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Proposal for a Decision of the European Parliament and of the Council

on the participation of the Union in the Partnership for Research and Innovation in the Mediterranean Area (PRIMA) jointly undertaken by several Member States

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0. Introduction

Water provision and food systems in the Mediterranean area are unsustainably managed

The sustainable management of water provision and food systems constitutes a key challenge for the Mediterranean area, which is generally characterised by high levels of hydric stress as no less than 180 million people in the region are considered 'water poor'.

This challenge is being exacerbated by climate change

Climate change is increasingly causing severe water shortages in the region, with major impacts on agriculture, since most of the water available in the region is used for irrigation, thus resulting in decreasing and irregular crop yields. This puts additional pressure on the **natural resources** of this area, such as land, water and biodiversity, and on the capacity of countries to provide **clean water and affordable food** to their inhabitants.

This challenge has important societal impacts including instability and external migration

As a result, important downstream effects occur in society, affecting negatively nutrition, health, livelihoods and standards of living, and levels of wellbeing. This **social and economic stress**, in turn, constitutes a key cause of instability and becomes a cause of **migration**, both internally, leading numerous farm families to move to cities and, externally, driving part of the population to migrate in particular towards Europe.

- Mediterranean countries account for 7% of the world population and 10% of world GDP[1][2].
- Water crises constitute the number one risk that could undermine economic growth, impacting upon several countries or industries within the next 10 years[3].
- A recent World Bank report highlights that the Middle-East and Northern Africa regions could see their growth rates decline by as much as 6% of GDP by 2050 as a result of water-related losses in agriculture, health, income, and property[4].
- The EU absorbs 50% of the agricultural and agro-food exports from the Southern and Eastern Mediterranean Countries while it accounts for 38% of their agro-food imports[5].

Migration is high on the agenda of the EU

There can be no doubt that Europe is confronted with its largest refugee crisis in recent history. In 2015, the number of irregular migrant sea arrivals in Europe was almost five times the number of 2014, increasing from 215,000 to around 990,000. It is estimated that around 3,500 people died in 2014 and 3,700 in 2015 attempting to cross into Europe[6].

[1] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative
[2] See Annex 3
[3] World Economic Forum (2015) Global Risks
[4] World Bank(2016) High and Dry: Climate Change, Water, and the Economy
[5] PRIMA Joint Programme Proposal (2014)
[6] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative

On 7 June 2016, the Commission adopted a Communication on establishing a new Partnership Framework with third countries under the European Agenda on Migration (COM(2016)385 final), which describes the challenge as follows: "*Despite increased efforts by the EU, deaths in the Mediterranean Sea occur on a daily basis. Europe is currently experiencing unprecedented migratory flows, driven by geopolitical and economic factors that will continue, and maybe intensify, over the coming years and indeed it is a global challenge with more than 60 million displaced persons worldwide. They are fuelled by unscrupulous smugglers who seek to benefit from the desperation of the vulnerable. Europe is duty bound to respond; to address the fate of migrants and refugees; to show its citizens that migration, including on the scale we see today, can be managed in a sustainable way. […] Since the adoption of the European Agenda on Migration a year ago, much has been done, not least beyond the EU's borders. […] However, much more needs to be done. The EU is still faced with a humanitarian crisis. Third countries and EU partners are housing millions of refugees, many of them unaccompanied minors, forced to leave their homes, and economic migrants who aspire to come to Europe. Reports suggest that there are tens of thousands of migrants in Libya today, looking for ways to enter the EU, with the number of arrivals increasing every day*".

The Communication proposes a comprehensive response to the refugee crisis: "*To respond in a meaningful way, the EU must use all means available and set itself clear priorities and measurable objectives*". On the one hand, "*development and neighbourhood policy tools should reinforce local capacity-building, including for border control, asylum, counter-smuggling and reintegration efforts*". On the other hand, "***in parallel, work is needed to tackle the root causes of irregular migration and forced displacement by applying sustained, medium and long term policies and to better use existing processes and programmes***".

With respect to tackling the root causes of irregular migration and forced displacement, the Communication presents many very concrete ways forward. The Communication states, for instance, that "*all EU policies including education, **research**, **climate change**, energy, **environment**, **agriculture**, should in principle be part of a package, bringing maximum leverage to the discussion*".

The PRIMA Joint Programme is of key importance for addressing the migration challenge

By delivering common innovative solutions for the sustainable management of water provision and food systems that are adapted to the realities of the region and are easily transferable across it, notably by focusing on the development of close-to-market pilots and demonstrators, the **PRIMA Joint Programme is ideally situated to address some of the root causes of migration**, one of the work streams put on the agenda by the Communication. The PRIMA joint programme is also clearly situated at the interchange between research, climate change, environment and agriculture policies, again fully in line with the logic proposed by the Communication. Finally, the PRIMA Joint Programme constitutes a prime example of the new development cooperation model championed by the Commission insofar as it involves **private investors, leverages limited budget resources, and focuses on SMEs and sustainable infrastructure**.

Coherence between PRIMA's thematic focus and related institutional drivers

The PRIMA Joint Programme fits into an institutional context which, at the highest political level, highlighted the need to strengthen EU cooperation with Southern Mediterranean Countries in the key sectors of water resources and food systems and related areas.

PRIMA anchors key regional challenges in research and innovation (R&I) with broader socio-economic and geopolitical objectives. Recent relevant institutional actions in policies of the EU other than R&I are described below.

Water diplomacy (Foreign Affairs Council Conclusions dated 22 July 2013)

The effects of climate change and demographic and economic development coupled with stress on water quality, availability and management represent existing major security challenges that are likely to give rise to tension and conflict over access to water over the next decade.

In this context, the EU's role in **promoting water diplomacy across the world** and more specifically in trans-boundary waters in Europe is recognised as highly important, including by promoting water initiatives with countries in the EU Neighbourhood and other countries identified in the EU water security mapping.

Review of the European Neighbourhood Policy (Foreign Affairs Council Conclusions dated 14 December 2015)

The Council welcomed the Review of the European Neighbourhood Policy as a key political priority for the EU in coming years. This include **the crucial role of R&I for socio-economic development in the neighbourhood**, while assisting in modernising and diversifying economies in Neighbourhood Countries by facilitating increased participation in EU Initiatives. The Council also embraces the approach towards differentiation and greater mutual ownership which recognises that not all neighbourhood partners aspire to the degree of closeness with the EU. This is reflected in the willingness of Neighbourhood Countries in aligning policies with and committing to the EU in joint actions such as PRIMA.

Sustainable Development Goals (Foreign Affairs Council Conclusions dated 26 May 2015)

Reference is made to the commitment in Horizon 2020 to support **sustainable development** both within the EU and in cooperation with international partners as well as the need to foster science, technology and innovation as part of the overall approach towards poverty eradication and sustainable development post-2015.

Migration (Foreign Affairs Council Conclusions dated 12 October 2015 and 17-18 March 2016)

The conclusions acknowledge that the migration crisis within and beyond the EU neighbourhood is exacerbated by poverty, poor socio-economic development in addition to violations of human rights and call for a strong EU external migration and asylum policy. In addition the Council renewed its commitment **to mobilise all instruments and policies** to support efforts **to address the root causes of migratory flows**, poor socio-economic conditions and climate change. While the conclusions do not directly imply actions in R&I, it refers to key pressures on Neighbourhood countries particularly, Jordan, Lebanon, Turkey and Iraq and countries hosting the majority of Syrian and Iraqi refugees.

European climate diplomacy after COP21 (Foreign Affairs Council Conclusions dated 15 February 2016)

In the overall context of climate diplomacy the Council refers to the development of a climate diplomacy action plan, including efforts to address the nexus of climate change, natural resources, including water, prosperity, stability and migration.

Institutional background

The initial institutional thrust that led to the PRIMA Joint Programme is attributed to the **Euro-Mediterranean Conference on Science, Technology and Innovation** held in Barcelona in 2012

with the aim of strengthen Euro-Mediterranean cooperation in R&I as part of the broader objectives of the Union's external policy towards the Southern Neighbourhood, which was in the midst of events in the region, then referred to as the Arab Spring. The conference, which was attended by some 350 high-level scientists and policy makers from more than 30 countries, concluded that European and Mediterranean countries needed to establish a true partnership at a regional scale to address key common challenges, including water availability and management, innovation and institutional coordination across the Mediterranean on the basis of co-ownership, mutual interest and shared benefit. Euro-Mediterranean cooperation would be stepped up with a view to **establishing long-lasting, sustainable and structuring coordination mechanisms** between the EU, its Member States and Mediterranean countries, such as through an initiative pursuant to Article 185 TFEU.

As a result this process was pursued during successive Council Presidencies, including during the Nicosia informal Competitiveness Council in July 2012, which launched the preparation of PRIMA and led to the selection by participating Member States and Southern Mediterranean Countries of a focus on **water availability and management, and its implications on food systems**. The informal Competitiveness Council held in Athens on 13 May 2014 and the Competitiveness Council held in Brussels on 26 May 2014 both confirmed a broad political support for strengthening Euro-Mediterranean cooperation with the proviso that appropriate instruments would be established for this purpose. The Italian Presidency of the Council made PRIMA a priority and secured long-term financial commitments by the countries participating to PRIMA.

Finally, **the Competitiveness Council of 5 December 2014**[7] invited the Commission to assess whether the participation of the Union in the PRIMA Joint Programme on the basis of Article 185 TFEU would be justified by the scope of the objectives pursued and the scale of the resources required. In its Conclusions, the Council welcomed in particular the focus of the PRIMA Joint Programme **on developing and implementing innovative and integrated solutions for the sustainable management of water provision and food systems in the Mediterranean area**. The Council regarded this as a priority challenge to be tackled in order to improve the health, well-being and socio-cultural conditions of the populations of the Mediterranean Area and to boost economic growth.

Therefore, on **23 December 2014**, Member States[8] and third countries of the Mediterranean Area invited the Commission to participate in a Joint Programme[9] initiative called "Partnership for Research and Innovation in the Mediterranean Area" (PRIMA), based on Article 185 of the Treaty on the Functioning of the European Union (TFEU)[10], and focused on **the development and adoption of innovative integrated solutions for improving the efficiency, safety, security and sustainability of water provision and food systems in the Mediterranean area**.

Subsequent to these Competitiveness Council conclusions and the formal submission of the proposal for the PRIMA Joint Programme, Commissioner for Research, Science and Innovation Carlos Moedas asked the Commission services to commence the preparation of an impact assessment on available policy options to tackle the aforementioned challenge including an initiative based on Article 185 TFEU.

On 29 February 2016, an Addendum[11] to the PRIMA proposal providing further information and clarifications on the initiative was received by the Commission from the PRIMA Joint Programme.

[7] http://data.consilium.europa.eu/doc/document/ST-16421-2014-INIT/en/pdf
[8] Croatia, Cyprus, Czech Republic, France, Greece, Italy, Luxembourg, Malta, Portugal, Slovenia and Spain
[9] http://www.unisi.it/sites/default/files/allegatiparagrafo/PRIMA_0.pdf
[10] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012E/TXT&from=EN
[11] https://ec.europa.eu/research/environment/pdf/prima/prima_proposal_addendum.pdf

On 15 June 2016, details were received by the Commission from the PRIMA Joint Programme concerning the foreseen Dedicated Implementation Structure (DIS) as well as their choice of a central grant management system.

Geographical scope

According to the information included in the PRIMA Proposal (2014) and its Addendum (2016), 19 countries are involved in the PRIMA Joint Programme:

- 11 Member States: Croatia, Cyprus, Czech Republic, France, Greece, Italy, Luxembourg, Malta, Portugal, Slovenia and Spain;
- 3 third countries associated to Horizon 2020: Israel, Tunisia and Turkey; and
- 5 third countries not associated to Horizon 2020: Algeria, Egypt, Jordan, Lebanon and Morocco.

Among these countries, 14 countries (Cyprus, Czech Republic, Egypt, France, Greece, Israel, Italy, Lebanon, Luxembourg, Malta, Morocco, Portugal, Spain and Tunisia) have agreed to jointly undertake the PRIMA initiative by committing ex-ante 200 million EUR in cash[12] over a 10 year period[13] starting in 2018 (see Table 1).

The other 5 countries (Algeria, Croatia, Jordan, Slovenia, and Turkey) are expected to contribute to the PRIMA initiative as observers (see Figure 1).

Participating State	Cash (M EUR)	In-kind (M EUR)	Duration (Year)
Italy	50	50	10
Czech Republic	10	10	10
France	40	40	10
Luxembourg	1.5	1.5	10
Malta	5		10
Morocco	20	20	10
Portugal	2.5		5
Spain	30		10
Cyprus	2		10
Egypt	15	3	10
Greece	5	5	10
Israel	5		5
Lebanon	4	2	10
Tunisia	10		10
TOTAL	**200**	**131.5**	

Table 1: Institutional level: financial commitment by Participating States (Ministries).

It is important to distinguish considerations relating to the geographical scope of PRIMA Joint Programme, as an initiative promoting a partnership for R&I in the Mediterranean Area in the domain of water provision and food systems, and the voluntary adhesion of Participating States (of

[12] According to Article 26 of the Regulation establishing Regulation Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020), only the indicative financial commitments have to be identified for programmes undertaken by several Member States in accordance with Article 185 TFEU.

[13] With the exception of Portugal and Israel that committed for five years and to revise their initial figures for the following five years according to the progress of the PRIMA initiative.

which 9 are MS, 2 are countries associated to Horizon 2020 and 3 are third countries in the Southern Mediterranean - see Table 1) **to pool national resources into a joint programming proposal** as submitted to the Commission in order to assess the Union's participation therein.

Indeed, the PRIMA Joint Programme was subscribed to by a number of Participating States, which includes countries outside the EU, and with whom the EU cooperates closely in many domains including R&I. In this context, the Commission's role is to assess the Union's participation in the joint programme prepared by all of the Participating States.

This approach follows closely the EU strategy for research and innovation cooperation[14] which promotes bi-regional cooperation with Neighbourhood Countries to establish regional-specific strategic approaches that maximise R&I impact by enhancing regional cooperation in key sectors of mutual interest. This is why it is important to target these countries. Also, as mentioned in the Communication, region-specific actions serve the broader objectives of the Union's external policies.

The participation of EU Member States in the PRIMA Joint Programme is driven by the common challenge of climate change (with a migration as a consequence) that is affecting the Mediterranean area. **Water stress affects one third of the EU territory all year round**[15]. During summer months **water scarcity** is more pronounced in Southern European basins but is also becoming increasingly important in Northern basins, including UK and Germany. Water is already becoming a tangible problem in Southern Spain, Italy, Southern France, Greece or EU islands like Malta or Cyprus.

EU Member States have been carrying out R&I activities in the field of water provision and food systems, improving their overall innovation capacity. Sharing knowledge with Southern Mediterranean third countries would allow adapting the developed innovation to the anticipated impacts of climate change that third countries are experiencing with greater severity. In this sense, EU could act as a living lab for testing innovative solutions.

EU MSs participating in PRIMA are also involved in bilateral cooperation activities in the field of research and science with many of the Southern Mediterranean third countries.

On the other hand, **the participation of Southern Mediterranean third countries** to the PRIMA Joint Programme is key towards addressing the region-wide challenges associated with the unsustainable management of water provision and the agri-food value chain. The inclusion of third countries in the PRIMA Joint Programme is particularly crucial for the following reasons:

- R&I activities cannot be implemented without fully mobilising and involving local knowledge and expertise;
- the results achieved through these R&I activities cannot be quickly disseminated and valorised into new products, processes and services if local stakeholders are not involved;
- third country governments should be involved so that they can adapt their domestic research and innovation programmes and take account of results in the design of new policies.

It is important to point out that the research expertise of third countries is of high level and relevant for **achieving the critical mass**. On this basis, the largest possible scale comprising all countries in the Mediterranean area is considered to benefit the PRIMA Joint Programme and its scope both in water and food policy coordination and in market-related technology transfer opportunities. This is also relevant to broader objectives of the PRIMA Joint Programme relating to addressing long-term impacts of migration into the EU.

[14] Communication from the Commission – Enhancing and focusing EU international cooperation in research and innovation: A strategic approach (COM(2012)497final)

[15] Report on the Review of the European Water Scarcity and Droughts Policy, COM(2012) 672 final - http://ec.europa.eu/environment/water/quantity/pdf/COM-2012-672final-EN.pdf

It has to be noted that adhesion to the PRIMA Joint Programme by Participating States is on a voluntary basis and is not driven by the EU as such. Thus, while Algeria, Turkey and Jordan were closely associated with the preparation of the PRIMA Joint Programme, at the time of submitting the proposal, these countries chose to keep observer status without participation in the programme. Of the remaining countries in the region, only Libya and Syria have not engaged in PRIMA Joint Programme as a result of political and security crises.

The PRIMA model of partnership based on equal footing among participant states has the potential to increase third counties buy-in of public and private stakeholders, foster scientific and diplomatic links among participants (science diplomacy), scale up the deployment of potential of innovative solutions, thus expanding and integrating national R&I investments.

Region-specific challenges leading to geographical scope of PRIMA

A succession of joint EU-MED initiatives and EU funded projects[16] have shaped regional cooperation and led to identification of region-specific challenges in the areas addressed by PRIMA. These are summarised below:

- Poor governance of water for planning and adaptation to global changes, including lack of engagement of stakeholders;
- Non equitable water allocation and unsustainable water management;
- Poor holistic vision of water resources;
- Need to increase competitiveness of research in water quantity management, water use efficiency as well as management of non-conventional waters;
- Unsustainable food production – ecosystem and nutrition;
- Need to develop smart rural arid and semi-arid areas[17] (and to develop innovative adaptation solutions).

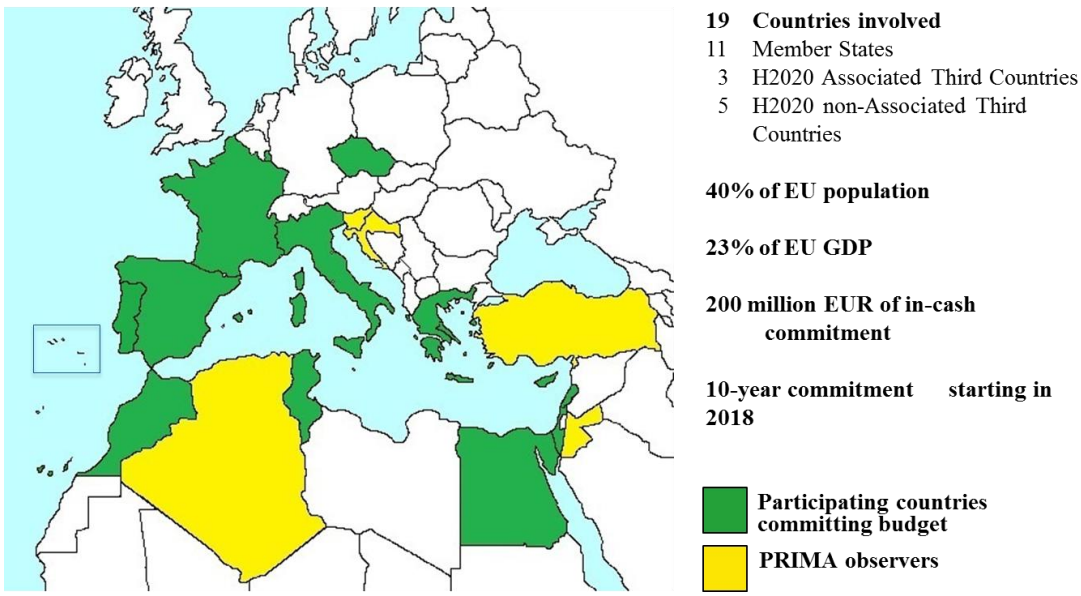


Figure 1: PRIMA Size and Scale

[16] [instert' MIRA 2009-2011, CRIA 2012, CIHEAM, 2012]
[17] MED-SPRING, 2014 – ongoing, quoting European Commission, 2012, CRIA, 2012, MIRA, 2009-2011.

External expertise and consultation

In the context of the preparation of the impact assessment, a **Group of External Experts** (Expert Group) was set up in October 2016 composed of 9 experts coming from Mediterranean and non-Mediterranean Member States and third countries (see Annex 1). The findings of the Expert Group report were cross-verified with findings from other sources (e.g. literature review carried out by Commission services, results of the online public consultation) and duly taken account of in the elaboration of the impact assessment.

For the consultation strategy, an **online Public Consultation** was launched on 1 February 2016, closing on 24 April 2016, and was complemented by dedicated events, in particular a 'Public Consultation Stakeholder Event' in Malta on 17 March (see Annex 2).

1. Section 1. Problem definition and drivers

1.1. The problem

As already mentioned in the introduction above, water provision and food systems in the Mediterranean area are unsustainably managed. This challenge is exacerbated by climate change and has important downstream societal impacts including instability and external migration.

The unsustainable management of water provision and food systems in the Mediterranean area is due to a number of factors including political instability, climate change, and the rapidly growing population.

A key reason, however, is the lack of a set of common innovative solutions that are adapted to the realities of the region and easily transferable across it, and have been fully piloted and demonstrated on the ground.

These solutions are not forthcoming because the overall level of R&I investment in the Mediterranean is not commensurate with the size of the regional challenge; investment levels also differ greatly between countries. Funding is not well focused on addressing the water and food challenge, and the relevant stakeholders involved – for instance, private sector ones – do not always have sufficiently strong R&I capabilities. Finally, the R&I and collaboration efforts between EU Member States and Southern and Eastern Mediterranean countries are too fragmented (mostly governed by bilateral agreements) to have any significant impact.

The challenge of unsustainably managed water provision and food systems is complex because of the interrelation between water and food and because of its cross-sectoral and transnational nature. Addressing the challenge requires trans-disciplinary research and integrated solutions that take into account not only innovation per se but also other factors such as the technology adoption behaviour of rural communities, economic constraints, or the legally and institutionally stable frameworks that may favour the adoption of the most appropriate measures[18,19].

- The World Bank estimates that by 2025 climate change will be responsible for shortfalls in crop yields and water availability that will affect 1.4 billion people worldwide. Unless some significant technological break-through occurs, water shortages will have a major impact on agriculture, especially in those countries, like in the Mediterranean region, where most of the available water is used for irrigation, placing additional pressures on the natural resources of this region, such as land, water, and biodiversity, and on the capacity of countries to provide affordable food and good quality water to their inhabitants.

- The 2011/2012 EU Development Report (ERD) "Confronting scarcity: Managing water, energy and land for inclusive and sustainable growth"[20] calls for public support for research on innovative technological

[18] Chartzoulakis, K. and Bertaki, M. (2015) *op.cit.*

[19] See for instance the recommendations from a historical analysis made by Bru, C. and Cabrera (2010) "Agua, historia y sostenibilidad, un trinomio complejo de armonizar en los países mediterraneos", in Cabrera, E. and Arregui, F. (Ed.) *La ingeniería y la gestión del agua a través de los tiempos. Aprendiendo de la historia*. ITA-Aqualia, pp.210-241. McKinsey also calls for engaging on regulation with participation of stakeholders, in order "shape the sector's economics, separating winners from losers". See: Boccaletti, G.; Grobbel, M. and Stuchtey, M. R. (2009) "The business opportunity in water conservation", in McKinsey Quarterly, December 2009 (http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-business-opportunity-in-water-conservation).

[20] Overseas Development Institute et al. (2012) *Confronting scarcity: Managing water, energy and land for inclusive and sustainable growth.* Luxembourg, OPOCE, at: https://ec.europa.eu/europeaid/sites/devco/files/consca-report-erd-2011_en.pdf

solutions to address the sustainable management of water, energy and land in developing countries[21], including Southern-eastern Mediterranean Countries.

- In the Mediterranean area, the competition for water use between agriculture, drinking water and other uses, such as tourism-related activities, becomes increasingly severe. Water used for irrigation represents 60% of the total water quantities used for human related activities in the Mediterranean area, and this percentage extends to more than 80% of total water use in Morocco, Greece, Egypt, Cyprus, Tunisia and Turkey[22].

- Mediterranean countries have a strong and growing interest in agro-food, a basic sector identified as one of the major contributors to the region's ecological footprint. The Mediterranean region uses two and a half times more natural resources than what its ecosystems can provide. Therefore, promoting innovation and knowledge creation across all of the agro-food related sectors, and along the whole food supply chain, can be considered as a crucial factor for Mediterranean economies in need of new and more sustainable production processes and business opportunities[23].

