nevertheless, the participants highlighted that, in many cases, NGOs and international organisations don't invest money and resources in an efficient way. An example provided by one participant was the delivery

of seeds as part of an international project intervention, without considering that the farmers didn't have the means to irrigate all the land required for the crop.

The business activities they started are closely related to what they studied. Indeed, all the entrepreneurs have a degree, ranging from highly technical, agri-food-related engineering and chemical disciplines, to more overarching rural development and sustainable tourism studies. All the entrepreneurs reported that the knowledge and the expertise acquired at **university was an important driver for developing their business idea, together with the willingness to help their villages and their countries with some concrete actions**. The conducted focus group suggested that tertiary education could play a key role in boosting the innovation and entrepreneurship needed in the agri-food sector to promote food security. Moreover, an interesting finding is that **cultural and creative industries** can help create awareness amongst farmers and to attract young people to test their skills in the agri-food sector. Indeed, cultural and creative businesses could help farmers to understand the reason why there is a need to move to more sustainable and technological solutions and to try different solutions, and show them how, why and to what extent they work. On the other hand, many young people in high schools and at university could find it difficult to see what they could actually do and, in this respect, cultural and creative solutions could help in organising trips, workshops and residencies²⁷ with a multi-disciplinary approach to rural and urban areas and agri-food businesses that could be developed. Moreover, the cultural creative sector can be crucial in creating networks and connections amongst entrepreneurs, to exchange best practices and find complementarities, and encourage supply and demand. To develop **food security that is resilient to climate change and socio-economic crisis** the target countries need coordinated new solutions and schemes for both urban and rural areas, to be developed throughout different sectors. Both in rural and urban areas, aquaponics and hydroponic systems offer an interesting opportunity to grow more crops requiring less water and, in some cases, also less space and energy. Likewise, new types of crops (like algae) could be used to develop important profitable businesses in countries like the target ones. Moreover, **young people could be less reluctant than traditional farmers to try to adopt new ways of doing business and farming the agri-food system**. Nevertheless, all the solutions to be implemented need investments. Fortunately, the entrepreneurs stated that, in their countries, **incubators are creating promising connections between the entrepreneurs' needs and NGO support, to benefit effective and well-targeted investments**.

²⁷ There are already several initiatives around the world placing artists – writers, visual, theatre and performing artists, dancers and musicians – on residential farms for one to four weeks to let both farmers and artists exchange ideas, perspectives and projects.

5 KEY CONCLUSIONS AND POLICY RECCOMANDATIONS

In general, the discussion with the focus group participants revealed that these countries possess a **vibrant young entrepreneurial system, that needs to be promoted through education, awareness, connection and investment.**

Evidence from the overview of FS in the region, highlighted the presence of several global threats (e.g., climate change, energy crisis, trade policies) hampered by the national behaviour of consumers and producers. Therefore, **to address FS requires a combination of national and international policies, to influence both macroeconomics and behavioural aspects related to the whole agri-food value chain.** That's why there is an increasing call for a **food system approach**, capable of taking into consideration all the elements impacting global value chains within the agri-food sector. **Food security needs to be tackled systematically**, through a holistic approach. Interestingly, from an entrepreneurial perspective, the research highlights that all the INVESTMED target sectors (blue, green and creative) can contribute to improving food and nutrition security. Therefore, **innovative Mediterranean blue, green and creative entrepreneurship should be promoted and incentivised to target more and better food and nutrition security.**

The **key opportunities and challenges highlighted by the entrepreneurs are strongly in line with those identified through the desk research** in the first section **and highlighted by the political frameworks analysed in the second section.** This denotes a basis of awareness about FS problems and solutions by the entrepreneurs in the three sectors and this should be exploited through targeted measures. Indeed, whilst countries and international organisations have already developed several policy recommendations, as explored in the previous sections of this study, in this concluding section, I would like to focus on **some key policy recommendations specifically targeting the blue, green and creative sectors in the region.**