Existing **R&I systems and investments in the Mediterranean area are fragmented, and not commensurate and adequately integrated** to cope efficiently and effectively with the complexity and the size of the regional the challenge, and to deliver the urgently needed innovative and integrated solutions for the sustainable management of water provision and food systems. Concretely, there is a lack of **common innovative solutions** fully piloted and demonstrated on the ground, adapted to the realities of the region, and easily transferable across it.

Stakeholders responding to the online public consultation organised by the Commission agreed that the difficulty involved in implementing innovative solutions related to insufficient cooperation between countries and actors is the most urgent issue for R&I in the Mediterranean area. More funding for R&I is also called for, though slightly less critical. Respondents called for more synergies among actors and countries and put particular emphasis on the importance of raising awareness about issues related to climate change.

1.2. The drivers

The drivers behind the inadequacy of R&I systems in the Mediterranean area to deliver the needed innovative and integrated solutions for the sustainable management of water provision and food systems are as follows:

Uneven R&I resources in the Mediterranean countries

For instance, average R&D intensities in the region are extremely low: 1.29% for the EU Member States participating in the PRIMA Joint Programme (compared to 2% for the Member States overall) and 0.54% for the Southern and Eastern Mediterranean countries (excluding Israel, for which the R&D intensity is 4.21%)[24].

Limited coordination of R&I policy programming between Mediterranean countries

For instance, in the field of water and food, more than 17 different bilateral and 11 transnational R&I collaboration programmes have been identified as being in operation in the region in a not well-coordinated manner.

[21] According to the Better regulation Toolbox, Tool #30, the reference list of developing countries can be found in IMF (https://www.imf.org/external/pubs/ft/weo/2011/02/pdf/tables.pdf) and World Bank (http://data.worldbank.org/region/MNA) websites.

[22] FAO, Aquastat database.

[23] Global Footprint Network Rapport (http://www.footprintnetwork.org/en/index.php/GFN/): "How can Mediterranean societies thrive in an era of decreasing resources?"

[24] PRIMA Expert Group

Lack of long-term strategic R&I agenda and multi-stakeholder governance

For instance, though of key importance for the rapid dissemination and valorisation of research results, less than 10% of research activities in the Mediterranean region are carried out by private actors[25].

Stakeholders responding to the online public consultation organised by the Commission recognised the importance of addressing as main drivers of the problem: (i) the lack of coordination and cooperation between Mediterranean countries and research organisations and the duplication of research efforts (64.1% of replies); (ii) the lack of cooperation between academic and non-academic actors (62.8%); and (iii) the insufficient investment in R&I (61.2%).

<u>Problem driver 1</u>: Uneven R&I resources in the Mediterranean countries

Table 1.1 shows the R&D intensity as well as the number of researchers per million inhabitants in the EU and South and Eastern Mediterranean third countries involved in the PRIMA Joint Programme. It shows that the performance in terms of R&D inputs (investment and researchers) is uneven:

- **R&D Intensity**: A wide variation exists across the 17 Mediterranean countries involved. Only three countries had R&D intensities above 2.00% in 2013 (the EU average was 2.02%) and eleven countries had R&D intensities below 1.00%.[26] Amongst the Third Countries, only Israel had a very high R&D intensity (4.21%). The other seven countries had intensities below 1.00%. The average for all Middle East and North African Countries was 0.36% in 2013.
- **Researchers per million people**: This indicator as well shows a wide variation across countries, ranging from high figures for countries like France to low figures for all third countries with the exception of Israel in the period 2011-13.

Member States	R&D Intensity (R&D as % of GDP), 2013[a]	Researcher Intensity, 2013[b]	Third Countries	R&D Intensity (R&D as % of GDP), 2013[a]	Researcher Intensity, 2013[b]
Croatia	0.81	1,529	Algeria	0.10	-
Cyprus	0.48	775	Egypt	0.68	544
France	2.23	4,153	Israel	4.21	8,282
Greece	0.8	2,628	Jordan	0.43	-
Italy	1.26	1,974	Lebanon	0.22	-
Malta	0.89	2,107	Morocco	0.73	852
Portugal	1.37	4,152	Tunisia	0.68	1,393
Slovenia	2.59	4,217	Turkey	0.94	1,169
Spain	1.24	2,653			

[a]R&D Intensity (R&D as % of GDP) was obtained from the World Bank, the UNESCO Science Report: towards 2030, Institute for Statistics (2015), Knoema and investinlebanon.gov.lb. All figures are for 2013 apart from these for Tunisia (2012), Morocco (2010), and Lebanon (2006).

[25] Promoting Innovation in the Mediterranean – Profiles and expectations of business incubators, technology parks and technology transfer offices, study No. 63, November 2012. This study covers Cyprus, France, Greece, Italy, Malta, Portugal, Spain, Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia, and Turkey with a focus on Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, and Tunisia. (http://www.animaweb.org/sites/default/files/ain_cmi_it1_promoting_innovation_en_2012.pdf).

[26] Investments in R&D are low compared to international averages: between 0.2% and 0.7% of GDP in the MED countries (Tunisia is an exception with approximately 1%), compared to almost 2% of GDP in Europe. According to FAO (2012), given the positive role of R&D in promoting agricultural growth and poverty reduction, there is an urgent need to increase R&D funding for agriculture in the low- and middle-income countries.

[b]*Researcher Intensity (Researchers per million people) was obtained from the World Bank. All figures are for 2013 apart from those for Israel (2012), Tunisia (2012) and Morocco (2011).*

Table 1.1: Country indicators of R&I capacity

<u>Problem driver 2</u>: Limited coordination of R&I policy programming between Mediterranean countries

The EU has supported R&I on water provision and food systems in the Mediterranean area through past Framework Programmes for Research, and Technological Development. In FP6 and FP7, for instance, this has been done through several funding instruments involving different levels of coordination and cooperation.

There are, for instance, past and also still on-going Joint Programming Initiatives[27] (JPIs – Table 1.2), whose aim is to pool national research efforts to address major societal challenges that cover scientific areas related to water and agro-food (e.g. JPI FACCE[28], JPI Water[29] and, to a lesser extent, JPI Healthy Diet for a Healthy Life[30] and JPI Oceans[31]). A number of Coordination and Support Actions (CSAs) have also been established with the aim of better coordinating research efforts in the Mediterranean area. The most relevant initiatives are the six Mediterranean ERA-NETs[32] funded under FP7 (Table 1.3): three of them (MIRA, MED Spring, ERA METMED) were funded in the International Cooperation (INCO) programme while the other three (FORESTERRA, ARIMNet, and ARIMNet2) were funded under the 'Food, Agriculture and Fisheries, and Biotechnologies' (KBBE) programme. In addition to JPIs and CSAs, 151 FP7 research projects involved the participation of Mediterranean countries (including Mediterranean third countries).

JPIs comprise mainly EU Member States. The participation of Mediterranean third countries is very limited. JPI FACCE, JPI Water and JPI Healthy Diet for a Healthy Life all have Turkey and Israel as members, while JPI Oceans has only Turkey as a member. The situation is somewhat different for ERA-NETs, which have a wider geographical coverage.

All of these initiatives tend to remain fragmented, however, and have not produced an integrated strategic research agenda, which is illustrated by the wide range of topics covers in an unintegrated manner. Table 1.3 shows that several EU initiatives are addressing to some extent the water and/or food sectors, and/or the cooperation between the Mediterranean countries. However, **the level of integration of R&I policy resulting from these EU activities remains limited** to the support and organisation of national programmes and activities. Most of the initiatives do not address the interdependency between food and water issues that is specific for the Mediterranean area. Furthermore, the limited representation of stakeholders of Mediterranean countries in the abovementioned JPIs limits the potential level of effectiveness in terms of tackling regional issues. These factors can result in an overlap or even duplication of efforts and put significant strain on critical bottlenecks (expertise, facilities, funding). Uneven public programmes with incompatible national funding rules and procedures result in limited diversity and quality of cooperation partnerships.

[27] TOWARDS JOINT PROGRAMMING IN RESEARCH: Working together to tackle common challenges more effectively, COM(2008) 468 final (http://ec.europa.eu/research/press/2008/pdf/com_2008_468_en.pdf).
[28] Joint Programming Initiative on Agriculture, Food Security and Climate Change (https://www.faccejpi.com/).
[29] Joint Programming Initiative Water challenges for a changing world (http://www.waterjpi.eu).
[30] http://www.healthydietforhealthylife.eu/
[31] The Joint Programming Initiative Healthy and Productive Seas and Oceans (http://www.jpi-oceans.eu).
[32] Under the ERA-NET scheme, national and regional authorities identify research programmes they wish to coordinate or open up mutually; their participants are programme 'owners' or programme 'managers'.

Mediterranean Countries		INCO-NETs			KBBE ERA-NETs		
		MIRA	MEDSpring	ERANETMED	FORESTERRA	ARIMNet	ARIMNet2
Member States	Croatia				X		X
	Cyprus	X	X	X		X	X
	France	X	X	X	X	X	X
	Greece	X	X	X	X	X	X
	Italy	X	X	X	X	X	X
	Malta	X	X	X			X
	Portugal	X	X	X	X	X	X
	Slovenia				X		X
	Spain	X	X	X	X	X	X
Third Country	Algeria	X	X	X	X	X	X
	Egypt	X	X	X		X	X
	Israel	X	X			X	X
	Jordan	X	X	X			
	Lebanon	X	X	X			
	Morocco	X	X	X	X	X	X
	Tunisia	X	X	X	X	X	X
	Turkey	X	X	X	X	X	X

Table 1.2: Participation of Mediterranean countries in previous FP7 ERA-NETs (countries participating in all ERA-NETs are underlined)

Initiative	Has no explicit focus on Food or Water	Water issues only	Food and food prod. only	Mainly water issues, with some attention to food production	Mainly food and food production, with some attention to water	Food and Water as part of a broader set of topics	Inter-dependency of water and food issues explicitly as key focus of initiative
JPI Water				X			
JPI Facce					X		
JPI Healthy Diet			X				
JPI Oceans		X					
MIRA	X						
MEDspring						X	X
ERANETMED						X	
Foresterra	X						
ARIMNet					X		X
ARIMNet2					X		X

Table 1.3: Thematic overlap of existing initiatives with R&I on water provision and agro-food systems in the Mediterranean

In addition to EU level actions, an extensive number of bilateral and transnational programmes are being implemented by the countries involved in the PRIMA Joint Programme. In Annex 4, a non-exhaustive list of the main programmes of scientific and technological collaboration between EU Member states and third countries in areas to be addressed by the PRIMA Joint Programme is provided. The table in this annex shows that:

- There is **no integrated R&I strategy for the Mediterranean in the area of the sustainable management of water provision and food systems**, which leads to possible overlaps between research activities and hampers the valorisation and scaling up of research results at European and international level.

- The identified programmes are **scattered** across numerous small bilateral agreements, with some privileged partnerships, which **does not allow for reaching the scale and scope** of R&I efforts required to achieve strategic objectives.
- The **initiatives are of limited duration** and/or subject to the yearly (re)definition of topics. Most of them are expiring at the end of 2016, which does not match the need for stable long-term commitments.
- **Policy dialogue, exchange of best practices, and mobility** of researchers appear to be the main focus of the identified programmes.
- R&I projects are also addressed but they **do not appear to have size, ambition or scale**.
- There is only a **limited presence of large-scale demonstration** projects in the identified programmes. Therefore, they do not allow for testing, demonstrating and implementing tailored water-saving and management solutions, smart and sustainable farming systems and innovative food products, novel approaches to reducing the impact of pests and pathogens in farming, and innovative quality-oriented business models in the agro-food sector.

Problem driver 3: Lack of long-term strategic R&I agenda and multi-stakeholder governance

The involvement of all types of stakeholders is needed to address the complex, cross-sectoral challenge of the sustainable management of water provision and food systems in the Mediterranean area. Stronger cooperation between stakeholders in different economic sectors in the Mediterranean countries leading to the effective coordination and integration of R&I systems is required to develop innovative and integrated solutions for the sustainable management of water provision and food systems. This is needed to tackle and mitigate the expected medium and long term impacts of climate and demographic changes in the Mediterranean area.

However, so far, **the coordination achieved between different areas of government policy (e.g. economy and environment, agriculture and energy) is limited**. In the same vein, stakeholders from the public and private sector in these countries have limited possibilities to create synergies for R&I activities, e.g. bringing the result of public research to the market. According to a 2012 study[33] by ANIMA Investment Network[34], most R&D activities in the Mediterranean area (over 90%) is carried out by public universities and research centres (compared to 54% on average in the European Union). This is notwithstanding the fact that cooperation among market-based actors of the Mediterranean food value chains (mainly customers, food retailers and suppliers)[35] is a key aspect for the development of the required innovation.

Furthermore, in most of the Mediterranean countries, the existence of sector-specific R&I structures is deeply rooted in the national governance systems and prevents the development and funding of multi-, inter- and trans-disciplinary environmental research and the subsequent uptake of results in innovative solutions and policy changes.

[33] Promoting Innovation in the Mediterranean – Profiles and expectations of business incubators, technology parks and technology transfer offices, study No. 63, November 2012. This study covers Cyprus, France, Greece, Italy, Malta, Portugal, Spain, Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia, and Turkey with a focus on Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, and Tunisia. (http://www.animaweb.org/sites/default/files/ain_cmi_it1_promoting_innovation_en_2012.pdf).

[34] The Promoting Innovation in the Mediterranean study was carried out within the framework an initiative of the Marseille Centre for Mediterranean Integration and coordinated by the European Investment Bank. The study was conducted by ANIMA Investment Network in coordination with the Madri+ foundation and the FP7 Project MIRA.

[35] Lefebvre, V. M., Raggi, M., Viaggi, D., Ljungström, C. S., Minarelli, F., Kühne, B., and Gellynck, X. (2014), SMEs' preference for innovation networks: A choice experimental approach. Creativity and Innovation Management, Vol. 23 No. 4 pp. 415-435; Bigliardi, B., Colacino, P. and Dormio, A.I. (2011), Innovative characteristics of small and medium enterprises. Journal of Technology Management & Innovation, Vol. 6 No. 2, pp. 83-93; Zeng, S.X., Xie, X.M. and Tam, C.M. (2010), Relationship between cooperation networks and innovation performance of SMEs. Technovation, Vol. 30 No. 3, pp. 181-194.

1.3. Who is affected by the problem

The problem affects a very wide range of stakeholders both within and outside the Mediterranean area.

The population at large in the Mediterranean countries, both EU and third countries, is affected since inadequate water provision and food systems have important downstream effects in society, affecting negatively nutrition, health, livelihoods and standards of living, and levels of wellbeing.

This **social and economic stress**, in turn, constitutes a key cause of instability and becomes a cause of **migration** in third countries, both internally, leading numerous farm families to move to cities and, externally, driving part of the population to migrate in particular towards Europe.

Farmers are affected since they are deprived from innovative solutions and have to keep suffering from inadequate water provision systems, which seriously affect crop yields.

Businesses, and in particular SMEs, are affected by the inability of current policies and programmes to adequately address market failures by providing long-term stable support and predictability, thereby being deprived from the opportunity to participate fully in the co-development of innovative integrated solutions and to valorise commercially the new products, processes and services developed.

The R&I community (policy-makers, programme managers, funders, R&I organisations (universities, research institutes), individual researchers and innovators) is affected because, as a result of the current cross-border, cross-sectoral and cross-discipline fragmentation of policies and programmes, it is unable to pool resources to develop, disseminate and implement the innovative integrated solutions urgently needed for the sustainable management of water provision and food systems.

1.4. EU dimension of the problem

Europe is affected by the large-scale instability close to its borders and by the refugee crisis driven partially by the shortage of water in the region. The PRIMA Joint Programme is of great relevance for a broad range of key EU policies.

EU migration policy

As outlined in a recent World Bank study[36], water scarcity and the consequent increase in food prices can induce people to leave their countries and can contribute to igniting civil conflicts. As the same report stresses, "in today's globalized and connected world, such problems are impossible to quarantine. And where large inequities prevail, people move from zones of poverty to regions of prosperity which can lead to increased social tensions" (p. vi). The EU is of course well aware of this, affected as it currently by the largest refugee crisis in recent history.

Within this context, and as explained in great detail in the introduction to this impact assessment, **the PRIMA Joint Programme fits clearly into the European Agenda on Migration and the 'Communication on establishing a new Partnership Framework with third countries** under the European Agenda on Migration' adopted by the Commission on 7 June 2016 (COM(2016)385). In the text of the Communication, research is mentioned explicitly as one of the EU policies that may

[36] World Bank (2016) "High and Dry: Climate Change, Water, and the Economy"

have a role to play in the wider context of the discussions on migration and in the dedicated agreements that the EU is expected to conclude with the most affected third countries.

EU external development policy

The PRIMA Joint Programme also fits clearly into the EU's efforts to achieve **the post-2015 Development Agenda** and the Sustainable Development Goals (SDGs), and, more specifically, SDG #2 "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" and SDG #6 "Ensure availability and sustainable management of water and sanitation for all".

EU sustainability policy

The implementation of the SDGs directly connects the PRIMA Joint Programme to EU sustainability policy. There are strong links between the content of the PRIMA Joint Programme and that of the Resource-efficient Europe Flagship Initiative, for its environmental dimension, and that of the European Neighbourhood Programme for Agriculture and Rural Development, for its international cooperation dimension.

EU R&I policy

Water and food systems cannot be managed effectively and sustainably if innovative solutions are not developed, implemented and shared among countries. This is where the EU R&I policy dimension, and Horizon 2020 in particular, comes into play. Horizon 2020 and the **"Open to the world" political priority of Commissioner Moedas** have been identified by PRIMA proposers as the most appropriate instruments for tackling the challenges raised by the initiative and allowing PRIMA to achieve impact that goes beyond the single R&I policy dimension.

1.5. How would the problem evolve, all things being equal?

Without additional initiatives aimed at increasing R&I investment and collaboration with respect to water provision and food systems in the Mediterranean area, **the current R&I initiatives using EU instruments and the current bilateral cooperation will not be sufficient to address the current water and food stress in Mediterranean area**. In fact, global competition for access to natural resources will continue to intensify, as will the associated risks: market volatility, geo-political tensions and instability. The large-scale exploitation and extraction of natural resources will still be highly concentrated in a small number of producer countries. According to EuroMed 2030[37], managing scarcity will be the principal challenge for the food and water supply by 2030.

In addition, climate change and demographic trends place additional pressures on the natural resources of the Mediterranean region and on the capacity of countries to provide affordable food and quality drinking water to an increasing population.

It can be expected that without additional action, on-going activities to coordinate the programming of R&I policies (e.g. ERA-NETs) related to water provision and food systems in the Mediterranean countries will be finalised before 2018. Funding for R&I projects will likely continue without a specific focus on food water provision and food systems in the Mediterranean area.

Overall, even though it is difficult to make projections with respect to future calls, it could be assumed that the level of investment from Horizon 2020 will be comparable to that of FP7.

[37] European Commission (2011) *EuroMed 2030. Long term challenges for the Mediterranean area. Report of an Expert Group*. Luxembourg: OPOCE (http://espas.eu/orbis/sites/default/files/generated/document/en/euromed2030.pdf).

Concerning FP7 (2007-2013), an analysis has been provided in Annex 5 showing the participation of entities from Mediterranean third countries in projects relevant to water provision and food systems. It can be concluded that:

- Over the course of the seven years of FP7, a total of 151 projects, with a total budget of 408 million EUR, were funded;
- A budget of 31 million EUR was invested in horizontal projects fostering Euro-Mediterranean Co-operation (ERA-NETs and Coordination Actions);
- 1 million EUR was invested in mobility actions[38].

Under Horizon 2020, the current EU Framework Programme for Research and Innovation[39], 13 out of the 19 countries involved in the PRIMA Joint Programme participate in actions related to water scarcity, irrigation, water saving, sustainable water, sustainable agriculture, agro food, and the food industry. These activities include different kind of instruments foreseen under Horizon 2020, including R&I actions and SME instrument actions.

To date, none of the Horizon 2020 actions involving Mediterranean countries cover integrated R&I activities on water provision and food systems, however. Opportunities for R&I topics tackling water provision and agro-food production might continue to be provided under Horizon 2020, mainly under Societal Challenges 2 and 5, but it is unlikely that they would address comprehensively and specifically R&I on water provision and food systems in the Mediterranean countries.

Based on the current situation under Horizon 2020 in the first two calls for proposals launched only under SC5 and SC2, the number of Mediterranean Countries covered by R&I food and water EC funding are 8 Member states and 4 third countries[40].

It may be concluded that:

- In Horizon 2020, the situation of the participation of Third Countries should be improved compared to FP7, and
- It could be assumed that this trend is likely to persist under the baseline scenario.

As for existing transnational initiatives, some activities might be carried out related to water provision and food systems. Few of these initiatives, however, have a strong focus on R&I activities and this is unlikely to change in the future. Some examples are the World Bank's Water Partnership Programs, particularly through IFAD (International Fund of Agriculture and Development); the Water Demand Initiative for the Middle East and North Africa (WaDImena), coordinated by the International Development Research Centre and supported by the International Fund for Agricultural Development; FAO's regional Initiative on Water Scarcity in the Near East and North Africa; the Consultative Group on International Agricultural Research (CGIAR[41]) and the International Center for Agricultural Research in the Dry Areas (ICARDA[42]); and Plan Bleu[43].

[38] The PRIMA Expert Group report includes figures on participation of beneficiaries from PRIMA non-EU States in FP7 projects, and on their EC contribution, addressing PRIMA objectives (see pages 148 and 149).
[39] Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020) (OJ L 347, 20.12.2013, p.104) (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0104:0173:EN:PDF).
[40] 8 Member States: Italy, Spain, France, Slovenia, Greece, Cyprus, Portugal and Malta (266 participations in total);4 Associated Mediterranean third countries: Turkey and Tunisia (5 participations in total); 2 Non-Associated Mediterranean countries: Morocco and Egypt (4 participations in total)
[41] http://www.cgiar.org/our-strategy/
[42] http://www.icarda.org/
[43] http://planbleu.org/en/publications/lagriculture-mediterraneenne-en-recherche-dadaptation-climatique

1.6. Fitness check /retrospective evaluation

There is no fitness check/retrospective evaluation carried out under the existing policy framework, targeting specifically R&I activities on water provision and food systems in the Mediterranean area.

2. Section 2. Why should the EU act?

2.1. EU right to act

The EU's right to act in the area of R&I, including through cooperation with third countries, is set out in the Treaty on the Functioning of the European Union (TFEU), which also provides instruments that can be used for such cooperation, see Box 1 for details.

International cooperation in R&I is a key aspect of the EU's global commitments and has an important role to play in the EU partnership with developing countries, which are often disproportionately affected by global challenges.[44] This cooperation can promote inclusive growth and is essential for the achievement of the Sustainable Development Goals as set by the 2030 Agenda for Sustainable Development Goals (SDGs)[45]. Horizon 2020 complies with the principle of general openness, while encouraging reciprocal access to third countries' programmes.

BOX 1: EU's right to act in the area of R&I and to collaborate with third countries in the TFEU

- **Article 4 point 3 TFEU** indicates that in the area of research and technological development, the Union has competence to carry out activities, in particular to define and implement programmes, in parallel with Member States.
- **Article 180 TFEU** provides that these activities should complement the activities carried out in the Member States and include implementation of research, technological development and demonstration programmes, by promoting cooperation with and between undertakings, research centres and universities; promotion of cooperation in the field of Union research, technological development and demonstration with third countries and international organisations; dissemination and optimisation of the results of activities in Union research, technological development and demonstration; stimulation of the training and mobility of researchers in the Union.
- **Article 181 TFEU** provides that "The Union and the Member States shall coordinate their research and technological development activities so as to ensure that national policies and Union policy are mutually consistent". The Commission may, in close cooperation with Member States, take any useful initiative to promote such coordination.
- **Article 182 TFEU** provides the legal basis for a multiannual framework programme (FP) setting out all the activities of the Union in the area of research, technological development and demonstration.
- **Article 185 TFEU** provides that "In implementing the multiannual framework programme, the Union may make provision, in agreement with the Member States concerned, for participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes".
- **Article 186 TFEU** provides that "In implementing the multiannual framework programme the Union may make provision for cooperation in Union research, technological development and demonstration with third countries or international organisations".

The EU right to act also derives from the characteristics of the problem identified (see Box 2). **The cross-border dimension of the problem and the links with R&I European policies call for intervention at EU level and beyond**. Achieving a resource- and water-efficient economy and

[44] https://ec.europa.eu/programmes/horizon2020/en/news/grand-challenge-design-and-societal-impact-horizon-2020

[45] Activities at the international level are equally important to enhance the competitiveness of European industry by promoting the take-up and trade of novel technologies, for instance through the development of worldwide standards and guidelines, and by promoting the acceptance and deployment of European solutions outside Europe. The three major third country groupings are: (1) industrialised and emerging economies; (2) enlargement and neighbourhood countries (which is the case of all Mediterranean Third Countries); and (3) developing countries. Horizon 2020 promotes cooperation at regional or multilateral level

society calls for investment in R&I with a long-term vision and strengthened cross-borders cooperation. This is both an EU and a global challenge of particular relevance for EU and non-EU countries in the Mediterranean area, where the adverse effects of climate change and the impacts of a growing population are increasingly putting under stress their resilience to respond to the on-going and foreseen environmental, climate and social changes.

BOX 2: Water provision and food systems from a sectorial perspective

- **Article 11 TFEU** provides that "environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development".
- **Article 191 TFEU** defines the objectives of the EU's policy on environment, including "prudent and rational utilisation of natural resources" and "promoting measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change" (§1). Such policy is guided by the principles of preventive action, precaution, rectification of environmental damage at the source and polluter pays (§2). It must take into account, amongst others "available scientific and technical data" (§3).

2.2. Why could Member States not achieve the objectives of the proposed action sufficiently by themselves?

The reference framework for R&I in the water and food sectors at EU level is provided by major EU initiatives, but it does not tackle specifically the problem identified in the Mediterranean area.

The national, bilateral and transnational programmes that have been used so far to improve R&I on water provision and food systems have not proved to be sufficient to tackle cross-border issues and attract further public and private investments.

At national level, there is no evidence of synchronization between programmes, and alignment only takes place in a few thematic areas covered by Joint Programming activities. Moreover, the focus is on EU-EU alignment, and not on alignment with Mediterranean third countries. Internationalisation and cooperation in R&I are important objectives for Mediterranean countries in general.

One commonality of all the national initiatives currently ongoing is that industry is not strongly involved. Three distinct weaknesses emerge at bilateral and transnational level:

- Uneven R&I resources: Past and present portfolios of bilateral initiatives with non-synchronised timeframes have not been able to leverage national efforts of Mediterranean countries at the required scale. In contrast, EU involvement would have the potential to attract and concentrate additional funding from the R&I community, industry, and other stakeholders.
- Limited coordination of R&I policy programming: The alignment of R&I Mediterranean programmes cannot be achieved by bilateral programmes alone.
- Lack of long-term strategic R&I agenda and multi-stakeholder governance: Bilateral R&I programmes of the Mediterranean countries in the area of water provision and food systems are not leading to the development of shared Mediterranean R&I Agendas. The creation and update of such agendas has been an aim of the EU since the establishment of MoCo in 1995[46].

As previously mentioned, the challenges of water provision and food systems in the Mediterranean area are complex, interrelated, transnational and multi-sectorial. They require trans-disciplinary research and integrated solutions that take into account not only innovation but also other factors,

[46] The "Euro-Mediterranean Monitoring Committee on Research and Innovation" (MoCo, established in 1995) is now termed "Group of Senior Officials" (GSO).

such as the social behaviour of rural communities, economic constraints, or the legal and institutional stable frameworks that may favour the adoption of the most appropriate measures. This shows that one country alone would never be able to cope with the complexity of the challenges to be covered.

In addition, the PRIMA Expert Group identified a series of gaps on R&I that need to be addressed in an integrated and coordinated approach in the Mediterranean area.

The same analysis also shows **the need for actual R&I projects including demonstrators, pilot plants, testing, pre-commercial deployment, and research projects addressing the complete range of Technology Readiness Levels (TRLs)** that need transnational cooperation (see section 4 for more details). Moreover, to achieve the objectives that will be detailed in the next section, it is essential to develop alignment policy mechanisms not only in research policy but also in agriculture, environment and economy. Finally, the problem addressed requires not only the participation of EU Member States but of non-EU Mediterranean countries on equal footing.

2.3. What would be the added-value of action at EU-level?

The added value of EU level action can be described along the three dimensions reported below.

1. Attaining scale and scope and achieving a critical mass of resources

Only action at EU level is capable of achieving a well-coordinated and integrated programme with adequate scale and scope. Experience with transnational programmes demonstrates clearly that without EU action and support, the level of ambition and the degree of coordination and integration is significantly lower and does not achieve a critical mass of financial and knowledge resources compared to a partnership approaches between the Member States and the Union.

EU action entails in addition a stronger policy dimension as compared to separate Member States activities, which in turn is often a prerequisite for ensuring long-term financial commitments from all Participating States, as clearly demonstrated in the European & Developing Countries Clinical Trials Partnership (EDCTP2 Art 185 initiative).

2. Leverage effects and delivery on impacts and broader implications to the EU's external policies and migration

Experience from similar initiatives such as BONUS (Joint Baltic Sea research and development programme) demonstrates that action at EU level triggers significant additional public investments from the Participating States, which increasingly shift available national resources to the joint programme. Better coordinated and integrated action at national and EU-level within a joint programme is able **to provide significant knowledge gains** for all participants but notably for those partners that had so far only limited access to world class knowledge. This, in turn, will improve the impacts stemming from joint efforts, so "the value for money" stemming from joint programmes is significantly higher than that stemming from discreet national activities.

In addition, action at EU-level following the Horizon 2020 rules will have significant impacts on the uptake of good practices in R&I policy design and implementation across Europe and beyond. This has been shown by similar initiatives such as EDCTP2, as well as in ERA-NET activities supporting the coordination of national research programmes since FP6.

As discussed in the introduction, PRIMA is a key example of a sectorial initiative that will contribute towards addressing some of the root causes of migration by providing innovative solutions to water resources and food systems that will help manage long-term migratory trends more efficiently.

3. International leadership, global cooperation and the European Neighbourhood South

A well-coordinated joint programme and thus action at EU-level will strengthen Europe's visibility and global responsibility far beyond what single Member States action would be able to deliver. With respect to the SDGs in the field of water and food, the planned initiative will therefore contribute significantly to the fulfilment of Europe's global responsibilities. On the other hand, joint action proved to be instrumental for similar initiatives to achieve a stronger recognition of Europe as the world's leading knowledge hub for clinical trials on tropical diseases (in the case of EDCTP2) or metrology and related standardization activities (in the case of EMPIR, the European Metrology Programme for Research and Innovation).

The approach towards a joint programme based on voluntary participation of countries from the Neighbourhood South on an equal footing as MS reflects **the spirit of EU Neighbourhood Policy towards differentiation and greater mutual ownership with neighbourhood partners** based on their aspirations to draw their policy formulation closer to the EU. This is a key aspect of science diplomacy within the region, whereby cooperation between nations is essential to addressing the common challenges and conditions in the Mediterranean area that are not confined by the EU's geographical borders. These conditions are more likely to be addressed effectively at EU level than through bilateral action of MS with Southern Neighbourhood Countries.

3. Section 3. What should be achieved?

3.1. Policy Objectives

The **general objective is to develop the fully piloted and demonstrated common innovative solutions in the field of water provision and food systems that the Mediterranean region urgently needs.**

Achieving this general objective will make water provision and food systems in the Mediterranean area more efficient, cost-effective, and sustainable. In this way, R&I can contribute to solving the higher-level problems in the field of nutrition, health and social wellbeing, and ultimately help address mass migration trends. R&I policies can thus be leveraged to the maximum to address the migration challenge, in line with the Communication on a new Partnership Framework with third countries under the European Agenda on Migration.

3.2. Specific Objectives

This general objective can only be achieved if, in a structured way, a durable framework for R&I in the field of water provision and food systems is put in place in the Mediterranean area. The following specific objectives need to be achieved in order to reach the scale and scope of R&I efforts required:

- **Common long-term strategic R&I agenda:**
  The formulation of a stable, long-term, common strategic R&I agenda in the field of water provision and food systems;
- **Alignment of national R&I programmes:**
  The orientation of all national R&I programmes towards the implementation of the strategic R&I agenda;
- **Critical mass of actors and resources:**
  The structural involvement of all relevant R&I actors (the public and private sectors) in the implementation of the strategic R&I agenda by pooling knowledge and financial resources so as to achieve the necessary critical mass;
- **Strengthening innovation capabilities:**
  The strengthening of R&I funding and implementation capabilities of all involved actors.

The achievement of the identified objectives will rely upon the establishment of long-term cooperation and upon end-user friendly and societally affordable solutions. The intervention logic reported in Figure 3.1 illustrates the links between the general objective, the problem definition, problem drivers and the identified objectives.

Synergies and trade-offs can be summarised as follows.

- **Cooperation in R&I** can lead to knowledge development and transfer. It increases research capacities quantitatively (i.e. number of researchers or highly qualified workers like engineers or technicians that are supported) and qualitatively, through the exchange of knowledge and experience. Common work between researchers and other highly qualified people may enhance skills and capacities, create knowledge-based job opportunities in opportunities in the Mediterranean countries.
- The activities linked with the operational objectives ensure proper attention to innovation and to the implementation of the developed solutions. These solutions, if adequately implemented and mainstreamed, would contribute:

- To **mitigating environmental pressures**, such as water stress or pollution derived from over-exploitation of natural resources;
- To **opportunities for investments and development of new markets**.

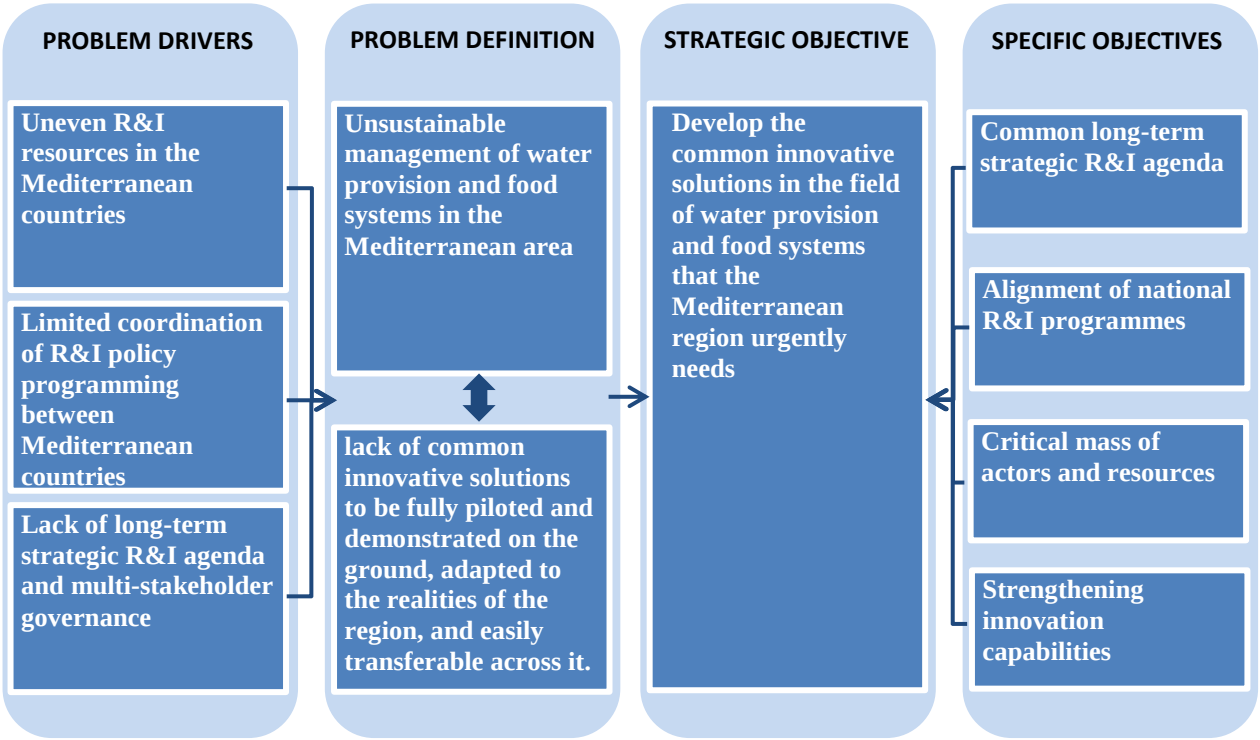


Figure 3.1: Intervention Logic

Addressing the inefficient and unsustainable use of resources through R&I implies new governance approaches (to improve regional R&I governance, structures for the evaluation, funding, management and follow-up of R&I proposals and grants, and water governance), based on integration and cooperation beyond Mediterranean neighbourhood boundaries and between different stakeholders, on equal footing. This is a critical condition to address the main problem and to reach the other operational objectives. R&I can also help shaping future policies in the water and agro-food sectors.

3.3. Consistency with other EU policies

The objectives are in line with the problem definition and cover the related R&I challenges ensuring adequate interaction with European, Mediterranean and global policies.

As already mentioned in the introduction and in Section 1 of this impact assessment, the objectives to be pursued are fully in line with the recent **Communication on establishing a new Partnership Framework with third countries under the European Agenda on Migration** (New Migration Partnership Framework), and with the 2011/2012 EU Development Report (ERD) "Confronting scarcity: Managing water, energy and land for inclusive and sustainable growth".

In particular the **New Migration Partnership Framework** calls very concretely for new development cooperation models that involve **private investors** looking for new investment opportunities in emerging markets, mobilise European private and public resources for investment in third countries of origin thereby contributing to the sustainable development of the local economies, assign an important role to **innovative financing mechanisms** that can be deployed and developed to **leverage** limited budget resources, and remove bottlenecks to **investment in SMEs**

and sustainable infrastructure". Indeed, the PRIMA Joint Programme constitutes a concrete example of how research policy can promote effective cooperation by leveraging national budgets and by bringing together Mediterranean countries around long-term common challenges.

The R&I objectives concerning water provision and food systems in the Mediterranean area appear to be consistent with and relevant also to the following initiatives:

- As highlighted in the Communication "**A resource-efficient Europe – Flagship initiative**"[47], EU-wide, coordinated public support for R&D and innovation is important to increase the availability and performance of the necessary resource efficient solutions.
- **Horizon 2020** identifies "Climate action, Environment, Resource Efficiency and Raw Materials" and "Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bio-economy" as two of the priority societal challenges to be addressed by supporting R&I investments. Moreover, Horizon 2020 recognises that R&I activities for these challenges should be carried out at the Union level and beyond, given the transnational and global nature of the climate and the environment, their scale and complexity, and the international dimension of the food and agricultural supply chain.
- In the report "Science, Research and Innovation performance of the EU - A contribution to the Open Innovation, Open Science, Open to the World agenda"[48] it is analysed how Europe should be leading the way in **developing global research partnerships to address challenges in areas like energy, health, food and water**. The report shows how the growing openness of the global R&I system has enhanced the importance of international collaboration, and **has become a crucial factor in accessing new sources of knowledge and improving competitiveness**.
- The **Post-2015 Development Agenda and the Sustainable Development Goals**[49,50].
- The Barcelona Process launched in November 1995 at the initiative of the Euro-Mediterranean Foreign Ministers, and the related Communication "Barcelona Process: Union for the Mediterranean"(COM(2008)319), which was adopted by the Commission on 20 May 2008 and established a multilateral partnership, focusing on regional and trans-national projects.
- The Communication "Enhancing and focusing EU international cooperation in R&I: a strategic approach" (COM(2012)497final) adopted by the Commission on 14 September 2012, which establishes a focus on fostering integration into – or alignment with – the **European Research Area (ERA) for the Neighbourhood**.

Regarding **Charter of Fundamental Rights of the European Union**[51], the initiative is consistent with Article 37 on "***Environmental protection:*** *"A high level of environmental protection and the improvement of the quality of the environment must be integrated into the policies of the Union and ensured in accordance with the principle of sustainable development".*

[47] A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy - COM(2011)21.
[48] Science, Research and Innovation performance of the EU - A contribution to the Open Innovation, Open Science, Open to the World agenda (European Commission, 2016) (http://bookshop.europa.eu/is-bin/INTERSHOP.enfinity/WFS/EU-Bookshop-Site/en_GB/-/EUR/ViewPublication-Start?PublicationKey=KI0415512).
[49] Transforming Our World: The 2030 Agenda For Sustainable Development (A/RES/70/1), UN 2015 (https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf).
[50] COM(2015)44final of 5.02.2015.
[51] OJ C 326, 26.10.2012, p. 391–407, (http://eur-lex.europa.eu/legalcontent/EN/TXT/HTML/?uri=CELEX:12012P/TXT&from=EN).

4. Section 4. What are the different options to achieve the objectives?

4.1. Analysis of the possible options

Several policy options are available to meet the objectives identified above. These options differ in terms of scope, geographical coverage and instrument used.

As regards the **scope** of possible actions, the following options were identified:

- Actions covering R&I activities related to water provision;
- Actions covering R&I activities related to food systems;
- Actions covering R&I activities integrating water provision and food systems.

As regards the **geographical coverage** of possible actions, the following options were identified:

- Actions with EU Member States;
- Actions with EU Member States and third countries associated to Horizon 2020 ("Associated third countries");
- Actions with EU Member States, Associated third countries and non-Associated third counties.

As regards possible **approaches**, the following options were identified:

1. **No dedicated EU action** ("Baseline scenario" - No policy change).
2. **Support to coordination between Participating States** (public-public partnerships) on the basis of specific grant-based support from Horizon 2020 with:
    - ERA-NET Cofund actions, where the Union would co-fund one joint call for proposals leading to the funding of trans-national research and/or innovation projects;
    - European Joint Programme Cofund actions, where the Union would support the implementation of a joint programme of activities of governmental research organisations.
3. **Support to integration between Participating States** (public-public partnerships) on the basis of Article 185, where the Union participates in programmes undertaken by several EU Member States, and where that participation is justified by the scope of the objectives and the scale of the resources required.
4. **Support to Public-Private Partnerships (PPP)**, set up between the Union and stakeholders from the private sector, in accordance with Article 187 TFEU, where all partners concerned commit to supporting the development and implementation of pre-competitive R&I activities of strategic importance for the Union's competitiveness and industrial leadership or for addressing specific societal challenges.

4.2. Options discarded at an early stage

A screening of all these options was undertaken based on Tool #14 of the Better Regulation Toolbox (Annex 6). Many options do not fulfil most key criteria related to legal and political feasibility and relevance.

As **regards scope**, options involving only water provision or only food systems were discarded at an early stage because of considerations related to relevance, effectiveness, efficiency and political feasibility. Options not covering both issues together would not be relevant enough to address a problem that is essentially of a cross-sectoral nature and requires an integrated approach.

As regards **geographical coverage**, options involving only EU Member States were discarded at an early stage due to considerations related to legal and political feasibility as well as relevance, as the problem identified concerns the complete Mediterranean area, which requires the involvement of Mediterranean third countries associated to Horizon 2020 and third countries not associated to Horizon 2020. Without the participation of both associated and non-associated third countries, it would not be possible to achieve critical mass in terms of knowledge and financial resources on both sides of the Mediterranean. The non-EU countries have important R&I capabilities and have made substantial financial commitments.

As for **possible approaches**, some options have been discarded at an early stage on the basis of legal and political feasibility, effectiveness and efficiency, as well as relevance:

- European Joint Programme Cofund would not allow addressing the full range of stakeholders, as it would be limited to selected governmental research organisations. The political feasibility would be low. EJP Cofund would provide little support to common long-term R&I agendas, little support to National alignment, create only a limited critical mass of actors and resources and would provide no support to Strengthening innovation capabilities, thus not meet the relevance requirements.
- For Public-Private Partnerships (PPPs) the preconditions are not met (Industrial leadership and its strong financial commitment). There is no political support from the Participating States for this approach. Furthermore PPPs would not necessarily provide support to a common long-term R&I agenda of the Participating States, or to the alignment of national activities, thus not meeting the relevance requirements.

4.3. Retained policy options

On the basis of the options screening undertaken, the following policy options have been retained:

- Option 0: No dedicated EU action ("Baseline scenario" - No policy change)
- Option 1: ERA-NET Cofund actions
- Option 2: PRIMA Joint Programme based on Article 185 TFEU

Option 0: No dedicated EU action ("Baseline scenario" - No policy change)

Under the baseline scenario, which consists of no dedicated EU action under Horizon 2020, usual calls for R&I proposals would continue, and Participating States would continue to implement national activities, mostly in a bottom-up manner with little orientation towards the challenge identified. No support for coordination and collaboration between Participating States at programme level would be ensured.

The main elements of this **Option 0,** as already described in detail in Section 1.4, can be summarised as follows:

- No dedicated EU action targeting specifically Water and Food in the Mediterranean;
- Horizon 2020 will continue supporting R&I on Water and Food issues in general and *ad-hoc*;
- Projects (indirect actions) will be selected from open calls for proposals, mainly for R&I Actions and Innovation actions, within Horizon 2020, some of which may or may not involve beneficiaries from the Mediterranean area;
- The beneficiaries would be any legal entity eligible for funding (in accordance with Article 10 of Framework Programme Regulation), typically research organizations and private companies;
- Individual actions would typically last 3-4 years.

Option 1: ERA-NET Cofund actions

The EU could intervene through Horizon 2020 ERA-NET Cofund actions, which support the coordination of national research programmes. The main, compulsory activity of ERA-NET Cofund actions under Horizon 2020 is the implementation of a single co-funded joint call for R&I proposals that results in funding for trans-national research and/or innovation projects. In addition, ERA-NET Cofund actions can also support the preparation and implementation of other joint activities (including additional joint calls without EU cofunding) that contribute to the coordination of national research programmes, such as workshops, meetings and studies. Past and ongoing ERA-NETs relevant to water and food in the Mediterranean area (e.g. ARIMNet2, ERANETMED) have been mentioned in previous sections[52]. In an ERA-NET action, all Participating States (EU and Third Countries) have the same rights and obligations as regulated by the Grant Agreement.

The cofunding of the Union has a positive impact on proposal evaluation and selection (international peer review, selection according to excellence) but also maximises the number of proposals that can be supported[53].

The implementation of ERA-NETs relies on existing national programmes. The scope of calls for proposals, the nature of eligible activities, and the type of beneficiaries depend on the applicable national funding rules. The result is that in many countries participating in ERA-NETs, predominantly public research organisations participate in calls. In ERA-NETS in the area of water and food, all participants are public research organizations. Also, only in some areas, ERA-NETs have been established that address the innovation dimension, e.g. MANUNET (with 70% SME participation) or the Horizon 2020 energy ERA-NETs (with a focus on demonstration projects and higher Technology Readiness Levels). The total duration of the action should normally not exceed 5 years.

Option 1 would consist of a series of ERA-NET Cofund actions, limited to the remainder of Horizon 2020. They would result in calls being launched by Participating States in the years 2018, 2019 and 2020 respectively. On the basis of past experience with ERA-NETs and Participating State commitments, it can be assumed that Participating States would contribute around €20 million to each call, and that consequently the Union would provide support amounting to €10 million (on the basis of the reimbursement rate, which for ERA-NET Cofund actions is set at 33%). This would lead to a total investment from the Participating States of around €60 million and a Union contribution of €30 million.

Option 1 would not allow for addressing substantially the innovation dimension, since the national programmes that would collaborate and coordinate their activities during these three years are mainly addressing research activities of public research organisations. Furthermore, Option 1 is not expected to integrate national funding programmes in a common research strategic agenda.