The businesses analysed have great potential to provide solutions to the problems highlighted in the preceding paragraphs. Indeed, after analysing the regional and national issues, strategies and entrepreneurial activities, rather than focusing on the key FS problems, I will focus on key FS solutions that can be offered by entrepreneurs in the blue, green and cultural sectors, which are the basis for the presented policy recommendations. Solutions and policy recommendations can be divided by the four dimensions of food security, summarised in Table 1, which are as follows:

Policy recommendation 1: New Fund for agri-food start-ups in MENA

The first dimension of FS is Availability (See Box 1 for definition). Under this dimension, from the focus group it clearly emerged that entrepreneurs are developing new technologies enabling farmers to increase productivity and resilience to climate change, capturing carbon, reducing emissions, recycling and saving water. The key problems are access to finance and cultural preparedness for accepting innovation. **To encourage the development and scaling up of these solutions, governments, together with international organisations and financial institutions, should facilitate access to finance for small innovative entrepreneurs with innovative new funds, targeting proposals accounting for climate change adaptation and mitigation, which are related to the agri-food sector and positive FS impacts (in all its dimensions).** Moreover, more funding should also be allocated to cultural promotion, marketing and training of these new technologies.

Most of the time, entrepreneurs developing innovative technologies for the agri-food sector are start-ups, meaning that they need money fast to develop, test and promote the technology they propose. This means that funding should be delivered quickly and the interest charged should be low and slowly repaid, due to the initially slow scaling-up of the technology. Therefore, the proposal is to develop a specific ***Mediterranean Fund for agri-food start-ups***, targeting start-ups with technological and/or cultural projects aimed at enhancing food security in all its dimensions. As in its last declaration, ARLEM proposes to develop an Emergency Plan and an Agricultural Solidarity Fund and to set up a Euro-Mediterranean observatory for agricultural markets, resilient agri-environmental practices and sustainable food systems (See previous section in this paper about key regional initiatives). A new Fund, specifically targeting blue, green and creative innovation in agriculture for food security, could be a perfect complement to ARLEM proposal. It would help start-ups play a pivotal role in transforming the agri-food system in the region. The Fund should be created through the partnership of several National Banks from Mediterranean countries and European Financial Institutions, International Development Institutions and Impact Investors. The financing mechanism should be a Public-Private Partnership scheme, mixing impact investing, revenue-based financing and guarantees. The fund should help the money set aside to be delivered and facilitated rapidly by local banks supported by a flexible repayment schedule, allowing for slow and delayed payments with a low interest rate. The Fund should also finance training and facilitate purchasing and training for local farmers with the help of the incubators, thereby making a meaningful positive contribution towards innovating the agri-food chain in the region.

Policy recommendation 2: community gardens and cooperative markets

Entrepreneurs working in the agri-food sectors are developing a number of I technologies that enable the growing of crops in larger quantities, in smaller spaces and with less need for water

and pesticides. This kind of technology should be adopted and promoted by the local authorities, to reduce the distances between production and consumption. The policy suggestion for this dimension is that local authorities could create a round table with farmers, entrepreneurs and citizens to build cooperatives that manage community gardens in both rural and urban areas. Moreover, these cooperatives could also organise local markets in rural areas, collecting agri-food products from remote urban remote areas and offering a low-cost transport and logistics service for producers participating in the consortia.

Policy recommendation 3: local exhibitions and gatherings

In the region, there are start-ups developing innovative businesses in eco-tourism and agro-tourism, providing activities that share the values of traditional food and traditional cooking. These types of activities should be promoted, since they have great potential to impart knowledge about the Mediterranean diet and its importance, as well as building and preserving community-knowledge. The key policy recommendation under this dimension is that local authorities or local associations should favour development partnerships between local authorities and local entrepreneurs, to organise exhibitions at community level, gathering people from agriculture (green or blue sector) and those from creative sectors to exchange ideas and develop opportunities for disseminating Mediterranean dietary principles through innovative creative projects. These initiatives could be connected and, therefore, sponsored by international organisations (the Mediterranean diet has already been classified by UNESCO as part of intangible cultural heritage) and in connection with the initiatives related to “Mediterranean diet labelling”, which has been proposed by ARLEM (See previous section in this paper about key regional initiatives).