Option 2: PRIMA Joint Programme based on Article 185 TFEU

Article 185 TFEU enables the EU to make provision for its participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes. Article 26 of the Horizon 2020 Framework Programme Regulation specifies the conditions and criteria for identifying and proposing an initiative pursuant to Article 185 TFEU. Among other criteria, Article 185 initiatives may only be proposed by the Commission in cases where there is a need for a **dedicated**

[52] An overview on past and ongoing ERA-NET actions and country participation can be found on ERA-LEARN 2020 https://www.era-learn.eu/network-information/countries

[53] JPco-fuND would have been able to fund only 8 to 10 proposals from the call; with the EC top up funding they were able to fund 20 proposals.

implementation structure and where there is a **high level of commitment of Participating States** to **integration at scientific, management and financial levels**. In order to submit a proposal, all criteria set out in Article 26(2) of the Horizon 2020 Regulation must be met and the Participating States must demonstrate that they are committed to integrating (rather than coordinating) their R&I efforts by defining and committing themselves to a joint programme. This high level of integration requires a new or pre-existing implementation structure - **Dedicated Implementation Structure ('DIS')** - that is designated by the Participating States, and entrusted under certain conditions, by the Commission with budget implementation tasks for indirect management purposes and with long-term commitment. The EU would provide financial support by matching under certain conditions Participating States contributions up to a ceiling. It deserves emphasis that Article 185 initiatives have a strong track record with respect to the long-term integration of national and European R&I efforts on common challenges, leverage effects and the delivery of impacts, international leadership and global cooperation, and implementation, budget and sound financial management (Box 3).

BOX 3: The track record of past Article 185 initiatives

The experience from past and on-going initiatives from FP6 to Horizon 2020 can be summarised as follows:

Long-term integration of national and European efforts on common challenges

- Article185 initiatives are the only legally possible form to address jointly common challenges in a long-term collaboration between R&I programmes of Member States, with clear up-front financial and political commitments;
- Art 185 initiatives are policy driven programming activities that ensure through their basic acts a high visibility and recognition among national and EU policy makers;
- They allow a high degree of scientific, management and financial integration within their narrow borders (in the case of EMPIR, the Article185 initiative on Metrology 50% of all related research in Europe) and wider coordination effects beyond; without the need to institutionalise joint efforts or create large new structures;
- Article185 initiatives operate on the basis of Annual Work Plans that allow flexible programming according to changing needs and coordination with broader Union and Participating States policy objectives;

Leverage effects and delivery on impacts

- They achieve substantial direct and indirect leverage both in terms of financial resources and overall knowledge gains;
- Article185 initiatives are designed around clearly specified objectives and targets in order to deliver economic and wider societal impacts, e.g. the Active and Assisted Living Programme (AAL2) accelerating innovative ICT-based solutions for active and healthy ageing; or the European & Developing Countries Clinical Trials Partnership (EDCTP2) developing new or improved drugs, vaccines and diagnostics against HIV/AIDS, tuberculosis and malaria in sub-Saharan Africa;
- They disseminate the uptake of good practice in R&I policy design and implementation across Europe and beyond, driven by principles and standards of Horizon 2020;

International leadership and global cooperation

- They have demonstrated the potential to set global R&I agendas and increase visibility of joint European efforts. Article185 initiatives on clinical trials (EDCTP2) or metrology (EMPIR) are perceived as internationally leading programmes;
- The joint partnership in the governance of EDCTP2 demonstrate the EU leadership in paving the way towards a new model for development cooperation;

Implementation, budget and sound financial management

- The efforts for the preparation, set-up and implementation of Article185 initiatives are high and need to be justified in particular by the scale and scope of the initiatives;
- The implementation of Article185 initiatives is considered efficient and in line with the requirements of the financial regulation for indirect management of Union funds.
- The frontloading of the commitments from the EU budget – with the actual fulfilment of matching commitments from Participating States being accounted for in later years – applies in principle to all

Article185 initiatives. In the case of BONUS this expanded to the next MFF. This has not compromised the sound financial management of the Union contribution. In case the Participating States contribute less, the Union contribution will be reduced proportionally, with the recovery of any amount unduly paid.

Third country participation in Article 185 initiatives

In an Article 185 initiative, all Participating States (EU Member States and third countries) have the same rights (e.g. participation in governing structures with decision-making power) and obligations (e.g. financial contribution) under the relevant basic act. Even though Article 185 TFEU refers specifically to the participation of the EU in programmes undertaken by several EU Member States, it does not preclude the participation of third countries in the Programme. However, depending on the status of these third countries in relation to the EU (especially their legal ties), different requirements have to be met to guarantee involvement on an equal footing of all Participating States.

Third countries associated to Horizon 2020 are already allowed to participate in Article 185 initiatives. The text of the specific Horizon 2020 Association Agreement expressly foresees the possibility for an associated third country to participate in various Article 185 initiatives. For the participation of third countries not associated to Horizon 2020[54], the following requirements must be fulfilled:

- The basic act must contain an opening clause for third countries;
- International agreements must be concluded with these countries to allow their participation.

The purpose of these international agreements is to extend the legal regime from the EU basic act to the third countries. Article 185 initiatives establish obligations that include financial contributions and financial control. Therefore, mutually agreed mechanisms that guarantee the effective enforcement of rights and obligations on each side are required. These international agreements would have a purely bilateral nature regulating the obligations of third countries vis-à-vis the EU, making direct reference to the basic act. As a consequence, no significant subsequent negotiation for the conclusion of these agreements would be needed.

Implementation and management of the PRIMA Joint Programme

For an Article 185 initiative, the Horizon 2020 Rules for Participation apply by default (Article 1). Article 185 initiatives under Horizon 2020 are implemented in different ways as regards the management of the Union contribution and the way in which Participating States provide their contributions to the programme. A PRIMA Joint Programme on the basis of Article 185 would be implemented taking full account of good practices in on-going initiatives, which have been analysed in detail in Box 4.

The implementation would involve a reinforced version of the approach followed in the case of the Article 185 "European & Developing Countries Clinical Trials Partnership (EDCTP2)", involving the matching of Union and Participating State contributions at programme level. Building on the strong commitment of cash contributions from Participating States to the PRIMA Joint Programme, and on their commitment to increasing the integration of national programmes into transnational activities, the main elements of the implementation and management are described in the following paragraphs.

[54] In the case of PRIMA, the EU has long-standing cooperation in R&I with third countries not Associated to Horizon 2020 (Egypt, Morocco, and Lebanon): Egypt and Morocco have Science and Technology Cooperation Agreements with the EU, and all three countries have or are currently participating in ERA-NET activities funded by FP7

BOX 4 – Implementation and management: Lessons learned from earlier Article 185 initiatives and applied to PRIMA

Active and Assisted Living Programme (AAL2) and Eurostars2 (for R&D performing SMEs)

Both initiatives make use of decentralised grant management on the basis of national funding rules, with national and Union contributions being paid to projects by National Funding Bodies through national grant agreements. The matching of contributions takes place at project level (grant amount is split between national and Union contribution). While this approach works, it has certain drawbacks:

- It requires significant derogations from the Horizon 2020 Rules for Participation (e.g. Eurostars: funding rules; AAL: IPR and funding rules);
- The approach works well with national programmes marked by a high degree of similarity, which is not the case for PRIMA, thus not allowing for deploying a wide range of instruments to achieve objectives;
- Different national funding rules apply. Beneficiaries are familiar with their national rules (an advantage) but would not fully benefit from the simplification under Horizon 2020.

EMPIR (European Metrology Programme for Research and Innovation)

The initiative and its implementation are based on National Metrology Institutes (NMIs), which are the main beneficiaries of the programme. Grant management is central, on the basis of the Horizon 2020 Model Grant Agreement. The Union contribution is the only cash contribution to the resulting projects. Participating States contribute mainly in-kind. The matching of contributions takes places at project level, where the Participating States' contribution consists of those indirect costs that are not reimbursed by the DIS. The overall approach and central implementation including grant management work very well.

The approach for the matching contributions relies on full-cost accounting (additional requirement compared to Horizon 2020). For PRIMA, this is not appropriate and this for the following reasons:

- The final beneficiaries will be very heterogeneous in terms of type and practices and it is likely that not all of them will have full cost accounting;
- The real indirect costs will only be established after some years of implementation of the initiative, which does not allow for establishing an indicative reimbursement rate. The use of the normal Horizon 2020 rates might lead to substantial recovery orders or drawing on guarantees from Participating States in case their contributions are lower.
- It would reduce the overall budget of the programme for the funding of new projects compared to the initial intention of Participating States to provide Euro 200 million in cash: the cash contribution would be from the Union and Participating States would contribute only in-kind at the level of projects.

EDCTP2 (Article 185 European & Developing Countries Clinical Trials Partnership)

This is the only initiative where the matching of contributions takes place at programme level:

- The transnational calls for proposals are financed by the Union contribution, with central grant management on the basis of the H2020 MGA;
- Participating States contribute mainly with in kind-contributions, the so-called Participating States Initiated Activities (PSIAs). These are included in the Annual Work Plan under certain conditions and implemented in accordance with common principles agreed by the Participating States and the Commission. The Annual Work Plan is subject to approval by the Commission. PSIAs are purely national activities; no transnational collaboration at programme level takes place. The costs of these activities have to be determined in accordance with the usual accounting practices and accounting standards of the Participating States concerned and the applicable International Accounting Standards / International Financial Reporting Standards.

Important to recall in comparison to PRIMA is that in EDCTP2 the African countries are not Participating States (third countries) in the basic act. They do, however, participate in the governance of the EDCTP association with the same voting rights. This approach works well, in particular concerning the central management of the Union contributions. There are clear advantages, in particular concerning Participating States' commitments:

- The Participating States' national activities are aligned with the strategic research agenda for EDCTP2 and all activities include collaboration between Participating States and Sub-Saharan countries. A number of calls or joint activities between several Participating States take place.

- The commitments expressed so far by the Participating States in the Annual Work Plans 2014-2016 are high and exceed by Euro 400 million the amounts that are necessary to justify the Union contribution.

Delivering innovative, integrated R&I solutions through the PRIMA Joint Programme

The PRIMA Joint Programme will operate on the basis of a **jointly formulated strategic R&I agenda** comprising (1) operational objectives, (2) R&I gaps identified, and (3) main expected R&I results.

A substantial start has already been made with the formulation of this agenda, as reflected in Table 4.1.

Operational Objectives	Gaps on R&I	Main Expected R&I Results
1. Smart and sustainable farming	Overexploitation of natural resources and unsustainable farming	• New plant genotypes • New cropping systems • New techniques • New tools
2. Water-saving solutions	On-farm irrigation inefficiencies	• Improved irrigation strategies and methods
3. Mediterranean food products	Changes in food demand and consequences on food supply chains, nutrition and health	• Feed/food security and safety • Innovation and functional foods • Innovation in recipes and ingredients • Environmentally friendly solutions
4. Food and water efficiency	Food and water losses and wastes	• Reusing and co-using biomass, by-products, waste, water processing • Post-harvest processing • Water and energy efficiency
5. Pests and pathogens in farming	Animal and plant diseases	• Better knowledge of pest and disease distribution and their drivers • Better pest and disease surveillance methods and networks • Pest and disease modelling • Better preparedness at the national and regional levels to emerging trans-boundary pest and disease events
6. New agro-business models	Business food systems unable to create employment and economic growth	• Identification of best practices in sustainable business models • Eco-friendly Mediterranean food industry, integrating safe and quality food production and ecosystem conservation • Premium quality Mediterranean products
7. Land and water sustainability	Soil erosion and mismanagement of water cycle at the watershed level	• Anticipation of the impacts of future changes on resources and societies • Test of resilience of natural socio-environmental systems to variability and long term trends impacting land and water • New strategies for soil management to provide higher sustainable and productive use • Mitigation of salinization processes by combining land conservation and efficient water desalinization and water use from farm to watershed scale • New vision of the dynamic management of natural resources, considering simultaneously quantity and quality dimensions
8. Water governance systems	Inequitable water allocation and un-sustainable water management	• New models for the governance of water management systems, including: innovative tools/Decision Support Systems for planning, monitoring and forecasting systems, unconventional water resources • New methodological approaches to enhance public and stakeholder involvement and the empowerment of civil society • Water sanitation and detoxification in food production

Table 4.1: Main R&I outcome of PRIMA Joint Programme

This strategic joint R&I agenda will be implemented through a succession of **Annual Work Programmes**.

A **clear division of labour** will guide the formulation and implementation of these Annual Work

Programmes. The EU financial contribution and the national financial contributions will essentially be used for different, but fully complementary, purposes.

The EU financial contribution will be focused mainly on R&I activities at higher TRLs. The EU Financial contribution will be managed exclusively by the DIS and used for transnational calls for proposals deploying Horizon 2020 instruments. However, not all Horizon 2020 instruments will be deployed. The EU financial contribution will be used in a highly focused manner. As Table 4.2 shows, the achievement of a number of operational objectives included in the strategic joint R&I agenda involves R&I activities at higher Technology Readiness Levels. These activities at higher Technology Readiness Levels are of crucial importance for the achievement of the PRIMA objectives since they are the most promising in terms of the quick delivery of the innovative, integrated and easily transferable solutions urgently needed to address the unsustainable management of water provision and food systems in the Mediterranean area. These activities are also the most demanding in financial terms and the most demanding in terms of complementary knowledge requirements and in terms of public-private stakeholder involvement needed for quick valorisation and dissemination of results. This is why there are most effectively and efficiently supported through the EU financial contribution.

Operational Objective		Research	Applied Research and Development	Demonstration	Pre-Commercial Deployment
O1	Smart, sustainable farming				
O2	Water-saving solutions				
O3	Mediterranean food products				
O4	Food and water efficiency				
O5	Pests and pathogens in farming				
O6	New agro-business models				
O7	Land and water sustainability				
O8	Water governance systems				
Technological Readiness Level:		1 2	3 4 5	6 7	8 9

Table 4.2: Technological Readiness Levels (TRLs)

Concretely, the EU financial contribution will be mainly used to support pilots and demonstrators. R&I activities at higher Technology Readiness Levels inevitably involve close-to-market pilots and demonstrators that can test adequately real life solutions. The EU financial contribution will therefore be focused on a limited number (5 to 10) of such pilots and demonstrators in strategically identified and carefully assessed areas.

On the other hand, **national financial contributions will be focused on R&I activities at lower Technology Readiness Levels, on mobility and training actions, on networking activities, etc.**

The Annual Work Plans (AWP) will ensure the consistency between all activities and their orientation towards the achievement of the operational, specific and general objectives of PRIMA. The AWP, which is subject to approval by the Commission, will include:

- Transnational calls for proposals to be funded by the DIS with Union contribution, in accordance with the Horizon 2020 Rules for Participation;
- Activities only funded by the Participating States, and counting for the matching with the Union contribution under certain conditions. In particular, these activities will be included in the AWP

after positive external evaluation by international peer review with regard to the objectives of the PRIMA Joint Programme. They will be implemented in compliance with common principles, to be agreed by the Participating States and the Commission. These activities will include joint calls between Participating States' programmes for transnational projects, organised by the DIS (including proposal evaluations).

PRIMA will be implemented with seven Annual Work Plans (2018 – 2024). It is expected that activities, including grant agreements for proposals selected for funding from calls of the last Annual Work Plan will be concluded still in 2024 and implemented until 2027-2028.

The budget of the PRIMA Joint Programme

The development of the joint strategic R&I agenda has been accompanied by a careful financial estimation of the costs involved in its implementation. It has been concluded that at least €400 million is required to implement fully all required R&I activities and reach the operational, specific and general objectives of PRIMA.

The Participating States have already committed to providing at least €200 million in cash. In fact, the current commitment of cash plus in-kind contributions exceeds €300 million of public funding for R&I activities towards achieving the objectives of the PRIMA Joint Programme. The Participating States would also contribute any administrative expenditure beyond the 5% contributed by the Union.

The EU financial contribution would not exceed €200 million. 95% of these funds would be used for operational purposes. As set out above, this EU operational contribution would be used to support a limited number of critical pilots and demonstrators in strategically identified and carefully assessed areas. The Union would also contribute to the administrative expenditure of the PRIMA Joint Programme implementation, with a maximum of 5%.

The governance of the PRIMA Joint Programme

The PRIMA Participating States intend to designate as Implementing Structure a newly created legal entity that will implement the PRIMA Joint Programme, as body governed by private law with a public service mission, under Spanish law that will be hosted in the same premises as the Union for the Mediterranean (UfM) Secretariat. This approach is in line with the one chosen in the context of ongoing Article 185 initiatives and is considered to be appropriate in principle for a potential PRIMA Joint Programme.

The DIS will be subject to an ex-ante assessment (audit) before the European Commission delegates budget implementation tasks to it. PRIMA Participating States have declared that they will provide adequate financial guarantees, as required for indirect management under the Financial Regulation.

The main bodies taking part in the Governance of the PRIMA Joint Programme, and their respective tasks, are described below.

- PRIMA General Assembly: The General Assembly will be the decision-making body of the PRIMA Joint Programme and will include all Participating States – whether EU Member States, Horizon 2020 associated third countries, or Southern-Eastern Mediterranean third countries – on an equal footing. The European Commission will have the role of Observer in the PRIMA General Assembly.
- PRIMA Chair and Co-Chair: These will come from the EU Member States and the Southern-Eastern Mediterranean third countries and will act as legal representatives of the DIS.

- PRIMA Executive Board: Appointed by the PRIMA General Assembly, it will include a selected number of Participating States and the Chair and Co-Chair. It will take decisions on all issues related to the administration of the PRIMA Joint Programme.
- PRIMA Scientific Advisory Board: Composed of experts in the scientific fields of the PRIMA Joint Programme, it will provide strategic advice for the PRIMA Joint Programme and will be consulted as part of the decision-making process for the implementation of the Programme. It will provide recommendations for priorities and topics to be addressed in the calls for proposals and other actions of the PRIMA Annual Work Programme (AWP).
- PRIMA Secretariat: This will be the Operational Management Unit, as the DIS shall be responsible for the management of the PRIMA Joint Programme.

Ensuring the sound financial management of PRIMA Joint Programme: monitoring and audit mechanisms, protecting the financial interest of the EU

DG RTD has adopted standard supervision arrangements for initiatives pursuant to Article 185 TFEU that will apply equally to the PRIMA Joint Programme. The details of monitoring and audit mechanisms are described in paragraph 7.2 of this report.

Stakeholder support for an Article 185 initiative

The **on-line public consultation** launched in the frame of the present impact assessment highlighted that 55% of respondents (58% of EU and 35.5% of Non-EU) believe that existing national and EU-level R&I actions in the field of water provisions and food systems in the Mediterranean Area do not adequately address the identified problem. As an alternative to the current scenario, 69.3% suggest to create a permanent dedicated structure (Article 185 TFEU); 29.1% would opt for a Cofund action; 1.6% (all from EU countries) selected "Other policy option" but did not provide any alternative policy option, except for one suggestion to launch a series of small grants, which can be likely associated to a specific implementation of the baseline scenario.

4.4. Stakeholders targeted by the different policy options

Policy **Option 0** would not target any specific stakeholder, since it would rely on a bottom-up participation of stakeholders concerned in proposals submitted to Horizon 2020 calls that are relevant for food and water.

Policy **Option 1**, all ERA-NETs would directly target research funders, and to a lesser extend the ministries that allocate the funding to their programmes. The final target audience is the one that is invited to apply to the calls launched under ERA-NETs, for the relevant programmes of the Mediterranean Countries mostly researchers in public research organisations.

Policy **Option 2**, the PRIMA Joint Programme based on Article 185 TFEU would allow, for the calls implemented by the DIS, **the participation of all relevant R&I actors, in particular industry and other end-users**. The activities of the Participating States would target mainly public research organisations. Option 2 would furthermore target the different ministries and other governmental authorities involved on the side of the Participating States.

In Annex 7 a detailed analysis of the actors affected by the three policy options is reported.

No different **digital solution** subject to assessment has been identified as relevant to the problem at stake.

5. Section 5. What are the impacts of the different policy options and who will be affected?

5.1. Likely economic, social and environmental impacts of each of the short-listed options

Taking account of the identified problem, problem drivers and objectives, this section assesses the retained options of section 4.3 according to their direct and indirect impacts.

In particular, the following most significant impacts have been identified:

- Direct impacts of **economic** nature:
  - Increased innovation and research
    - ✓ Integration of national R&I programmes and activities
  - Technological development
    - ✓ Delivery of fully piloted and demonstrated, common innovative, integrated solutions for the sustainable management of water provision and food systems
  - Growth and investment
    - ✓ Opportunities for agro-food industry and other SMEs and other companies
- Indirect impacts of **economic** nature
  - Growth and investment
    - ✓ Large-scale aggregate economic impacts
- Indirect impacts of **social** nature
  - Working conditions
    - ✓ Improved livelihoods for farmers
  - Public health and safety
    - ✓ Improved nutrition and health
  - Social impact in third countries
    - ✓ Political stability and reduced migration
- Indirect impacts of **environmental** nature
  - Fostering the efficient use of resources and fighting climate change
    - ✓ Large-scale environmental impacts

5.2. Direct impacts

The identified likely direct impacts of the Article 185 option are of economic nature, according to the impacts category of Tool #16 of the Better Regulation Toolbox. Article 185 option is expected to have relevant positive impacts on innovation and research, technological development and growth and investment, as described in the following paragraphs.

5.2.1. Rapid integration of national R&I programmes and activities in the Mediterranean area

The **most immediate direct impact of the Article 185 option, and an impact that no other option can achieve**, is the rapid integration of the R&I programmes and activities of the Participating States within the context of **a jointly formulated strategic R&I agenda focused on addressing the challenge of unsustainable managed water provision and food systems**. This will provide a comprehensive, long-term stable and predictable framework for all relevant stakeholders to collaborate towards the achievement of the operational, specific and general objectives of the PRIMA Joint Programme.

Considering the strategic and specific objectives described in Section 3, and based on Tool #16 of the Better Regulation Toolbox, the direct impacts on the integration of national R&I programmes and activities are summarised in Table 5.1.

Direct impact category	Baseline scenario: No dedicated EU action	Option 1: ERA-NET Cofund actions	Option 2: PRIMA Joint Programme based on Article 185 TFEU
Mobilisation of additional resources in R&I in the field of water provision and food systems	Baseline scenario would not specifically address additional resources. The instruments available under Option 0 are not specifically designed to directly leverage R&I resources.	ERA-NET Cofund actions would be able to attract further public funding, but it would likely more difficult to mobilise private investment. In fact, in ERA-NETs predominantly public research organisations are participating in the call.	Article 185 option presents a longer-term engagement towards common R&I investment over a period that generally lasts 10 or more years would enable the structural involvement of different types of stakeholders, both public and private, bringing together and leveraging their respective knowledge and financial resources.
Uptake of innovative solutions	Baseline scenario would be able to address directly the innovative solutions, through dedicated calls. However, it does not present the necessary scope and scale for addressing the challenges of water provisions and food systems in the Mediterranean area.	ERA-NET Cofund actions are likely to address research activities, but have limited capacity to address the innovation dimension.	Article 185 would likely result in the development of innovative solutions with high TRL by implementing large scale demonstration project in the Mediterranean area.
Knowledge transfer and skill creation	Baseline scenario and ERA-NET Cofund actions are expected to have a positive impact on knowledge transfer and skill creation. However, given the need to develop innovative integrated solutions for the sustainable management of water provision and food systems and to ensure sufficient geographical coverage, they are likely to have only a limited impact. These options, in fact, don't have the necessary long term spam and cooperation capacity to cope with societal challenges, such as the ones addressed by the identified objects, that are of scale and complexity, requiring different types of knowledge and skills from different sectors and disciplines to resolve them.		Article 185 ensures long-time commitment on specific objectives of EU and third countries on equal footing. The long term cooperation could lead to the generation of new knowledge to be valorised in the form of new products, processes, services and economic, social and environmental impacts.
Main features concerning R&I activities and their coordination			
Priority setting	Ad-hoc, bottom-up	Commission Driven	Joint decision
Coordination framework	None	ERA-NET, variable geometry for countries participating	Article 185 (14 countries[55])
Coordination entity / governance	none	ERA-NET consortia of research funders	PRIMA DIS and PRIMA General Assembly with Participating States representatives
Research on water and food	Ad hoc, bottom up	Coordinated	Integrated, based on common R&I agenda
Innovation activities incl. demonstrators and industrial research	Ad hoc, bottom-up	No	Integrated, based on common R&I agenda
Policy/normative research	No	No	Integrated, based on common R&I agenda
Support for capacity building and skills	No	No	Integrated, based on common R&I agenda
Time frame for resulting	2018 – 2023	2018 – 2023	2018 - 2027

[55] Cyprus, Czech Republic, Egypt, France, Greece, Israel, Italy, Lebanon, Luxembourg, Malta, Morocco, Portugal, Spain and Tunisia

R&I activities

Table 5.1: Direct impacts on the integration of national R&I programmes and activities

5.2.2. Efficient and effective delivery of fully piloted and demonstrated, common innovative, integrated solutions for the sustainable management of water provision and food systems

The aforementioned stable, focused, comprehensive framework provided by the Article 185 option, which involves all relevant stakeholders and establishes a clear division of labour between the use of the EU financial contribution (pilots, demonstrators, higher TRL levels) and the use of the national financial contributions (training, networking, lower TRL levels), will ensure the best delivery of the intended scientific and technological outcomes, whether on the input side (higher levels of R&I investment, skill creation) or on the output side (actual development, piloting and demonstration of innovative integrated solutions for the sustainable management of water provision and food systems, uptake of those solutions).