Policy recommendation 4: promoting dialogue for circularity and enhancing collaboration

The last set of policy recommendations are related to the Sustainability dimension of food security. In my opinion, increasing circularity and collaboration are the key pillars for sustainable FS over time. The entrepreneurs in the region are developing innovative instruments and practices to increase the resilience of crops against water shortage and to soil deterioration, along with projects to spread awareness about nutrition, the Mediterranean diet and its positive effects on individual and environmental health. Very often, start-ups and innovative businesses demonstrate great potential for collaborations that could increase circularity and collaboration, which are currently underexploited. That’s why the last policy recommendation is to promote dialogue about circular approaches, involving public authorities and local associations, easing access to public spaces for exhibitions and public training, and co-creating public awareness campaigns both in rural and urban areas. This recommendation is in line with the one proposed by ARLEM about launching "Grow well, eat well" awareness-raising campaigns, in line with the new European

Farm2fork and Biodiversity 2030 strategies, including sustainable/resilient agriculture, agronomic R&D (agritech), bioeconomy and food security/sovereignty in the Mediterranean region, within European programmes and funds.

Table 1 - policy recommendations by FS dimension

FS DIMENSION	ENTREPRENURIAL SOLUTIONS	POLICY RECCOMANDATIONS
Availability	New technologies improving farmers' productivity and resilience.	⇒ Develop a New Mediterranean Fund for start-ups for Food Security – facilitate access to finance and market creation
Accessibility	Selling new technologies and training people in innovative practices (both in rural and in urban areas) to access safe fresh food.	⇒ Develop community gardens in both rural and urban areas ⇒ Create cooperatives /consortia managing/facilitating transportation from farmers to local markets
Utilization	Development of activities (i.e., agro-eco-tourism projects) increasing awareness about traditional farming and traditional cooking	⇒ Local exhibitions gathering people from agriculture (green or blue sector) and those from creative sectors to exchange ideas and develop opportunities/projects in co-creation with the community
Sustainability	Interconnectedness amongst entrepreneurial activities	⇒ Promote projects involving circular approaches adopted by partnerships of entrepreneurs and public authorities/centres via easing access to public spaces for exhibition and training ⇒ Creating/fostering collaboration for co-designing public awareness campaigns both in rural and urban areas