Due to the features of R&I activities linked to the policy options, only **Option 2** is likely to have significant impacts in terms of delivery of fully piloted and demonstrated and integrated solutions. **Option 1** usually addresses lower TRL projects with very low involvement of industry. **Option 0** would require specific and ad-hoc actions under Horizon 2020 Work Programmes that are not likely to achieve the adequate level of integration and involvement of all relevant stakeholders in the Mediterranean area.

5.2.3. Greater opportunities for food industry and other SMEs and other companies

In the Mediterranean area, Micro, Small and Medium Enterprises constitute a key economic and employment driver, accounting for about 70% of the total workforce and 99% of overall enterprises in the region[56].

Food industry SMEs account for a large share of the total number of SMEs and have much innovation potential. Dedicated statistics show, for instance, that about half of Spanish food SMEs carry out either product or process innovations. The figures for Italy are similar: 54% of all Italian food SMEs carry out product or process innovations, and 28% develop their own R&I activities. According to the PRIMA Expert Group, extrapolating the abovementioned figures to the Mediterranean region would mean that around half of the food SMEs would be able to perform innovation activities. This percentage might be lower in Southern-Eastern Mediterranean countries due to the predominantly micro-character of the local food producing and processing companies, with restricted or no market access.[57]

The current position of the fragmented Mediterranean food industry is not competitive, however, in a market dominated by large food multinationals (even if food chains of Mediterranean products are characterised by the strong presence of SMEs in food production and food processing) because of low levels of innovation. Regarding organisational innovations, only part of the food and agricultural SME sector of the Mediterranean will be able to develop and implement it to be competitive (e.g. improved cost structures, better market access, increasing sales figures or profit margins).

[56] Euro- Med Development Center for Micro, Small and Medium Enterprises, 2012, presentation at the Workshop on challenges and opportunities for the textiles and clothing sector in the Euro Mediterranean region, based on Eurostat data

[57] Extrapolations made by the Commission services based on erva, M.C., Triguero-Cano, A., and Corcoles, D. (2013), Differences in innovation between food and manufacturing firms: An analysis of persistence. Agribusiness Vol. 29 No. 3, pp. 273-292.

All Policy Options are expected to affect the food value chain, farming and related services and water management sectors, from firms in the process industry to retailers.

Option 0 is expected to produce low impacts on SMEs and competitiveness because of the limited capacity of single (and not continued over time) Horizon 2020 actions to produce innovations to be brought to the market.

Option 1 is expected to provide a moderate positive impact on SMEs and competitiveness, because of the larger cooperation among a specific set of Mediterranean Countries and because of the leverage effect on investments they make.

Option 2 is expected to produce much more positive impacts on SMEs and competitiveness due to the long-lasting commitment period and to the common strategy for the adoption of eco-innovation and sustainable business models, together with the set-up of more sustainable marketing chains. The wide scientific and stakeholder base achievable within **Option 2**, the strong economic commitment, the closeness to regional policy-making and the long timeframe are likely to bring positive impacts on SMEs and competitiveness.

5.3. Indirect impact

The identified likely indirect impacts of the Article 185 option are of economic, social and environmental nature, according to the impacts category of Tool #16 of the Better Regulation Toolbox. Article 185 option is expected to indirectly generate relevant positive impacts on growth and investment, working conditions, public health and safety, social impact in third countries, efficient use of resources and fighting climate change. The expected significance of the identified likely indirect impacts is assessed in the following paragraphs.

5.3.1. Large-scale aggregate economic impacts

To assess the economic impact of the different options it is crucial to address the nexus 'climate change, water availability/variability/predictability, and food systems, and the role the R&I can play within this nexus.

Climate change already has, and will increasingly have in the coming years and decades, large-scale effects on water quality and availability. As a recent World Bank report (2016) argues, the impacts of climate change will be channelled primarily through the water cycle. Water will become scarcer, more variable and less predictable. The World Bank argues that this will have large-scale economic effects. Water-related climate risks cascade through food, energy, urban, and environmental systems. Water is a vital factor of production, so diminishing water supplies can jeopardise growth and economic prospects. **Some regions could see their growth rates decline by as much as 6% of GPD by 2050 as a result of water-related losses in agriculture, health, income, and property**. As the World Bank argues, the impacts of water mismanagement are felt disproportionately by the poor, who are more likely to rely on rain-fed agriculture to feed their families, live on the most marginal lands, which are more prone to floods, and are most at risk from contaminated water and inadequate sanitation. Changes in water availability and variability can also induce migration and ignite civil conflict according to the World Bank. Where economic growth is impacted by rainfall, episodes of droughts and floods have generated waves of migration and statistical spikes in violence within countries. In a globalised and connected world, such problems are impossible to quarantine. Furthermore, where large inequities prevail, people move from regions of poverty to regions of prosperity, which can lead with increased social tensions.

While ineffective water management policies can exacerbate the adverse growth impacts of climate change, forward-looking policies can go a long way towards neutralising them, according to the

World Bank. In the Middle East, for instance, business-as-usual water management policies can lead to GDP being smaller by 14% by 2050 while efficient water management policies can reduce the effect to minus 6.02%. And in the Sahel, the business-as-usual scenario leads to minus 11.7% of GDP while good policies can reduce it to minus 0.82%.

In the Mediterranean region, water supply and food supply are inter-related. Irrigation accounts for 70% of total water use in the region and in some Southern and Eastern Mediterranean countries even for 80%. As a consequence of climate change, in order to sustain agriculture and meet the growing need for food (by 2050, the population will exceed the 600 millions), the Mediterranean area as a whole may face an increase of between 4% and 18% in gross irrigation requirements (if irrigation systems and conveyance are not improved). At present, the Mediterranean region could save 35% of water by implementing more efficient irrigation and conveyance systems.

According to the McKinsey report "Pursuing the global opportunity in food and agribusiness, Chemicals & Agriculture June 2015", fruits and vegetables in the Middle East and North Africa are one of the 24 most attractive global hotspots for investors in the period 2011-2020.

R&I are absolutely key for bringing about better water management policies and thus have, against the abovementioned background, huge potential economic and socio-political impacts. The aforementioned World Bank report explicitly calls attention to the opportunities offered by advancing technologies for water supply expansion and water resource recovery and calls for greater research *inter alia* to determine the commercial viability and opportunities to scale up new technologies. It also calls for carefully researching investments in technologies to reduce the impact of extremes, variability and uncertainty.

In general terms, the returns on total R&D expenditure are high. For instance, a 0.1 percentage point increase in R&D could boost output per capita growth by some 0.3–0.4%. The returns specifically on public R&D expenditure are also high. For instance, the rate of return on publicly funded R&D usually exceeds 30% while each extra 1% in public R&D generates an extra 0.17% in productivity growth. The returns specifically on private R&D are equally high. Firms' returns on their own investment in research usually range from 20% to 30% while societal returns on firms' investment in research usually range from 30% to 40%. Each extra 1% in business R&D also generates an extra 0.13% in productivity growth.

These overall figures are confirmed by empirical evidence on returns to water and agricultural R&I. **For instance, a recent study on the rates of return to water management research estimated returns between 11% and 20% per year**. A recent study re-examining the reported rates of return to food and agricultural research and development estimated a median of 9.8% per year and a mean of 13.6% per year.

According to the PRIMA Expert Group, closing the gap between supply and demand by deploying water productivity improvements across regions and sectors around the world could cost about $50 billion to $60 billion annually over the next two decades. Private-sector companies will account for about half of this spending. **Many of these investments yield positive returns in just three years**.

R&I make their greatest contribution if governments support it. This is because of the existence of market failures. Firms often find it difficult to finance risky R&D projects, especially during recessions. R&D investment also has beneficial effects for the wider economy as a result of knowledge spill-overs but firms do not take these effects into account in their decisions. The IMF (2016) therefore calls for promoting private R&D by providing subsidies and tax incentives.

The large-scale returns on public support for R&I are demonstrated by evidence from the ex-post evaluation of the FP7. According to the High Level Expert Group (HLEG) that carried out the ex-post evaluation of FP7, the programme will directly create 130,000 research jobs over a period of 10 years and indirectly 160,000 additional jobs over 25 years. The HLEG also estimated an indirect

economic effect of €500 billion over 25 years, or approximately €20 billion annually in additional GDP. According to the external evaluation of the HLEG, through short-term leverage and long-term multiplier effects, **each euro spent by FP7 generated approximately €11 of estimated direct and indirect economic effects through innovations, new technologies and products**.

In the specific case of the Mediterranean area, strong efforts are needed in product, processing and marketing innovation to succeed in competitive food markets (both locally and internationally). Many companies, and mostly SMEs, are developing products and services that can help business customers raise their water productivity. In agriculture, improved irrigation technologies and plant-management techniques are yielding "more crops per drop".

Developing innovative solutions for water provision and food systems in the Mediterranean could also contribute to generating employment opportunities. A number of EU Mediterranean countries show high unemployment rates, while non-EU Mediterranean countries offer unattractive, unspecialised jobs incentivising migrations. The implementation of innovations in (traditional) food products can contribute to job opportunities. Product innovation in food SMEs is positively linked to employment, and process innovations do not necessarily reduce employment in the food industry. Additional market opportunities will be created for agricultural producers of raw materials for traditional food products.

Enhanced investment in R&I are likely to achieve the aforementioned broad economic indirect impacts if the effects of a more sustainable management of water provision and food systems would be beneficial also to other sectors, e.g. more availability of water in urban area and non-food industrial sector.

Policy Option 0 and Option 1 have a limited capability of achieving an appropriate scale of resources as to have cross-sectoral impacts thorough the Mediterranean area, for their low level of integration and short time frame.

Policy Option 2, due to the long time-frames associated with innovation development and adoption and the integrated approach, has the capacity to address regional strategies and policies to transfer positive impacts in the broader regional economy.

5.3.2. Improved livelihoods for farmers

Farmers would be amongst the most immediate beneficiaries of improved water provision and food systems. Productivity enhancements increasing farmers' resilience in the face of climate change pressures can alleviate poverty, create jobs and lower food prices[58]. The analysis suggests that while all policy options can be expected to have some impacts (in proportion to the resources invested), **Option 2 is likely to be the most fit for purpose** due to its wide scope, mobilisation of resources and integrated nature able to stimulate co-fertilisation among Mediterranean countries and economic sectors. In addition, R&I on sustainable agricultural practices will provide incentives for young people to invest in becoming farmers[59,60]. Large, long-term R&I programmes could develop or enhance instruments to attract young farmers through: a) education and increased awareness with regard to sustainable agriculture practices; b) capacity-building with regard to implementation of relevant education; and 3) financial schemes enabling access to land and credit for relevant investments and insurance coverage.

[58] Nelson, G.C., Rosegrant, M.W., Koo, J., Robertson, R., Sulser, T., Zhu, T., Ringler, C., Msangi, S., Palazzo, A., Batka, M., Magalhaes, M., Valmonte-Santos, R., Ewing, M., and Lee, D., 2009. Climate Change Impact on Agriculture and Costs of Adaptation. International Food Policy Research Institute, Washington, D.C. (USA)

[59] IFAD (2010) Rural Poverty Report 2011, Rome: International Fund for Agricultural Development

[60] White, B., 2012. Agriculture and the Generation Problem: Rural Youth, Employment and the Future of Farming. Institute of Development Studies (IDS) Bulletin Vol. 43 (6):9-19.

A new generation of educated young farmers, able to use advanced technologies and innovation-ready, will require an array of new services in rural areas. Young farmers also have a longer-term stake in their farmland and need to be able to rely on its continued productivity for decades to come, and then for future generations, too. Young farmers are particularly conscious of soil health and sustainability, and therefore it is crucial that they are supported by R&I programmes to protect fertile but fragile Mediterranean natural resources (as well as the services these soils provide).

5.3.3. Improved nutrition and health for the people of the Mediterranean area

The activities identified by the PRIMA initiative are likely to have positive indirect impacts with respect to achieving the SDGs. In particular, developing and implementing innovative solutions for sustainable management would likely lead to reduced unsustainable water use and agricultural practices, thus significantly contributing to SDG 2 and 6. The analysis suggests that **Option 2** and, to a lesser extent, **Option 1** would both be aligned with and complement high-level EU goals related to the attainment of the Sustainable Development Goals.

Sustainably managed water provision and food systems will not only improve the livelihoods of farmers and create large-scale economic opportunities in the food industry and other sectors, they will also directly improve the nutrition and health status of the people of the Mediterranean area.

According to a study by the World Bank (2016)[61], there is growing evidence that water shocks, due water scarcity and variability, and climate change, may have much longer-term effects. This is particularly true when water shocks cause nutritional deficits or health impacts in young children, or income shocks which prevent families from investing in their children.

The establishment of clear links between food, nutrition and health in the Mediterranean is an extremely complex issue requiring a very long-term time perspective, that can exceed even the time frame of all three policy options. It would anyway be possible to influence the diet of the population in the Mediterranean region towards health-promoting nutrition and reorganising the agro-food value chain accordingly. This approach requires multidisciplinarity (agriculture, food technology, nutrition science, social sciences, economics, psychology, sociology, IT experts), and the involvement of a wide range of societal and value chain actors. Additionally a significant increase in Mediterranean scientific knowledge is required in the areas of food, nutrition and health and the interactions between them.

5.3.4. Greater political stability and reduced internal and external migration

It is now widely recognised that climate changes, increased frequency and severity of droughts and storms, changes in rainfall patterns and losses of agricultural productivity are likely to increase migration in the coming decades. **Building resilience to the more extreme precipitation events of climate change will become a more urgent priority especially in rainfall vulnerable areas**. Migration within and between countries tends to increase in areas facing water shocks (World Bank 2016).

A R&I strategy addressing water provision and food systems by deploying innovative solutions to tackle the adverse effects of climate change in the Mediterranean area can have positive impact on nutrition and health status for the people of the Mediterranean region, and more economic

[61] World Bank(2016) High and Dry: Climate Change, Water, and the Economy

opportunities for them, as explained in the above paragraphs. **These improved conditions will contribute to greater political stability, which in return will reduce internal and external migration**. In fact, water scarcity and unsustainable farming can destroy agriculture, causing many farm families to migrate to cities. In Sub-Saharan Africa a 1 percent reduction in precipitation is associated with a 0.59 percent increase in the urbanization rate[62].

The 2030 Agenda for Sustainable Development included migration in the SDG #10 on reduced inequalities within and between countries. PRIMA is likely to contribute to SDG #10 reduce the transaction costs of migrant remittances and eliminate remittance corridors among Mediterranean countries.

The analysis suggests that Option 2 is likely to be the only one that can achieve significant impact in this regard, thanks to its wide scope, mobilisation of resources and integrated nature.

5.3.5. Large-scale environmental impacts

All Options are likely to have positive indirect impacts - though clearly with different intensity - on the environment in terms of improving the resource-efficient management of water provision and food systems.

The three options would, in fact, support R&I activities aiming at the development of solutions able to address the wide societal challenges of "Climate action, Environment, Resource Efficiency and Raw Materials" and "Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy". Under **Option 0 and Option 1**, the focus of the topics of future calls for proposal would depend on the Work Programmes of Horizon 2020 and future Framework Programmes. Water provision and food systems represent, therefore, potential topics that could be addressed in specific calls and/or topics.

Under Option 2, the increasing investment in and cooperation on R&I with a long term perspective, in line with a common defined strategic R&I agenda, focusing on water provision and food systems would create the appropriate conditions to develop and implement resource-efficient and cost-effective solutions in the Mediterranean area. If successful, these solutions would bring benefits to the environment, reducing resource use and waste generation.

In particular, positive environmental effects will be achieved more effectively if innovative solutions could be developed and demonstrated in the frame of an increased collaboration and exchange of knowledge and expertise among Mediterranean countries, which are facing the same challenges due to the climate change, increasing population and social instability.

As illustrated in the previous sections, the PRIMA Joint Programme based on Article 185 could make use of the Union contribution to fund large-scale demonstration projects by transnational calls, thus reducing the time needed to implement innovative solutions.

Based on the analysis of the PRIMA Expert Group, below are reported examples of areas where Option 2 could help achieving more effectively large-scale environmental impacts:

- Improved water conservation by developing: (i) novel plant varieties for irrigated and dry farming conditions; (ii) innovative irrigation technologies and user-centred water conservation processes; efficient water allocation between different economic sectors; (iii) user-centred water-saving processes and programmes; (iv) improved water governance, management and coherence between agriculture, water and energy policies;

[62] Barrios, Luisito, and Strobl 2006

- Sustainable farming practices by implementing innovative solutions for: (i) reducing land conversion and habitat loss, (ii) improving water-use efficiency for irrigation, (iii) reducing soil erosion and degradation; (iv) producing and using safer fertilisers; (v) increasing productivity of local crops and farm animals;
- Recovery of water and nutrients from wastewater for agricultural use by developing: (i) new site-specific policies, (ii) user acceptance strategies, (iii) and innovative wastewater treatment and reuse technologies;
- Water desalination by developing : (i) technological breakthroughs in energy consumption and desalinated water quality, (ii) brine disposal, (iii) integration into energy networks and local water management strategies, (iv) coordinated strategies for water reuse solutions and desalination as to close water loops;

Implementing integrated innovative solutions in these areas can result in reducing greenhouse gases (GHG) emissions, harvest shocks due to droughts, heat waves and floods, and build resilience and adaptation capacity in the Mediterranean area.

5.4. Budgetary impacts

As it regards the impact on the costs and budgetary implications of the different policy options, a detailed analysis is reported in Table 5.2.

	Baseline scenario: No dedicated EU action	Option 1: ERA-NET Cofund actions	PRIMA Joint Programme based on Article 185 TFEU
Union contribution (commitments)	≈ € 30 million 2018 - 2020	≈ € 30 million 2018 - 2020	€ 200 million 2018 - 2020
Crowding in public funding (Direct contribution from Participating States)	13%	200% ≈ € 60 million 2018 - 2023	≈ 150 – 300% € 300 – 600 million 2018 - 2028
Crowding in private	39%	0%	39%
Total funding	≈ € 45.6 million 2018 - 2020	≈ € 90 million 2018 - 2020	≈ € 695 - 1112 million 2018 - 2028
Total leverage on Union contribution	0.52	2	3.48 – 5.56
Additional administrative expenditure (Commission/Participating States)	None/none	None/5% Participating States have additional costs for the transnational calls	None/5-7%
Monitoring	Project based	Project based	Programme based
Evaluation	Part of overall H2020 evaluation	Part of overall H2020 evaluation	Dedicated interim and final evaluation
Administrative effort Commission	Project based - low	Project based - low	Programme based - medium
Prevention of errors, irregularities or fraud	Project based	Project based	Programme based (indirect management by the DIS)
Financial risks for Union contribution	Low	Low	Low
Operational risks	Low	Medium	Medium

Table 5.2: Budgetary and financial impacts, including risks

Concerning the financial and operational risks associated with the different options the assessments is based on the requirements and specificities in place described below.

- For **Option 0 (baseline scenario)** the operational and financial risks are comparable to those that apply to Horizon 2020 funding of indirect actions in general. Risks of non-recovery are covered by the Participant Guarantee Fund. Beneficiaries report on the basis of standard Horizon 2020 reporting, including where appropriate provision of certificates of financial statements. Supervision of the actions is done by the Commission services or its Executive Agencies.
- For **Option 1 (ERA-NET Cofund actions)** the financial risks are low. The principle is that the comparable Union contribution is reimbursing part (up to 33%) of the public funding (financial support to third parties) that is paid by national programmes to beneficiaries participating in successful projects resulting from the transnational calls. The ERA-NET participants report on the basis of standard Horizon 2020 reporting, including provision of certificates of financial statements concerning the funding they have paid according to national funding rules. There are certain operational risks associated with it, typically that national commitments are not as high as expected when publishing the topic for the ERA-NET in the Work Programme, or the transnational proposals selected are not fully consuming the call budget.
- In case of the **Option 2** (**PRIMA Joint Programme based on Article 185 TFEU**) the management mode is different. Article 185 uses the indirect management of Union funds by the DIS. Before the delegation of management and transfer of funds the DIS will be subject to an ex-ante assessment in accordance with the requirements set out in Article 61 of the Financial Regulation, in order to assess its capacity to implement the programme, including receiving, allocating and monitoring the Union's financial contribution in the framework of indirect management of the Union budget. The assessment is usually carried out by using a Framework Contractor to the European Commission (DG BUDG or DG RTD) for audit services, using terms of reference developed and agreed within the DG. The ex-ante assessment leads to a conclusion accompanied, where appropriate, by a number of recommendations, prioritised according to the nature and importance of the audit findings, that need to be followed up by the DIS (action plan) in order to ensure full compliance with the rules.
  Once the DIS has been positively assessed, financial guarantees provided and the delegation agreement with the Commission signed, the implementation of the Joint Programme can start. The DIS provides comprehensive annual reporting including auditor opinions and a management declaration. The DIS is furthermore responsible for the ex-ante control of expenditure of all indirect actions funded by the DIS. The financial risk for the Union is low, as the risk of non-recovery is covered by the financial guarantees that the Participating States have to provide will have to provide in due time and at the latest before the signature of the delegation agreement. There are minor operational risks that can be identified, in particular concerning the fully fledged start of programme implementation. This can be mitigated by with annual budgets starting low and increasing over time.

It has to be pointed out that the Participating States have requested flexibility concerning the central management of national contributions. This has been taken into account in the design of the Option 2 by using a two-tier approach:

- **Tier 1**: Transnational open and competitive calls organised and funded by the DIS and resulting in financial support mainly in the form of grants to beneficiaries in indirect actions managed by the DIS, including R&I activities, e.g. demonstrators, pilot plants, testing, pre-commercial deployment, and research activities addressing the complete range of TRLs; as well as Dissemination and outreach activities to promote PRIMA and maximise its impacts.
- **Tier 2**: Activities funded by the Participating States or their national funding bodies without Union contribution.

This approach allows flexibility for Participating States in deciding which national contributions are managed centrally by the DIS, and which contributions remain at national level, but count for the

matching with the Union contribution at programme level under the conditions set out in the basic act, and are determined in accordance with the usual accounting practices and accounting standards and to the applicable International Accounting Standards / International Financial Reporting Standards.

In addition, the above described approach for the implementation of the Option 2 (PRIMA Joint Programme based on an Article 185) requires only **limited derogations from the Horizon 2020 Rules for Participation**. To ensure balanced core participation in indirect actions under a north-south configuration, as a derogation from point (b) of Article 9(1) of Regulation (EU) No 1290/2013, the minimum number of participants should be three legal entities established in three different Participating States of which one is established in a Member State or in a country associated to Horizon 2020, and one is established in a third country, associated or not to Horizon 2020. Derogation from Article 9(3) of Regulation (EU) No 1290/2013 is necessary to ensure that the minimum eligibility conditions for participation in indirect actions are not discriminatory for entities established in third countries participating in the PRIMA Joint Programme as Participating States. Derogations from Article 12 of Regulation (EU) No 1290/2013 are necessary to allow broadening cooperation through joint calls launched by DIS with legal entities other than third countries and international organisations.

Commitments and their fulfilments

The Participating States and the Union make up-front commitments to contribute to PRIMA. The commitment from the Union of €200 million will be mainly used to finance indirect actions resulting from calls launched by the DIS. This will cover a series of seven Annual Work Plans (2018 – 2024). The Participating States will at the same time describe in the Annual Work Plan their activities funded from national programmes and the respective budgets allocated to these activities.

The commitment of the Union contribution to each Annual Work Plan will not exceed the commitment of the Participating States to it. This ensures that at the level of commitments there is a balance with at least matching contributions of Union funding and Participating States. This allows an automatic mechanism to reduce the Union commitment if Participating States fail to commit as expected.

The **fulfilment of the commitments (actual contribution)** can be verified in two steps:

1. Indicatively at the level of implementation of activities:
   - For the Union: the amount of funding for e.g. the respective Grant Agreements signed by the DIS;
   - For the Participating States: the amount of funding actually committed at the level of implemented individual activities (national grant agreements and other in-kind contributions).
2. Concretely at the level of the expenditure after end of implementation of the activities:
   - For the Union: the sum of the expenditure incurred by the DIS for the implementation of the entrusted tasks accepted by the Commission and of the remuneration for their implementation;
   - For the Participating States: the sum of expenditure incurred by Participating States or their national funding bodies and accepted by the Commission.

The annual reporting of the DIS will cover both strands. This allows close monitoring by the Commission services and facilitates taking corrective measures, if necessary, in particular reducing Union commitments to individual Annual Work Plans if the implementation of the activities by Participating States does not maintain the necessary level of commitment to match the one of the

Union.

5.5. Affected actors, measures to comply with requirements, and potential obstacles

The main affected actors, compliance requirements for beneficiaries and Participating States' authorities, and potential obstacles are reported in the Table 5.3.

	Baseline scenario: No dedicated EU action	Option 1: ERA-NET Cofund actions	Option 2: PRIMA Joint Programme based on Article 185 TFEU
Main actors affected	Public and private research actors	Funding agencies of participating states, Public research actors	Participating States authorities, Public and private research actors
Compliance requirements for beneficiaries	Beneficiaries need to comply with the Horizon 2020 rules for participations	Funding agencies need to comply with Horizon 2020 rules for participations, final beneficiaries need to comply with national funding rules	Final beneficiaries need to comply with • Horizon 2020 rules for participations • national rules in case of activities funded by Participating States
Compliance requirements on Participating States' Authorities	none	Participating States, via their funding agencies, have to ensure that they provide financial certificates on their expenditure for selected projects, according to national funding rules	Fulfilment of obligations resulting from the basic act, e.g.: • designate a dedicated structure (DIS) for the implementation, including receiving, allocating and monitoring funding; • provide financial guarantees; • establish and maintain the governance model in accordance with the Article 185 Decision; • provide formal commitments to contribute to the financing of PRIMA and fulfil those commitments; • ensure implementation in accordance with the requirements of the basic act e.g. for activities funded by the PS only; • ensure that costs of activities funded only by them and counting for the matching with the Union contribution at programme level have been determined in accordance with the requirements set out in the basic act.
Compliance requirements on DIS	-	-	• ensure implementation in accordance with the requirements of basic act and H2020 Rules for Participation (subject to any derogations set out in the Decision); • Implement EU funding and financial commitments of participating states. • comply with the relevant provisions of the Financial Regulation concerning indirect management.
Compliance requirements on final beneficiaries in Participating States	Determine costs of their activities in accordance with the usual accounting practices and accounting standards and to the applicable International Accounting Standards/ International Financial Reporting Standards.	Determine costs of their activities in accordance with the usual accounting practices and accounting standards and to the applicable International Accounting Standards/International Financial Reporting Standards.	• Determine costs of their activities in accordance with the usual accounting practices and accounting standards and to the applicable International Accounting Standards / International Financial Reporting Standards. • For costs counting as PS contributions at programme level, it is the responsibility of the PS to ensure they have been determined in accordance with the requirements set out in the basic act.

Potential obstacles for an effective implementation of the option and compliance by participating states/ beneficiaries	None identified	Potential obstacles are linked to lower national commitments when publishing the Work Programme; limited participation to the transnational proposals.	Potential obstacles on the basis of past experiences are difficulties on timely provision of financial guarantees. They have so far not put at risk the implementation of the initiatives.
Frequency of reporting	Usually every 18 month for each individual project	Usually twice in 60 month for each ERA-NET action; Resulting projects according to national rules	• Annual reporting for the DIS and the Participating States towards the Commission; • Resulting projects funded by the DIS usually every 18 months; • Resulting national activities according to national rules.

Table 5.3: Main affected actors, compliance requirements for beneficiaries and Participating States' authorities, and potential obstacles

In the case of Option 2, it is important to distinguish between the compliance requirements on Participating States that apply collectively at the level of the programme, and those that are relevant for the individual Participating State. In the approach for the PRIMA Joint Programme there is a clear separation between the activities funded by the Union contribution and implemented by the DIS, and those that are funded by national programmes. Therefore there is no requirement for compliance for specific implementation capacities at national level. The Participating States collectively set-up the DIS for the implementation of the PRIMA Joint Programme, including receiving, allocating and monitoring of funding, and establish the PRIMA governance structure. The compliance with the financial regulation and the Rules for Participation of Horizon 2020 is required for the Participating States to the extent they do not implement activities funded by them. Furthermore, the basic act allows flexibility for the Participating States to contribute either financially through the PRIMA DIS to activities funded with Union contribution, thus achieving a high degree of financial integration, or in kind to activities only funded by them without Union contribution.

Participating State have to provide, inter alia, financial guarantees, contribute via the national activities to the programme in accordance with the requirements of the basic act, determine costs of their activities in accordance with the usual accounting practices and accounting standards and to the applicable International Accounting Standards / International Financial Reporting Standards. Requirements incumbent on the Participating States in general can be fulfilled by all Participating States, as most of their capabilities are already in place through implementation of national activities under their national programmes.

5.5.1. Assessment of capability and expected contribution of third countries not associated to Horizon 2020 in relation to the conditions to be met by Participating States in PRIMA under Option 2 (Article 185 TFEU)

The compliance requirements on Participating States set out in Table 5.3 shall apply equally to Member States and countries associated to Horizon 2020 as well as to third countries participating in the PRIMA Joint Programme. The only notable distinction is that the first two groups of countries (Member States and countries associated to Horizon 2020) would be bound by the Decision of the European Parliament and of the Council on the participation of the Union in an Article 185, while non-associated third countries would accede to an Article 185 regime through bilateral international agreements with the EU. In order to ensure participation of all countries on an equal footing international agreements would need to mirror the provisions in the aforementioned Decision of the European Parliament and of the Council establishing the Article 185.

Countries associated to Horizon 2020 enjoy equal status as Member States under Horizon 2020, having met the conditions in Article 7 of the Regulation establishing Horizon 2020. This refers to the whole of Horizon 2020 beyond joint programming initiatives such as PRIMA.

As indicated in the introduction of this Impact Assessment Report, the non-associated Participating States (i.e. having committed to contributing resources) to PRIMA Joint Programme are Egypt, Lebanon and Morocco.

Egypt

State contribution to PRIMA

- ✓ €15 million cash contribution (corresponding to 7.5% of total cash contribution from Participating States)
- ✓ €3 million in-kind

Nature of research and innovation relationship with the EU and track record of cooperation

- ✓ The overall framework for R&I cooperation with the EU is provided by the EU-Egypt Association Agreement (OJ L304, 30/09/2004, p. 39), in which Article 43 addresses 'Scientific and technological cooperation' on access Union R&D programmes;
- ✓ The EU and Egypt have signed a science and technology agreement (OJ L182, 13/07/2005, p. 12) which is in force since 2008;
- ✓ Legal entities from Egypt are already eligible to receive EU funding under Horizon 2020.
- ✓ Participation record in EU Research Framework Programmes:
  - 2007-2013 (FP7): Total participant costs: €19 million; EU contribution: €15 million drawn in accordance with research framework programme rules.
  - 2014-on-going (Horizon 2020): Total participant costs: €2.3 million; EU contribution: €1.6 million drawn in accordance with research framework programme rules.

Record of administrative and financial management in cooperation with the EU, and management of EU funding.

- ✓ See track record in the participation in EU Research Framework Programmes above.
- ✓ Proven experience of funding agencies in the participation in joint programming actions (ERA-NET type projects) and a successful track record of fulfilment of financial commitments from national budgets combined to EU funding.
  - ERANETMED: Egypt contributed national funds amounting to €1.5 million[63] in Call 1 (2014), which has now been allocated to selected projects on a competitive basis. A further national funding amounting to €1.25 million has been committed to Call 2 (2016), which has attracted 174 proposals.
  - ARIMNet and ARIMNet2: Egypt committed €0.5 million of national funding to Call 2 (2016).
- ✓ Under the ENPI, Egypt has successfully completed phase 1 of the Research, Development and Innovation programme, which had a financial package of €11 million, with the Ministry of Scientific Research in the lead. The success of this programme has led to a second phase, which started in 2011, for which the EU has committed budget of €20 million. Most recently, Egypt awarded 26 projects under RDI in January 2015, with a total EU Contribution of €7.5 million.

[63] Contributions from Egyptian national funding agencies as follows: Science & Technology Development Fund (STDF): €0.75 million – 2014, €0.75 million – 2016; and the Academy of Scientific Research and Technology (ASRT): €0.75 million – 2014, €0.5 million – 2016

- ✓ In terms of broad EU-Egypt relations, bilateral programmes under the EU Neighbourhood policy (ENI funding) see transfers from the EU budget toward Egypt amounting to above €100 million annually (2014: €115 million, 2015: €105 million), which are allocated to specific national projects and/or direct contributions to the national budget.
- ✓ Egypt's STDF also has joint research funds with Germany, Italy France, Japan, South Korea, Jordan, Russia and USA (U.-Egypt STI Joint Fund amounts to $4 million per country/year). Given the availability of budget and the openness of the STDF to co-fund R&I international cooperation (9% of the STDF budget is dedicated to joint funds with other countries), it is expected that Egypt will remain committed to international cooperation with the EU.

Related R&I actions and national capacity

- ✓ The governance structure of the national STI system rests on the Ministry of Higher Education and Scientific Research, the Higher Council of Science and Technology, which sets research strategy, the ASRT, which is in charge of planning and programming, and the funding agency STDF. This institutional setup is supported by the network of research centres and universities. A key challenge to the country is to step up private sector R&D to lower dependence on public research funding.
- ✓ Egypt has Science and Technology Agreements with many countries, such as the USA, China and Japan, and almost all EU MS. In it national research funding policy, it maintains a highly international profile and mutual openness by dedicating 9% of the programme budget to joint programmes with international partners adopting primarily a matching fund approach.
- ✓ Water scarcity is a key issue in Egypt, which relies on the Nile for 95% of renewable water resources, while agricultural production (81% of water usage) depends heavily on irrigation. The Egyptian Water Resources Vision 2050 includes research as a major driver in the development and management of water resources, conservation of water quality as well as adaptation to expected impacts of climate change. Egypt has succeeded in participating for the first time in JPI related to water "WaterWorks2015" under Horizon 2020 WP 2014-2015, where Egypt will be contributing €0.65 million to the project.
- ✓ Public research in water has a dedicated research centre (National Water Research Centre – NWRC), which is supported by 12 research institutes that focus on water management, drainage, water resources, Nile research, hydraulics, channel maintenance, groundwater, construction, mechanical and electrical research, survey research, coastal research and environmental and climate research.

Lebanon

State contribution to PRIMA

- ✓ €4 million cash contribution (corresponding to 4% of total cash contribution from Participating States)
- ✓ €2 million in-kind

Nature of research and innovation relationship with the EU and track record of cooperation

- ✓ The overall framework for R&I cooperation with the EU is provided by the EU-Lebanon Association Agreement (OJ L143, 30/05/2006, p. 2), in which Article 44 governs 'Scientific, technical and technological cooperation' on access Union R&I programmes and to study means for Lebanon to participate in European Framework Programmes for Research.
- ✓ Legal entities from Lebanon are already eligible to EU funding under Horizon 2020.
- ✓ Participation record in EU Research Framework Programmes:
  - 2007-2013 (FP7): Total participant costs: €3.3 million; EU contribution: €0.8 million drawn in accordance with research framework programme rules

- 2014-on-going (Horizon 2020): Total participant costs: €2.8 million; EU contribution: €0.8 million drawn in accordance with research framework programme rules.

Record of administrative and financial management in cooperation with the EU, and management of EU funding

- ✓ See track record in the participation in EU Research Framework Programmes above.
- ✓ Proven experience of funding agencies in the participation in joint programming actions (ERA-NET type projects) and a successful track record of fulfilment of financial commitments from national budgets combined to EU funding.
  - ERANETMED: Lebanon contributed national funds amounting to €0.2 million[64] in Call 1 (2014). A further national funding amounting to €0.4 million has been committed to Call 2 (2016).
- ✓ Under the ENPI, Lebanon receives approximately €50 million annually; partly disbursed through dedicated programmes managed by Lebanese authorities and partly directly injected into the national budget.

Related R&I actions and national capacity

- ✓ National STI policy is driven and monitored by the National Council for Scientific Research (CNRS), which established a first national policy in 1966. While research funding is small in absolute terms[65], 80% of the budget is dedicated to funding the activities of research centres and programmes. The national STI system is also supported by a network of 41 accredited universities, of which some are internationally recognized research universities[66].
- ✓ Lebanon also has bilateral STI agreements with France and Italy as well as joint Lebanese-French and Lebanese-Syrian research grant programmes.
- ✓ Among its public research capabilities, Lebanon has a National Centre for Remote Sensing (CRS), which has carried out several projects using remote sensing and GIS techniques in applications that are highly relevant to PRIMA such as environmental surveys on land degradation and desertification risks, watershed mapping, forestry management, integrated coastal zone management and natural hazards. CRS has also set up a detailed soil map of Lebanon for the purposes of environmental monitoring. The CRS also collaborates with the French Centre Nationale de la Recherche Scientifique in this field.

Morocco

State contribution to PRIMA

- ✓ €20 million cash contribution (corresponding to 10% of total contribution from Participating States)
- ✓ €20 million in-kind

Nature of research and innovation relationship with the EU and track record of cooperation:

- ✓ The overall framework for research and innovation cooperation with the EU is provided by the EU-Morocco Association Agreement (OJ L70, 18/03/2000, p. 2), in which Article 45 'Regional cooperation': d) addresses how 'research in science and technology' is to be fostered with a regional impact involving third countries'.
- ✓ The EU and Morocco have signed a science and technology agreement (OJ L37, 10/02/2004, p. 9) which is in force since 2005.

[64] Contributions from Lebanese National Council for Scientific Research (CNRS)
[65] The annual budget of CNRS amounts to approximately USD 8 million per year.
[66] Source: MERID, FP7 project 645846.

- ✓ Legal Entities from Morocco are already eligible to EU funding under Horizon 2020.
- ✓ Participation record in EU Research Framework Programmes:
  - 2007-2013 (FP7): Total participant costs: €17.2 million; EU contribution: €13.6 million drawn in accordance with research framework programme rules.
  - 2014-on-going (Horizon 2020): Total participant costs: €3.3 million; EU contribution: €3.0 million drawn in accordance with research framework programme rules.

Record of administrative and financial management in cooperation with the EU, and management of EU funding.

- ✓ See track record in the participation in EU Research Framework Programmes above.
- ✓ Proven experience of funding agencies in the participation in joint programming actions (ERA-NET type projects) and a successful track record of fulfilment of financial commitments from national budgets combined to EU funding.
  - ERANETMED: Morocco contributed national funds amounting to €1 million[67] in Call 1 (2014). A further national funding amounting to €0.3 million has been committed to Call 2 (2016).
  - ARIMNet and ARIMNet2: Morocco committed €0.5 million of national funding to Call 2 (2016).
- ✓ Under the EU Neighbourhood policy Morocco benefits from a privileged partnership with the EU. Bilateral financial transfers during the period from 2014 to 2017 to range from €728 to €890 million, which are allocated to specific national projects and/or direct contributions to the national budget.

Nature of research and innovation relationship with the EU and track record of cooperation

- ✓ The national STI system is steered by the Ministry responsible for scientific research (MENESFCRS), together with the Centre National pour la Recherche Scientifique et Technique (CNRST), which is primarily responsible for the implementation of national programmes. Meanwhile L'Association Marocaine pour la Recherche-Développement (R&D Maroc) deals with innovation policy and private sector research.
- ✓ Bilateral cooperation is strongest with France, whereby 54% of co-publications with researchers outside Morocco occur with France, of which approximately two thirds are with the French Centre Nationale de la Recherche Scientifique[68]
- ✓ Research cooperation in the area of water management includes French-Moroccan research programme Sudmed targeting water resources in the region of Marrakech Tensift-El Haouz. Bilateral S&T agreements are also in place with Belgium, Portugal, Spain, Turkey and USA.
- ✓ Water management is a key priority for R&I efforts in Morocco given a semi-arid climate and heavy recourse to irrigation for agricultural purposes. Agricultural production is an important contributor to Moroccan economy, accounting for 10.5% of exports and 65% of revenues in rural areas and is highly volatile and susceptible to climatic fluctuations[69].
- ✓ The International Institute for Water and Sanitation (IEA) was set up in 2008 in Morocco with a regional (MENA) focus. It activities include research on water technologies and practices. A notable project undertaken with the Hassan II Institute of Agronomy and Veterinarian Studies studied crop yields and water productivity[70].

[67] Contributions from the Morocco MESRSFC
[68] Source URL: http://www.cnrs.fr/derci/spip.php?article131
[69] Source (2012) URL http://www.fao.org/nr/water/aquastat/countries_regions/mar/index.stm
[70] Source URL: http://menanwc.org/projects/global-yield-gap-and-water-productivity-atlas-jordan-morocco-and-tunisia

5.6. Impacts likely to change over time

Impacts in **Option 0** are not expected to change over time.

Option 1 would contribute in a ad-hoc way to the short-term coordination of Mediterranean R&I systems. The implementation of transnational research projects based on an international peer review evaluation process should contribute to increasing the quality of research, increasing the level of funding for challenges which no country can tackle alone and avoiding the duplication of research funding.

In **Option 2**, which implies long-term integration and substantial resources commitments, a centralised grant management by the DIS would lead to simplification in the medium and long term. Effective co-ordination of Mediterranean R&I capacities, solid public and private investment in R&I in the field of water provision and food systems, and third countries and international relations would increase.

A similar situation could be envisaged regarding knowledge transfer and skill creation among Public Institutions and researchers and innovators.

With regards to the scope of the initiative, Article 185 initiatives could be enlarged to other countries European and third countries, and therefore, expected impacts may increase.

In a mid to long-term perspective, achieving results of the R&I activities are expected to lead to a stable Mediterranean R&I capacity likely to entail additional positive social impacts, impacts on competitiveness (e.g. food industry and water management solutions for small agricultural producers) and environmental impacts.

In consideration of the on-going activities reported in Section 1, in the previous paragraph 5.5.1, more extensively in the Annexes 4, 5 and 8, and in the next sections on the comparison of the policy options, the Prima Joint Programme based on Article 185 TFEU is not likely to have a crowding out effects of other existing or planned bi- or multilateral programmes. There are, in fact, no specific programmes overlapping with the objectives of the PRIMA Joint Programme. The existing or planned bi- or multilateral programmes, that are partially addressing either water or food, are, in most of the cases, taking place between the countries that have also committed to the participation to the PRIMA Joint Programme, with limited or no budget attached. In addition, many of the ERA-NET actions are going to be terminated by the end of 2016. Therefore, in consideration also of the approach for the implementation of the PRIMA initiative, it is reasonable to assume that there will be no discontinuity in such bi- or multilateral programme, as many activities will still be managed at national level. On the contrary, PRIMA will likely to contribute to ongoing initiatives, resulting in a more efficient and effective expenditure of public funding for R&I, thanks to a common, integrated and long term strategic agenda.

6. Section 6. How do the options compare?

6.1. Compare the options

Taking into account the likely impacts of the options and the assessment presented in Section 5, the different policy options have been compared against each other using the baseline scenario as the reference and applying the following criteria:

- **Effectiveness**: the proposed options should be effective at improving the R&I framework in Mediterranean Area in the fields of water provision and food systems.
- **Efficiency:** the proposed options should achieve the identified main likely impacts with the greatest benefit/cost ratio.
- **Consistency with other policies**: the proposed options should be coherent with other European and National R&I policies and programmes and with coordination and cooperation policies at international level.

Based on these three criteria, comparisons of the policy options have been carried out against the specific objectives and analysed main impacts, and are reported in Table 6.1 and Table 6.2 respectively.

The Table 6.3 is intended to provide a summary of the option comparison assessment.

Specific Objectives	Baseline scenario: No dedicated EU action	Option 1: ERA-NET Cofund actions	Option 2: PRIMA Joint Programme based on Article 185 TFEU
Common long-term SRIA	low	medium	very high
National alignment	low	medium	high
Critical mass of actors and resources	low	medium	very high
Strengthening innovation capabilities	low	low	high

Table 6.1: Comparison of impact of the options on Objectives

Likely impacts	Baseline scenario: No dedicated EU action	Option 1: ERA-NET Cofund actions	Option 2: PRIMA Joint Programme based on Article 185 TFEU
Direct Impact			
Economic			
Integration of national R&I programmes and activities	low	high	very high
Delivery of fully piloted and demonstrated, common innovative, integrated solutions for the sustainable management of water provision and food systems	medium	medium	very high
Opportunities for industry	low	low	high
Indirect Impact			
Economic			
Large-scale aggregate economic impacts	low	low	medium
Social			
Improved livelihoods for farmers	low	medium	high
Improved nutrition and health	low	low	medium
Political stability and reduced migration	low	low	high
Environmental			
Large-scale environmental impacts	medium	medium	very high

Table 6.2: Comparison of impact of the options on economic, social, environmental and other impacts

Criteria	Baseline scenario: No dedicated EU action	Option 1: ERA-NET Cofund actions	Option 2: PRIMA Joint Programme based on Article 185 TFEU
Effectiveness Strengthening the integration of R&I systems and activities in the Mediterranean countries in the fields of water provision and food systems	**0**	+ +	+ + +
Efficiency Implementation of the policy options and meeting the expected likely impacts	**0**	+	+ + +
Synergy Coherence with other policies and programmes and wider coordination at international level	**0**	+ +	+ + +

0 = Neutral, + = minor positive impact, + + = Moderate positive impacts, + + + = Significant positive impacts

Table 6.3: Comparative effectiveness, efficiency and synergy of the policy options

6.2. Highlight the trade-offs and synergies associated with each option

There is no significant trade-offs between the likely impacts of any of the Policy Options and desirable outputs of other EU policies. There are a number of potential synergies highlighted in Annex 8, regarding JPIs (on Water, FACCE, Healthy diet and Oceans), MIRA, MEDSPRING and ERA-NETs (ERANETMED, Foresterra, ARIMNet and ARIMNet2). **Option 2** presents the highest potential to align national and EU R&I agendas, and to address overlapping and duplication in most relevant areas. **Option 2** and, to a lesser extent, **Option 1** would both be aligned with and complement high-level EU goals related to the achievement of the Sustainable Development Goals and improved North-South relations.

Concerning risks of simultaneity or potential financial overlapping with other relevant initiatives on R&I on water provision and food systems in the Mediterranean, it has to be considered that:

- The first joint calls under **Option 2** would be launched in 2018;
- INCO-NETs (MEDSPRING) and ERA-NETs (ERANETMED and ARIMNet2) will be finished by the end of 2017;
- Joint Programming Initiatives, FACCE JPI and Water JPI will be active beyond 2017, focussing on pan European societal challenges (not specifically on water provision and food systems in the Mediterranean), and they do not imply any predefined funding/financial instrument at conceptual level.

The conceptual approach of JPIs stands for Strategic Research Agendas; therefore, synergies could be expected at the level of: (i) coordinated visibility and advocacy inside and outside Europe, (ii) mapping capacities, (iii) exploring interfaces, and (iv) joint activities.

The European Innovation Partnerships stands for Strategic Innovation Agendas, and do not have any linked funding/financial instrument either. Therefore, the approach on synergies regarding EIP on water and on EIP on agriculture is the same as described above for the JPIs.

6.3. The likely uncertainty in the key findings and conclusions and how these might affect the choice of preferred option

The likely uncertainty refers to the success to agree and implement, on time, common financial and administrative arrangements within EU and third countries in **Option 2**. It is not possible, however, to discriminate between EU Member States and third countries in an Article 185 initiative considering that participation to the Horizon 2020 Framework Programme is open to all Mediterranean countries. The participation of the EU to Article 185 initiatives provides a number of inherent safeguards with respect to the use of the EU budget, namely that the EU contribution is subject to financial commitments by participating states being honoured.

Options 0 and **1** do not imply the set-up of the DIS, the agreement on a feasible and integrated grant management, or international agreements there is therefore no significant implementation uncertainty. In terms of financing and programming, however, Option 0 and 1 cannot rely on a long terms strategic agenda, as budget and topic addressing water provision and food systems in the Mediterranean area are subject to the adoption of the (bi)annual Work Programme for Horizon 2020 and future Framework programmes.