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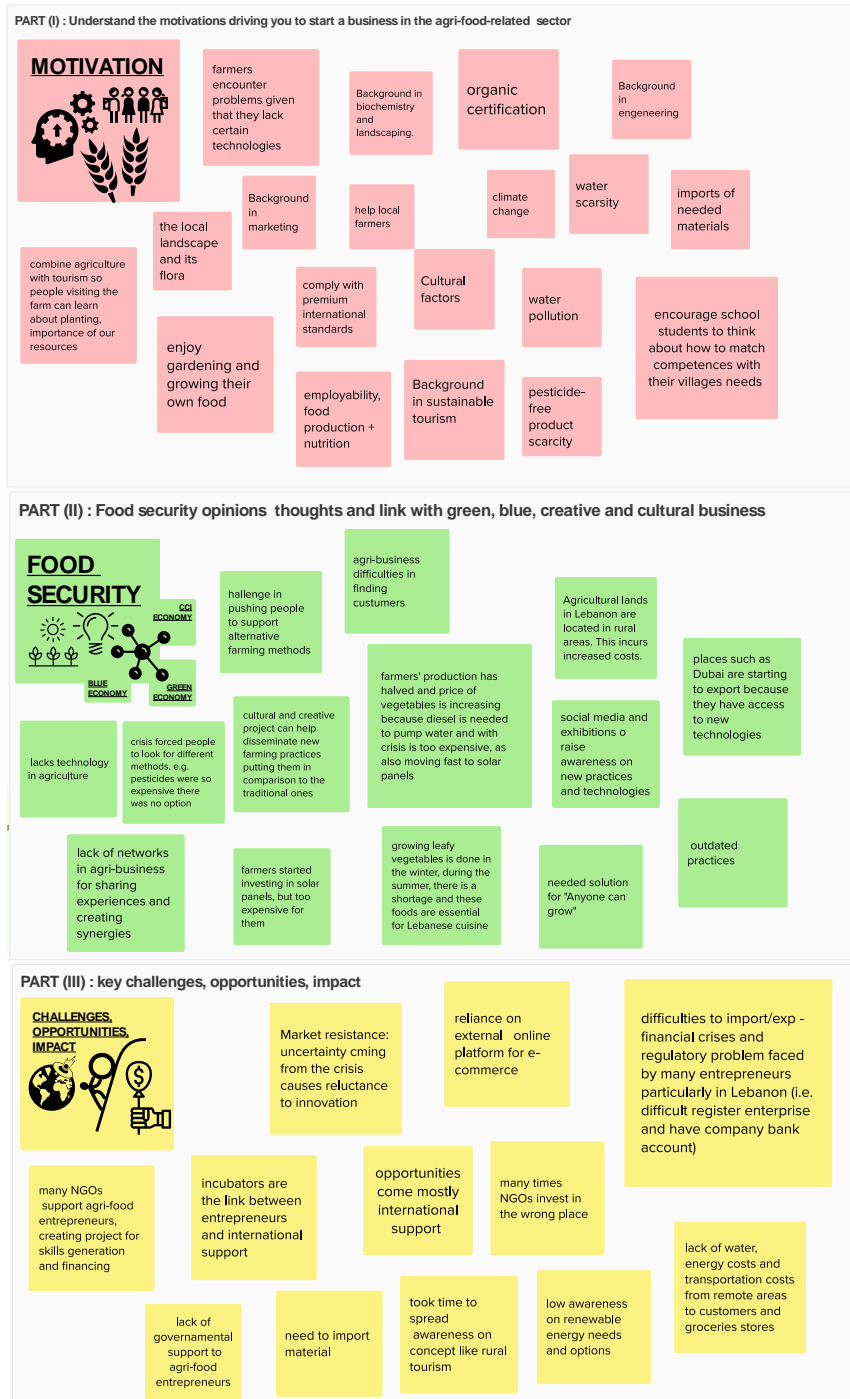
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7 ANNEXE 1 – MURAL REPRESENTATION OF THE FOCUS GROUP RESULTS



ABOUT INVESTMED

Mediterranean MSMEs face important challenges in terms of competitiveness, sustainability, internationalization and capacity to innovate while urgent measures are needed to tackle common environmental challenges and untap the potential of both natural and cultural heritage to contribute to sustainable growth and economic development. Against this backdrop, the INVESTMED project aims at addressing both economic and environmental challenges, by supporting new, sustainable business opportunities for young people and women in three Mediterranean Partner Countries: Egypt, Lebanon and Tunisia.

The INVESTMED Project (InNoVative Sustainable sTart-ups for the MEDiterranean) is co-funded by the European Union under the ENI CBC Mediterranean Sea Basin Programme 2014-2020. INVESTMED has a duration of 30 months, with a total budget of €3.8 Million, of which €3.4 Million (90%) is funded by ENI CBC MED. It has 8 partners from Tunisia, Spain, Lebanon, Greece, Egypt, and Italy:

- Union of Mediterranean Confederations of Enterprises, BUSINESSMED (TU)
- Euro-Mediterranean Economists Association, EMEA (ES)
- European Institute of the Mediterranean, IEMed (ES)
- Beyond Group / Irada Group S.A.L, BRD (LE)
- Institute of Entrepreneurship Development, IED (GR)
- Libera Università Maria SS. Assunta, LUMSA (IT)
- Confederation of Egyptian European Business Associations, CEEBA (EG)
- Spanish Chamber of Commerce, CCE (ES)

INVESTMED will have an impact on MSMEs, start-ups and recently established enterprises where staff will be trained and coached to become more sustainable and competitive and financially supported via an open competition. Specific business incubation services will also be established for sustainable start-ups as well while relevant public authorities will benefit from capacity building and exchange of best practices to facilitate access and protect IPR for MSMEs.

The **Euro-Mediterranean Economists Association – EMEA** is a Barcelona-based regional think-tank that serves as a leading independent and innovative policy research institution; a forum for debate on the political and socio-economic reforms in Mediterranean and Africa; and promoter of actions and initiatives that fulfil objectives of sustainability, inclusiveness, regional integration and prosperity.

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