6.4. Preferred policy option

According to the outcome of the stakeholder consultation activities carried out in the context of the present Impact Assessment, **Option 2** is considered to represent the optimal policy option. According to the Expert Group, as stated in its report, **Option 2** is also considered representing the most favourable policy option.

From a broad policy perspective, the option to prioritize must be commensurate with the importance of the problem to tackle and its acuteness, the need to address it in earnest and without delay, and the ambition and commitment of the participants to devote sufficient resources and collective attention to ensure a successful outcome. In this perspective, due to a potentially higher level of **effectiveness** for achieving the identified objectives, a better **efficiency** of implementation, and more **coherence** with other policies and programmes, **Option 2** appears the most adequate, although not exempt from a number of risks which would have to be properly mitigated.

An initiative based on Article 185 TFEU appears as the most efficient and effective mode of intervention to achieve the strategic and specific objectives. In particular, the use of an Article 185 TFEU initiative is likely to have high leverage effect on national public funds in a stable, long-term and integrated manner, as demonstrated by previous and on-going initiatives (**see Box 3**), thus contributing to:

- delivering the desired **structuring effect** on and integration of national R&I policies and programmes;
- enabling the formulation of **stable, long-term, common strategic research agendas** with adequate scale and scope of actions;
- supporting the **alignment of national R&I programmes**;
- enabling the **involvement of partner countries on an equal footing**;
- enabling the structural involvement of **different types of stakeholders, both public and private**, bringing together and **leveraging** their respective knowledge and financial resources;
- **strengthening R&I capabilities in a lasting manner**.

An Article 185 TFEU would enable the development of a more equal relationship with neighbourhood countries whereby the EU and the countries concerned will determine together their mutual priorities in a tailored manner, thus entering into a new phase of cooperation, **in line with the priorities of the European Neighbourhood Policy**.

Article 185 initiatives are only used in selected areas, ambitious in terms of their objectives, scale and scope, and are only used in cases where objectives cannot be achieved with other instruments. This limits their number by definition and requires a strong commitment from the Participating States. Four initiatives have been launched so far under Horizon 2020, with up to Euro 1.445 million Union contribution and at least Euro 2.000 million contributions from Participating States. PRIMA would be the last Article 185 initiative launched under Horizon 2020.

6.5. Conformity to principles of subsidiarity and proportionality

Problems confronting the Mediterranean area go beyond the scope of individual countries, thus there is a need to tackle them jointly. Under both **Options 2** and **1**, interventions by the EU can be justified by the principle of subsidiarity. The scale of the problems, including the inability of many individual countries to mobilise sufficient endogenous resources, justifies a proportionate response to **Option 2.** It will be certainly greater than any response dependent solely on endogenous resources as in **Option 0**.

7. Section 7. Monitoring and evaluation of impacts

7.1. Plan for future monitoring and evaluation

Key evaluation issues for the initiative should be effectiveness (whether it has realised its objectives); efficiency (whether it has been well implemented); and impact (what are the intended and unintended impacts).

In case of an Article 185, effectiveness should be evaluated at both programme level (focusing on whether the overall objectives have been achieved) and national level (focusing on whether the goals and aspirations of individual countries have been attained). The initiative should be subject to mid-term and ex-post evaluations only in this case. Baseline scenario and Cofund action do not imply specific monitoring and evaluation activities, apart for the ones normally envisaged for Horizon 2020.

7.1.1. Core monitoring indicators for the main policy objectives

Monitoring and evaluation are important activities that need to be adequately planned at the start of an initiative. Key elements include:

- the definition of major evaluation issues (e.g. effectiveness, efficiency and impact);
- the elaboration of an adequate logic model for the initiative, linking aims, objectives, actions and expected impacts;
- the design of appropriate indicators relevant to each of the chosen evaluation issues;
- a baseline study to provide an adequate benchmark;
- well planned and resourced monitoring strategies.

To the extent possible the indicators should be able to provide information which is Relevant, Accepted, Credible, Easy to monitor, and Robust ('RACER').

Implementation indicators

A number of indicators will be further developed to measure the effectiveness and efficiency of the initiative. This will require qualitative research methods such as interviews and surveys with those directly involved in the governance system. A baseline study of the situation at the start and the expectations for the future is advisable.

Table 7.1 presents a set of qualitative indicators that should contribute to assessing the medium-term development of the activities. It is nonetheless important to stress the indicative nature of these indicators.

The first set of indicators refers to the **inputs** associated with the activities of the initiative. Indicators should look at the quantitative aspects such as scale (e.g. the amount of R&I funding that is allocated to the specific objectives, the geographical dispersion) and scope (e.g. the coverage of all themes set out in the programme, its coverage of relevant stakeholders, the inclusion of relevant Technology Readiness Levels). Qualitative input indicators should focus on the development of an implementation structure and a governance model that underpins the goals of the programme.

The second set of indicators should cover the **outputs** and the overall outcome of the initiative.

Type	Description
Output	Large-scale pilots and demonstrators
	The national research (funding) priorities adapted as results and the (R&I) priorities of the SRIA
	Alignment of national R&I funding programmes
	New or updated country strategies that mirror the impact of the initiative
	Efficiency benefits through pooling of resources. Share of public investment of Participating States. Volume and share of co-funding from EU and Mediterranean third countries. Operating costs. Time to Grant. Time to Pay
	Allocated funding through joint transnational calls for proposals or non-project funded activities
	Growth in share of implemented models of sustainable management of water provision and food systems in the Mediterranean area
	Growth in share of implemented new strategies for improved water and food efficiency and waste reduction developed for the Mediterranean area
	New water and food quality oriented business models and strategies adopted at national and regional levels
	Expansion of national teams involved in R&I projects on improving efficiency in management of water provision and food systems
	Number of countries in which water-saving solutions are implemented
	Number of transitional calls per year addressing water provision and food systems
Inputs	Participation grade of Participating States in Management Board meetings
	Additional countries participating in the initiative
	Countries dropping out as Participant States
	The actual financial commitment in kind by the Participating States
	Progress on the updates of the Strategic Research and Innovation Agenda (SRIA)
	Participation on equal footing by all third countries

Table 7.1: Qualitative indicators to assess the medium-term development of the PRIMA activities

Impact indicators

The most challenging indicators to define are the **Impact indicators**, as they should be able to demonstrate a causal link between the outputs, on the one hand, and the impacts that the initiative wants to achieve, on the other hand.

To this end, a set of Key Performance Indicators (KPIs) for monitoring the achievement of the operational objectives of the PRIMA Joint Programme have been defined. They are aiming to assess and monitor the performance of the initiative.

The indicators have been selected based on the Sustainable Development Goals (SDGs) framework and focus mainly but not exclusively on food security (SDG #2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture) and sustainable management of water (SDG #6 Ensure availability and sustainable management of water and sanitation for all). They aim at specific targets addressing social aspects:

1. Multidimensional Poverty Index
2. Population overweight (%)
3. Land Use (%)
4. GHG emissions (total and AFOLU – t CO2e)
5. Cereal Yield (kg/ha)
6. Agriculture Value Added (EUR/worker)
7. Fertilizers consumption (kg/ha of arable land – available also at 5 x 5 km scale)
8. Crop water productivity (kg/m3)
9. Proportion of total water used (% – available also at 5 x 5 km scale)
10. Population using safely managed water services (rural, %)
11. Population using safely managed sanitation services (rural, %)

12. Amount of agricultural residues used for energy purpose (t)

The KPIs defined above have been put in relation with the eight operational objectives of the PRIMA initiative. The final aim has been to identify which KPI is more adequate to address and measure each single specific objective. The results of this coupling exercise are reported in Figure 7.1 here below:

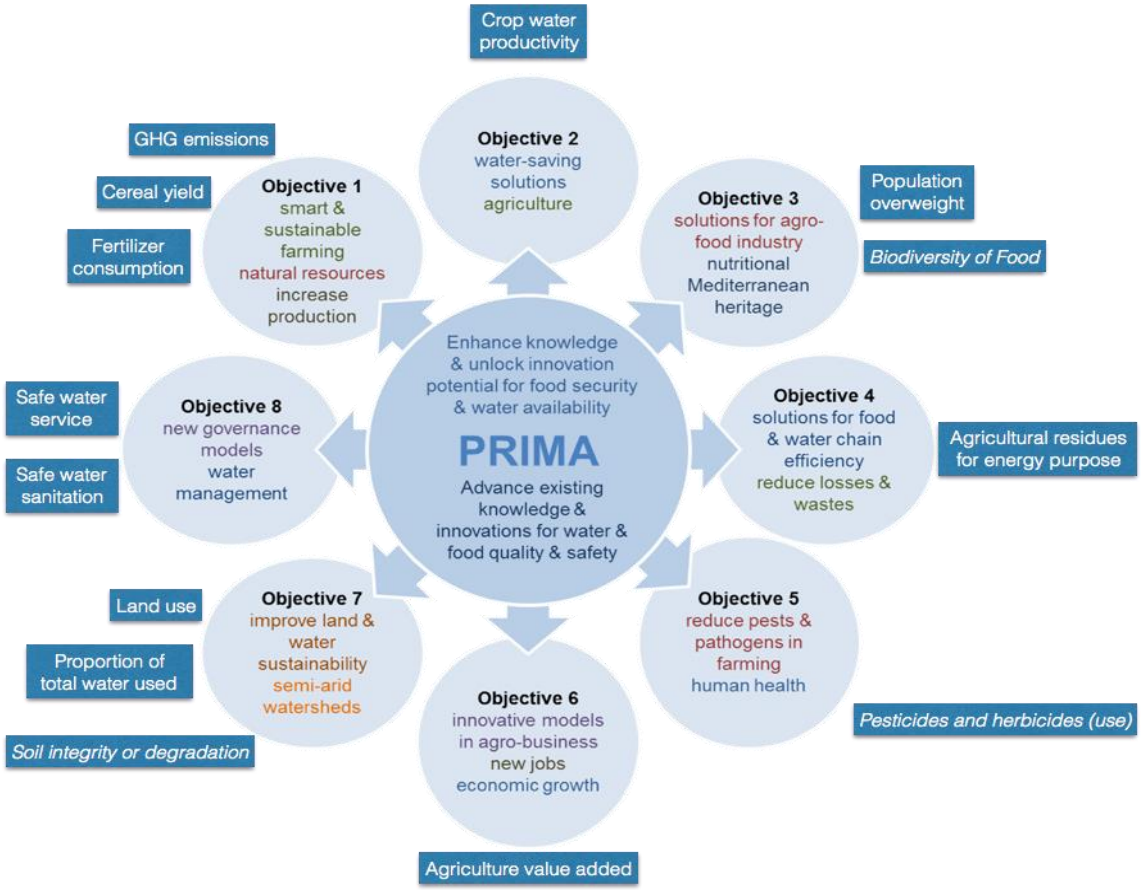


Figure 7.1: Key Performance Indicators (KPIs) and PRIMA operational objectives

The targets to be achieved for each operational objective of the PRIMA Joint Programme have been listed in Table 7.2, which also makes the link with the most relevant SDGs:

PRIMA Operational objectives	Targets to be achieved	SDG
1. To develop smart and sustainable farming systems to maintain natural resources and to increase production efficiency	• Crop nitrogen use efficiency: >60% • (Target context-specific, primarily depending on climate, yield, current nitrogen use, soil quality, irrigation, and other crop management practices. This indicator needs to be interpreted in relation to other indicators, such as the crop yield gap indicator and the water productivity indicator) • Mineral Nitrogen application: < 50 kg/(ha year)	2
2. To test and promote adoption of context-tailored water-saving solutions, in particular in agriculture.	• Attainable water limited yield potential on a sustainable basis: at least 80%	6 12
3. To innovate in the Mediterranean food products based on Mediterranean diet heritage and to enhance the links between nutrition and health	• Population Overweight: All the MCs below 50% of overweight population • In each country implement a system for the valorization of traceability of typical food and origin of products and at least 5% of food products are traceable or qualitatively certified in all MCs.	3 12
4. To find context-adapted solutions to increase food and water chain efficiency, and reduce losses and wastes.	• Crop water productivity: for MPCs and ACs ≥ 1 kg/m3; for MSs > 1 kg/m3 and at least maintaining the present level. • Amount of Agricultural residues used for energy and/or value added products: at least 10% of waste along the food chain	2 12
5. To design and promote the adoption of novel approaches to reduce the impact of pests and pathogens in farming systems (agriculture, aquaculture and fisheries), including their consequences on human health	• To diminish pesticide use by 20% in all MCs • Reduction of the 50% of pest outbreaks • Reduction of pesticide residues in terrestrial and aquatic ecosystems, drinking water and the food chain by 30%	2
6. To conceive and implement innovative, quality oriented models in agro-business as potential sources of new jobs and economic growth	• Agricultural Value Added per worker: For those countries with AVApW<5000 US$ the target is AVApW> 5000 US$; the other countries should at least maintain the same number of jobs and the same AVApW.	8 12
7. To improve sustainability of land and water use in arid and semi-arid areas	• Population using safely managed water and sanitation services in rural areas: >90% for all MCs and at least maintaining the present situation. • Do not diminish the percentage of forested areas in each country	15
8. To elaborate and stimulate adoption of new models for the governance of water management systems	• Adoption of a national database for water footprint in all MCs • Signature of a Euro-Mediterranean trans-national declaration on water management in food production to be adopted in at least 10 MCs	6

Abbreviations: AC=Associated Country; MC=Mediterranean Country; MPC=Mediterranean Partner Country; MS=EU Member State.

Table 7.2: PRIMA operational objectives, targets to be achieved and SDGs

7.1.2. Verification of monitoring arrangements

An Article 185 initiative needs to be evaluated at mid-term as well as ex-post, as already mentioned. The conditions and data requirements for these evaluations need to be specified at the start of the initiative as an Article 185, as it requires a DIS that manages the programme and oversees the adoption of common rules for the implementation of the programme. Resources will need to be reserved to set up the monitoring and evaluation essentials, such as a **data collection system and a baseline study** of the situation at the start of the initiative. In terms of mapping international collaborations, some work has already been done by previous ERA-NETs and INCO-NETs, but more work tailored to the topics related specifically to water provision and food system in the Mediterranean area is needed. Indicators to be defined at the outset need to closely fit the main policy objectives of the initiative.

7.2. Monitoring and feedback process of Article 185

For an Article 185, the results of the monitoring exercise should feedback continuously into the daily management of the initiative, as should the results of the mid-term evaluation. The results of both the mid-term and the ex-post evaluation should feed into future policy formulation and the design of future policy initiatives.

Results will be used by the European Commission and the Participating States to better improve performance, including **fine-tuned measurements of key performance indicators**. Key principles of the monitoring and evaluation system are the following:

- Evidence and quality-based (e.g. indicators).
- Comprehensive in the following sense:
  - Indicators updated and published annually by Participating States.
  - Annual reports on the implementation of the initiative giving details on its performance and progress towards targets.
  - Initiative assessed through an interim evaluation, carried out by an expert panel convened by the Commission, conducted no later than 2021, with a specific focus on implementation, quality of R&I, progress towards objectives and targets, and recommendations for possible improvements.
  - At the end of the programmes, and not later than 2028, an independent evaluation conducted to reviewing quality and performance of the implementation and performance, and funded activities.
  - A final independent evaluation conducted no later than 2030.

Participating States have to provide detailed evidence on the nature and volume of direct and indirect contributions to the joint programme annually. The Commission will also ensure that all actions taken and supported in the context of the initiative respect the Charter of Fundamental Rights of the EU.

7.3. Monitoring and audit mechanisms

DG RTD has adopted standard supervision arrangements for initiatives pursuant to Article 185 TFEU that will apply equally to the PRIMA Joint Programme. The key elements are described below.

With respect to monitoring and audit mechanisms, a distinction has to be made between the responsibilities of the Commission Services and those of the DIS and the Participating States. They

will be defined in the basic act and at the level of the delegation agreement between the Commission and the DIS.

The **DIS will be subject to an ex-ante assessment in accordance with the requirements set out in article 61 of the Financial Regulation** before the delegation agreement is signed, in order to assess its capacity to implement the programme, including receiving, allocating and monitoring the Union's financial contribution in the framework of indirect management of the Union budget. The DIS provides comprehensive annual reporting including auditor opinions and a management declaration. The DIS is furthermore responsible for the ex-ante audit of expenditure of all indirect actions funded by the DIS.

The **Participating States** will determine the costs of their activities in accordance with the usual accounting practices and accounting standards of the concerned Participating States and with applicable International Accounting Standards/International Financial Reporting Standards. These include audit certificates and a management declaration.

The **Commission** is observer in the decision-making body of the DIS (without voting rights) and verifies and approves the AWP and related budget plans by Commission decision. Commission Services receive, examine and accept the comprehensive annual reporting. If the accounts cannot be accepted then follow-up action will be taken in order to mitigate any financial and reputational risks to the Commission. Where necessary, payments to the DIS will be suspended and/or recovered, if necessary by drawing on the financial guarantees provided by the Participating States. If all of the above steps are inadequate to protect the financial interests of the Union or to ensure that policy objectives are properly achieved then, after due consideration, an audit of the DIS may be performed. Furthermore, the Commission may decide if necessary to suspend the implementation or terminate the Delegation Agreement.

In addition **interim and final evaluations** of the initiative will be undertaken.

Annexes

Annex 1: Procedural information

1.1. Identification

This Staff Working Paper was prepared by the unit I2 'Eco-Innovation' of Directorate I 'Climate Action and Resource Efficiency' of Directorate General 'Research & Innovation'. The RWP reference of this initiative is 2015/RTD/009.

1.2. Organisation and timing

The IA has been conducted through the following steps:

- An internal RTD related PRIMA Task Force (members from DG RTD including Dir. A., B, C, F, I, J and R & DG AGRI.H.5) was set in March 2015 in order to discuss all the issues relevant for the IA report and beyond, including a drafting team for the IA report and preparing the contributions for the ISG meetings.
- An ISG was set up in October 2015 that included the following DGs: AGRI, BUDG, CLIMA, CNECT, DEVCO, EEAS, ECHO, ENV, GROW, HOME, JRC, MARE, NEAR, REGIO, RTD, SANTE, SG and SJ. Ten meetings were organised from October 2015 to June 2016.
- An Expert Group[71] was set up in October 2015 and duly registered in the SG Register. It is composed of 9 experts. Their mandate was to support an informed and evidence-based decision-making processs especially with regard to the desired economic, environmental and social impacts of the proposed initiative, taking into account the impacts on the integration of national research and innovation systems in a common initiative. They submitted a first final draft report in April (final version in May 2016) This report provided results of different analyses and date in support of the IA report.
- Public Consultation: an online Public Consultation was launched on the 1st February up to 24 April 2016. It has been complemented by dedicated events in particular a 'Public Consultation Stakeholder Event' in Malta on 17 March.
- The PRIMA Consortium sent an Addendum on 29 February 2016 to the initial Joint Proposal as requested by Robert-Jan Smits' letter on 25 November 2016.

Each inter-service group meeting was dedicated to clarify different issues.

Inter-service group meeting	Main issues	Inputs to the IA report
1 – 21/10/2015	• Timeline presentation and discussion • PRIMA initiative presentation and discussions • Agreement on policy options based on IIA	• Comments and inputs of the final version of IIA to be approved • Integration of comments from ISG members
2 – 25/11/2015	• Discussion on the Inception	• Discussion on the need of extra

[71] http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=3342

	Impact Assessment (IIA) in view of its approval by the ISG • Public Stakeholders' consultation • Information on work of the Expert Group for the IIA	information from the PRIMA Consortium to be received by the 29/02/2016 • Revised version of the IIA
3 – 16/12/2015	• Discussion around Consultation Strategy • Presentation of the Expert Group	• Validation of the IIA • Discussion with the Expert Group • Discussion Stakeholders' consultation
4 – 13/01/2016	• Public consultation: questionnaire and press package	• Communication related activities • Validation of the Consultation strategy • Draft questionnaire
5 – 17/02/2016	• Discussion on the experts' methodology (in presence of the Expert Group)	• Finalise consultation related activities • Validation of the Expert Group work methodology
6 – 14/03/2016	• Consultation and Stakeholders event • First outline IA report	• Analysis of contribution from the PRIMA Consortium in their addendum sent on 29/02/2016
7 – 04/04/2016	• Public Consultation Stakeholders event • IA report - Problem definition and drivers	• Integration of the inputs of the Addendum of the PRIMA Consortium into the draft IA report • Integration of comments from ISG into the draft IA report
8 – 04/05/2016	• Draft IA report • Legal aspects of the DIS proposed by the PRIMA Consortium • Grant management and funding model • Discussion on the Short Summary report of the Stakeholders consultation	• First final report from the Experts Group (30/04/2016)
9 – 13/05/2016	• Discussion with the rapporteur of the Expert Group • Discussion on the international agreements • Discussion on the letter sent by R.J. Smits (DG) to the PRIMA Consortium on the financial and grant management and the DIS • Discussion of the IA report sections (1, 2, 3 & 4) and deadlines • Planning for the consolidated IA report	• Revised Short Summary Report of the Public Stakeholders consultation taking into account comments from the ISG • First final report from the Experts Group (09/05/2016) • Agreement of the methodology for the inputs to the IA report during following weeks
10 – 01 and 6/06/2016	• Discussion on the final Synopsis Report • Discussion on the IA Report, section by section.	• Comments to be integrated on the IA report to be sent to the RSB. • Agreement on the procedural follow up

1.3. Evidence

The whole report and the options considered in the IA report were designed by taking into account the following documents:

- Science, Research and Innovation performance of the EU – A contribution to the Open Innovation, Open Science, Open to the World agenda – 2016 (http://bookshop.europa.eu/en/science-research-and-innovation-performance-of-the-eu)
- Ex-Post Evaluation of the Seventh Framework Programme-SWD(2016) 2 final (https://ec.europa.eu/research/evaluations/index_en.cfm)
- Horizon 2020 Monitoring Report 2014 (https://ec.europa.eu/research/evaluations/pdf/archive/Horizon 2020_monitoring_reports/first_Horizon 2020_annual_monitoring_report.pdf)
- PRIMA Joint Programme Proposal – December 2014
- Addendum to the PRIMA Joint Programme – February 2016
- Experts Group Final Report – May 2016
- Public Stakeholders Event – March 2016
- 'EC Contributions to Sustainable Development Goals' workshop – February 2016

The sources are clearly indicated in the bibliography and range from academic papers to industry figures and estimates.

1.4. External expertise

The European Commission sought external expertise on the technical field, on Horizon instruments as well as on environmental and socio-economic impacts.

An Expert Group was set up in October 2016 and duly registered in the SG Register. It is composed of 9 experts coming from Mediterranean MS, non-Mediterranean MS and Third Countries. The members of the Expert Group have covered a wide and complementary field of competences: water technologies and management, agriculture, food systems, sustainability, sociology, policy, econometrics, impact assessment, migration, Mediterranean, and SMEs.

Five out of the nine members of the PRIMA Expert Group are based in countries participating in PRIMA. The organisation these five experts currently work for could eventually become grant beneficiaries of actions launched in the context of PRIMA. All of the experts have a senior R&I background, and have long been involved in activities and initiatives related to the different Framework Programmes, with an emphasis on Mediterranean issues and cooperation. At this point of their careers, most of them have high-level management responsibilities. As a consequence, these five members could have more of an indirect interest in PRIMA rather than a direct one.

The Expert Group collected evidence and drew their conclusions and recommendations based on:

- the analysis of an extensive set of policy and research documents related to PRIMA. This resulted in a thematic CIRCA repository with over a hundred documents and 188 references to external documents in the Expert Group Report;
- 20 open-ended interviews and six questionnaires with relevant external stakeholders;
- a review of the existing initiatives for cross-border R&I collaboration in the PRIMA domain;
- a bibliometric analysis of Mediterranean scientific cooperation, including Article 185 initiatives AAL and BONUS;
- an analysis of FP7 projects in the Themes of the PRIMA operational objectives;
- an analysis on the demand for R&I projects in the Mediterranean Region.

The methodology followed by the expert group was shared and discussed in a constant interaction with the PRIMA ISG.

The experts met five times:

- 1st meeting on 6 November 2015.
- 2nd meeting on 16 December 2015.
- 3rd meeting on 4 February 2016. The meeting was held in conjunction with the Workshop one EC Contributions to the Sustainable Development Goals' and included a first meeting of the Expert Group with the PRIMA Consortium.
- 4th meeting on 8 March 2016.
- 5th meeting on 14 and 15 April 2016.

Additionally:

- The Chair of the Expert Group addressed the inter-service group on 16 December 2015, 17 February 2016, and the Rapporteur on 13 May 2016.
- The PRIMA Expert Group was represented at the PRIMA Stakeholders Event, which took place in Malta on 17 March 2016.

The inputs from the Expert Group's report were duly taken into account in the elaboration of the final IA Report and compared with the findings from other sources (e.g., literature review carried out by the EC services and results of the online public consultation).

Annex 2: Stakeholder consultation – Synopsis Report

2.1. Stakeholder consultation strategy

In their meeting of 13 January 2016, the members of the PRIMA Impact Assessment (PRIMA IA) Inter-Service Group (ISG) agreed on a Consultation Strategy[72], aiming at ensuring the inclusiveness and full transparency of the IA process and collecting the views of those directly or indirectly affected by the PRIMA initiative. More specifically, the Consultation Strategy was designed with the purpose of collecting:

- data and information on the state-of-the-art of research and innovation in the field of water and food systems in the Mediterranean area;
- input on the problem definition and on the scope of a potential EU intervention;
- feedback on the different options for future research and innovation in the field of water and food systems in the Mediterranean area (including their impact).

The following categories of stakeholders have been considered as particularly relevant for the purpose of the PRIMA IA: research organisations and associations of research organisations; universities and associations of universities; public authorities (including regional/local administrations); local communities; farmer associations; large businesses; SMEs; business associations; inter-governmental organisations; non-governmental organisations (NGOs), and individual citizens. Giving the potential area of intervention of PRIMA, both European and third countries' stakeholders (with a particular focus on Mediterranean countries) have been targeted.

In line with the provisions of the Consultation Strategy, two main consultation activities were organised in the context of the PRIMA IA:

- a 12-week online public consultation, running from 1 February to 24 April 2016;
- a stakeholder event which took place in Malta on 17 March 2016.

Both these activities, as well as the whole PRIMA IA process, have been actively disseminated through: a webpage dedicated to the PRIMA initiative[73]; the mailing lists of the different members of the PRIMA IA ISG; social media (Facebook, Yammer, LinkedIn and Twitter); a press package sent to EU representations and delegations; the mailing list of some ongoing FP7 and Horizon 2020 ERA-NET projects focusing on the Mediterranean Area; and a news alert sent in the occasion of the launch of the online public consultation. The online public consultation was published on Your Voice in Europe. The members of the PRIMA Expert Group (PRIMA EG) also contributed to disseminate the different consultation activities via their network of contacts.

Members of the internal PRIMA Task Force were also invited to present the PRIMA IA process and the different consultation activities at the following events:

- 11 February, Brussels: Spanish Office of Science and Technology (SOST), short session dedicated to the PRIMA IA;
- 16 February, Brussels: UfM Senior Officials' Meeting (SOM);
- 1 March, Brussels: IGLO (Informal Group of RTD Liaison Offices) Open event;

[72] Link to the PRIMA Impact Assessment Consultation Strategy:
https://ec.europa.eu/research/environment/pdf/prima/prima-ia_consultation_strategy.pdf#view=fit&pagemode=none
[73] Link to the webpage dedicated to the PRIMA initiative:
https://ec.europa.eu/research/environment/index.cfm?pg=prima

- 15 March, Lisbon: final conference ARIMNet project and kick-off ARIMnet2 project;
- 16 March, Brussels: UNIMED event.

In order to ensure the transparency of the whole IA process, the outcome of the two main consultation activities were published in the webpage dedicated to the PRIMA initiative as short summary reports[74] [75]. Furthermore, the participants of the PRIMA stakeholder event in Malta were given the possibility to provide a feedback on the initiative via a post-event questionnaire. The feedback received via the post-event questionnaire was also included in the short summary report of the stakeholder event.

During the whole IA process, external stakeholders have been given the opportunity to interact with the EC services via the functional mailbox RTD-PRIMA-STAKEHOLDER-CONSULTATION@ec.europa.eu. In addition to this, and in line with the provisions of the Better Regulation Package, external stakeholders have been given the possibility to provide feedback on the PRIMA Inception Impact Assessment (PRIMA IIA) via the dedicated webpage[76].

2.2. The questionnaire

Following the discussions taking place at Inter-Service Group (ISG) level, the questionnaire of the online public consultation on PRIMA[77] was structured around the following seven sections: Respondent profile; Problem definition; Core objectives; R&I priorities; Actions; Impacts and Policy options. Some inputs and suggestions from the PRIMA EG have also been incorporated in the final version of the questionnaire.

The questionnaire served as a source of inspiration for the parallel tables which were organised during the afternoon session of the PRIMA stakeholder event in Malta. The participants were asked to choose among 4 parallel discussion tables focusing on the following topics: Problem Definition; Objectives and R&I Priorities; Actions and Impacts, and Policy Options. A copy of the questionnaire was distributed to the participants at the beginning of the session with no obligation for them to follow and/or base their discussions on the text of the questionnaire.

2.3. Feedback and analysis

The contributions received from both the PRIMA online public consultation and the PRIMA stakeholder event were duly considered and analysed.

In the specific case of the PRIMA online public consultation, a quality check of the replies was carried out at the end of the consultation period. In case of more than one contribution from the same respondent, the respondent was contacted and asked to choose which contribution had to be finally retained. In the absence of a reply, the most recent reply only was taken into account, on the assumption that this reply was submitted with the purpose of amending the less recent one (-s). In the case of some organisations (mainly, universities), replies from different departments members or persons somehow related to the particular organisation were received. These replies were sent mostly on each respondent's personal behalf and their individual content is different from one

[74] Link to PRIMA Impact Assessment Stakeholder Event – Short Summary Report:
https://ec.europa.eu/research/environment/pdf/prima/prima-ia_stakeholder_event_ssr.pdf#view=fit&pagemode=none
[75] Link to PRIMA Open Online Public Consultation – Short Summary Report:
https://ec.europa.eu/research/environment/pdf/prima/prima-ia_consultation_ssr.pdf#view=fit&pagemode=none
[76] Link to the Roadmaps/Inception Impact Assessments of the Better Regulation webpage:
http://ec.europa.eu/smart-regulation/roadmaps/index_en.htm
[77] Link to the questionnaire of the PRIMA Open Public Online Consultation:
http://ec.europa.eu/research/consultations/prima/survey.pdf

another. These replies were therefore considered as separate replies. One contribution was not taken into account since its content appeared as automatically generated and not linked to this particular online public consultation. A statistical analysis of the replies was carried out with the aim of identifying the most recurrent answers and their distribution among typologies of respondents. The results of this statistical analysis were included as an annex in the Short Summary Report of the online public consultation.

In the summary of each stakeholder consultation activity, an effort was made to provide a complete overview of the different inputs received, by reporting the full range of the collected options without discarding possible minority views.

The main findings of the PRIMA online public consultation and the PRIMA stakeholder event were then compared and grouped according to the seven sections of the questionnaire. The results of this comparison are presented in the paragraphs that follow.

The views and perspectives of the external stakeholders have been incorporated in the final version of the IA Report and carefully taken into account in the formulation of a potential EU intervention in support of PRIMA.

2.4. Stakeholder profile

A total number of 562 replies to the PRIMA online public consultation were received and 86 people participated in the stakeholder event which was held in Malta on 17 March 2016. 29 out of the 86 participants of the stakeholder event also sent their contribution, under their individual name or on behalf of their organisation, to the PRIMA online public consultation.

The online public consultation registered a large majority of replies from EU countries (86.5% of the total). third countries countries were relatively more represented at the Malta event, accounting for 28% of the total number of participants.

At the time of writing, no feedback on the PRIMA Inception Impact Assessment document has been received via the dedicated webpage. One position paper – signed by The Netherlands' Ministry of Economic Affairs, Ministry of Infrastructure and the Environment and Ministry of Education, Culture and Science – was sent to the IA functional mailbox. The same stakeholders also sent a contribution to the PRIMA online public consultation. The only difference between the two contributions lies in the preferred policy option: while the baseline scenario was chosen in the case of the online public consultation, Co-fund action was selected as preferable policy option in the position paper.

In terms of typology of respondents/participants, public authorities, research organisations and universities were the most represented categories at the Malta event, whereas individual citizens resulted as the largest contributor (33.8% of the total number of replies) in the online public consultation. From an analysis of their replies and contact details, many of these individual citizens who took part in the online public consultation appear to be staff of universities and research organisations who replied on their personal behalf. Their professional affiliation probably explains why more than half of them are, to various degrees, familiar with the Framework Programmes for Research and Innovation of the European Commission and with the PRIMA initiative.

With the exception of organisations representing local communities, all the targeted categories of stakeholders appear to have been reached out by the consultation activities which were put in place. The high response from citizens in the online public consultation is considered to somehow partially compensate the lack of replies from local community organisations. Small-sized and more local actors like SMEs and farmer associations have also been reached out: SMEs were 7% of the participants in the Malta event and 3.7% of the replies to the online public consultation; the

representative of one farmer association from Malta was present at the stakeholder event and three other EU farmer associations replied to the online public consultation.

2.5. Problem definition

The difficulty to implement innovative solutions due to the lack of effective cooperation among countries and actors, as well as inadequate R&I investments and R&I governance structures, emerge as the most relevant issues for R&I in the Mediterranean area.

More specifically, in the online public consultation the following three problem statements were identified as the most relevant R&I challenges in the field of sustainable food production and water resources management in the Mediterranean area:

- lack of coordination and cooperation between countries and research organisations and duplication of research efforts;
- lack of cooperation between academic and non-academic actors;
- insufficient investments in R&I.

More funding for R&I investments emerges as a less critical factor, above all among third countries respondents. According to the majority of respondents, encouraging synergies among countries and actors is considered essential to ensure the benefits of additional R&I funding.

Similar conclusions can be drawn from the discussions on Problem Definition which took place during the Malta event. Inadequate R&I governance structures and processes to address common and inter-related problems and the insufficient implementation of innovative solutions emerged as the most relevant challenges for R&I in the field of food production and water resources management in the Mediterranean area, with the first one being the most difficult challenge to implement. Insufficient investments in R&I was included among the five most relevant R&I challenges but it was considered as the least relevant one, with no particular implementation issues.

2.6. Core objectives

Supporting the development and application of innovative solutions in the field of sustainable food production and water resources management in the Mediterranean region was identified as the most relevant objective for PRIMA by both the respondents to the online public consultation and the participants in the stakeholder event in Malta. There appears to be a general consensus on the importance of this objective, independently on the country of origin (EU or third countries) of the respondent/participant.

Another objective which was particularly emphasised is the need to reinforce cooperation not just among Euro-Mediterranean countries but also among sectors and regions. Knowledge sharing and transfer (e.g., via a dedicated platform), capacity building, support to knowledge-based jobs and competences and ensuring research quality were also mentioned as relevant objectives for PRIMA.

2.7. R&I priorities

As for the most relevant R&I priorities for the PRIMA initiative, a slightly different feedback was provided by the respondents to the online public consultation, on the one hand, and the participants in the stakeholder event in Malta, on the other.

According to both EU and third countries replies to the online public consultation, finding context-adapted solutions capable of increasing food and water chain efficiency and reducing losses and waste in the region is the most relevant R&I priority for a Partnership for Research and Innovation geared towards improving the efficiency and sustainability of food production and processing and

water resources management in the Mediterranean basin. In addition to this, EU respondents underlined the importance of supporting the common development of smart and sustainable farming systems capable of maintaining natural resources and increasing production efficiency as well as the need to test and stimulate the application of context-tailored water-saving solutions, particularly in agriculture. From EU respondents, there was also the suggestion to address within PRIMA the whole water-food-energy nexus, thus adding energy as an area of intervention. As for third countries respondents, they strongly emphasised the need to improve land and water sustainability in arid and semi-arid environments.

As already mentioned, slightly different R&I priorities were identified as a result of the dedicated discussion table which took place during the Malta event. Participants highlighted the importance of supporting the development of:

- tools for knowledge capitalisation;
- climate modelling / services for end-users;
- collaborative projects including different stakeholders.

2.8. Actions

Asked about the most relevant actions for PRIMA to achieve its objectives, both the respondents to the online public consultation and the participants in the Malta event valued as very important the development of pilot projects. Respondents to the online public consultation also considered as particularly relevant the following two actions: public sector's direct investments in R&I and the support to networking and coordination/cooperation activities. Training for researchers and career development was identified by third countries replies as a very important element for PRIMA to achieve its objectives. In addition to the need of developing and supporting pilot projects, participants in the stakeholder event underlined the relevance for PRIMA of having the private sector investing in R&I, with the public sector facilitating these investments.

It is here worth mentioning that, in the optional box dedicated to any potential additional actions which might be relevant for PRIMA to achieve its objectives, respondents to the online public consultation – and EU stakeholders in particular – strongly underlined the need to set up those synergies among actors whose importance was emphasised in the problem definition section. For a R&I initiative to be successful, local actors and end-users need to be involved from the very early stage of the process and specific training programmes and schemes need to be designed and implemented.

2.9. Impacts

Respondents to the online public consultation and participants in the Malta event considered as relevant all the impacts listed in the questionnaire of the PRIMA online public consultation. Particular importance is attributed by external stakeholders to the introduction and dissemination of innovative products, technologies and production methods adapted to the specific socio-economic conditions of the Mediterranean area.

According to EU respondents to the online public consultation, more effective, sustainable and responsible production, food consumption patterns and use of water resources in the region emerge as the most relevant impact for PRIMA. They particularly insisted on PRIMA's potential to improve wellbeing and quality of life in Mediterranean Countries (especially in the Southern shore), thus contributing to mitigating the current migration crisis. Improving wellbeing is also very present in the comments regarding additional potential impacts for PRIMA, next to raising awareness of climate change issues and boosting cooperation and synergies. As for third countries respondents,

they strongly emphasised the potential for PRIMA to support economic growth in the region through job creation.

The potential for PRIMA to support job creation and economic growth, as well as to improve the competitiveness of the SMEs established in the region, was particularly stressed during the discussion table on Action & Impacts which took place during the stakeholder event in Malta.

2.10. Policy options

From the outcome of the stakeholder event in Malta and the analysis of the online public consultation results, it emerges that existing national and EU-level R&I actions in the field of water resources management and food systems in the Mediterranean Area do not adequately address the problem statements highlighted by the same stakeholders in the Problem Definition section.

Only 26.5% of the total number of respondents (149 out of 562) to the online public consultation – less than one quarter of EU replies, but slightly more than half of the third countries replies – believe that the current scenario is enough to address the R&I challenges in the field of sustainable food production and water resources management in the Mediterranean area. 18.5% of the total number of respondents (104 out of 562) did not express any opinion in relation to policy options. The reasons explaining the overall satisfaction of the majority of third countries respondents (43 out of 76, corresponding to 56.6%) with the current scenario could not be further investigated since none of these respondents provided any additional justification for their choice in the optional box

A positive evaluation to the current state-of-play has been interpreted by the ISG members as a preference for the baseline scenario option mentioned in the PRIMA IIA. It has not been possible though to dig more into the advantages of the baseline scenario, since none of the respondents who are positive about the current scenario provided any reason in support of their choice in the dedicated optional box.

Among those respondents not in favour of the baseline scenario, 69.3% (214 out of 309) suggest to create a permanent, dedicated structure (Article 185 TFEU), while 29.1% (90 out of 309) would opt for a Co-fund action. 1.6% of the respondents – five replies, all from EU countries – selected "Other policy option" but did not provide any alternative policy option, except for one reply suggesting to launch a series of small grants. While long-term cooperation commitment emerges as the key advantage of Article 185 TFEU, the reduced administrative cost and burden of such option (in comparison to Article 185 TFEU) is indicated as the key advantage of a Co-fund. No strong opposition from specific categories of stakeholders could be detected. All typologies of respondents are represented in almost similar proportions in all the options, with the exception of inter-governmental organisations which all opted for Article 185. For instance, individual citizens represent 26.2% of the replies in favour of the baseline scenario, 33.3% of the replies in favour of Co-fund, and 32.3% of the replies in favour of Article 185; research organisations represent 25.5% of the replies in favour of the baseline scenario, 20% of the replies in favour of Co-fund, and 21.5% of the replies in favour of Article 185; universities represent 27.5% of the replies in favour of the baseline scenario, 25.6% of the replies in favour of Co-fund, and 27.1% of the replies in favour of Article 185. As a general remark, the absence of an overwhelming majority of replies in favour of the Article 185 is likely to indicate that the stakeholders who sent their inputs to the PRIMA online public consultation do not represent a biased sample of respondents.

Article 185 TFEU emerged as the preferred policy option also from the Policy Options-dedicated discussion table at the PRIMA stakeholder event in Malta. In this case, participants were asked to identify a maximum of three suitable policy options for addressing the challenges for R&I in the field of food production and water resources management in the Mediterranean area. The pros and cons of each policy option were then to be counted and a final ranking list was to be provided. The participants decided to base their discussions on the three policy options (baseline scenario, Co-

fund action and Article 185 TFEU) mentioned in the questionnaire of the online public consultation. Article185 TFEU ranked as the most suitable policy option, with three pros and three cons. The three pros are: the long-term commitment, the coherence/alignment among national and international programmes that an Article 185 TFEU is expected to bring along, and the additional financial contribution from the EU. At the same time, the differences among national R&I programmes, together with the legal and the implementation issues which are likely to arise, are all elements which can jeopardise the successful outcome of the initiative.

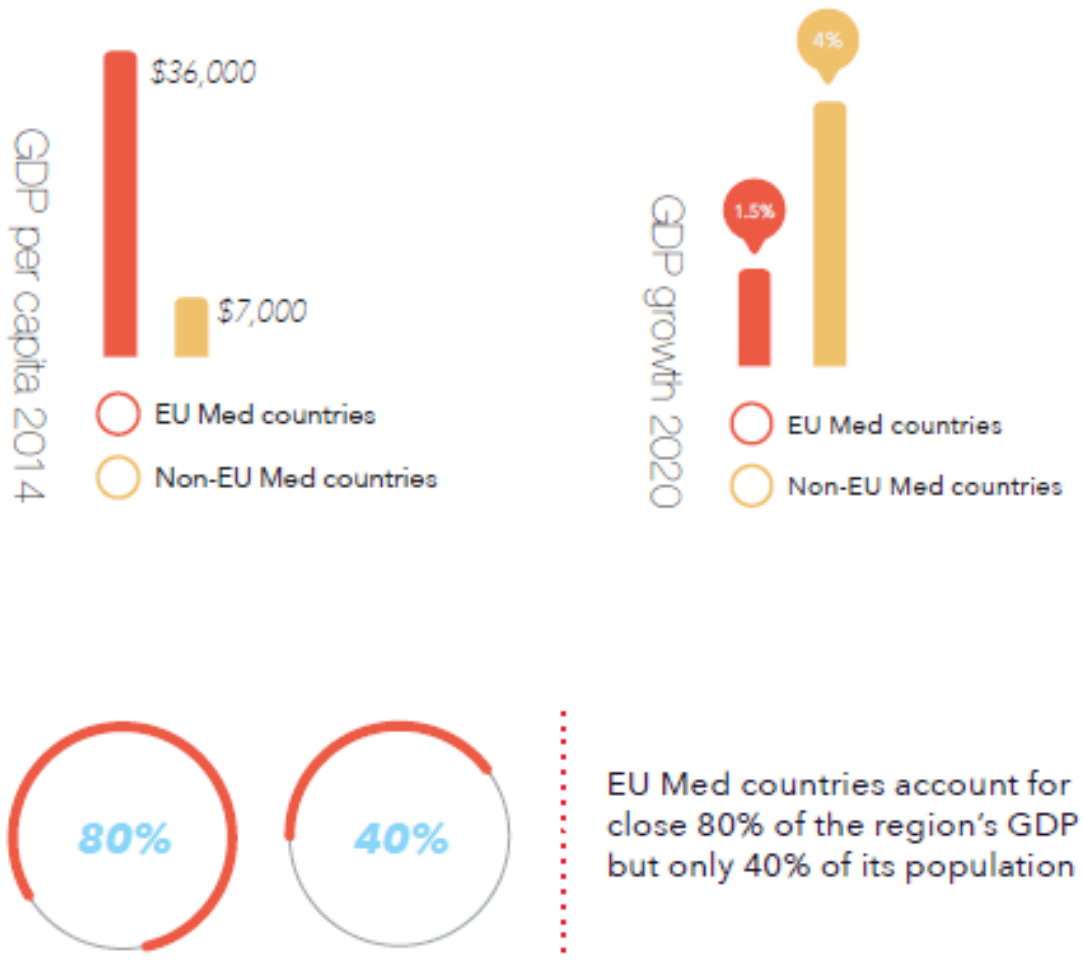
With regard to the position paper sent by The Netherlands' Ministry of Economic Affairs, Ministry of Infrastructure and the Environment and Ministry of Education, Culture and Science, and based on the text of the e-mail which accompanied the paper, it can be concluded that the preference for the Co-fund option is intended to replace the one for the baseline scenario made in the contribution by the same stakeholders to the PRIMA online public consultation. As mentioned in the paper, Co-fund is seen as the most suitable option to implement the 'virtual common pot' mechanism envisaged by PRIMA proposers. There is no rationale – the paper continues – for the EU to support an Article 185 initiative, if the PRIMA partner countries themselves do not allow for further synergies between their national programmes.

Annex 3: Socio-economic outlook of the Mediterranean region

3.1. Introduction

The figures here reported are intended to provide a socio-economic outlook of the Mediterranean region, which includes data on population, GDP, diversity, migration, inequality, competitiveness, unemployment, governance, easy of doing business.

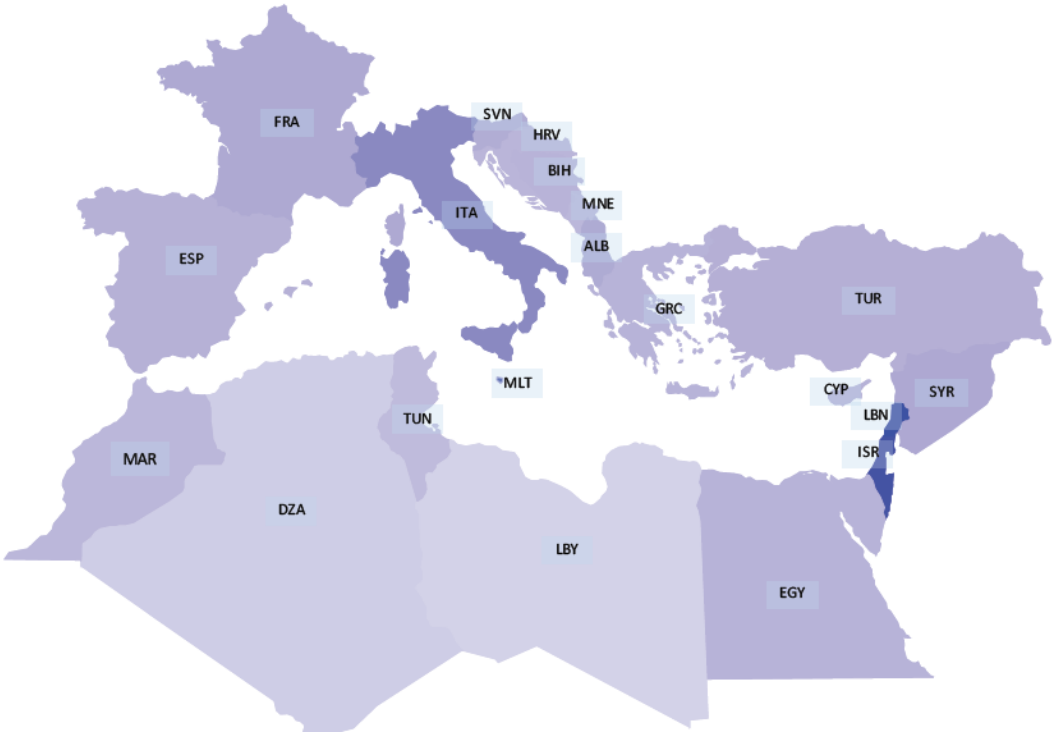
3.2. EU vs. non-EU countries



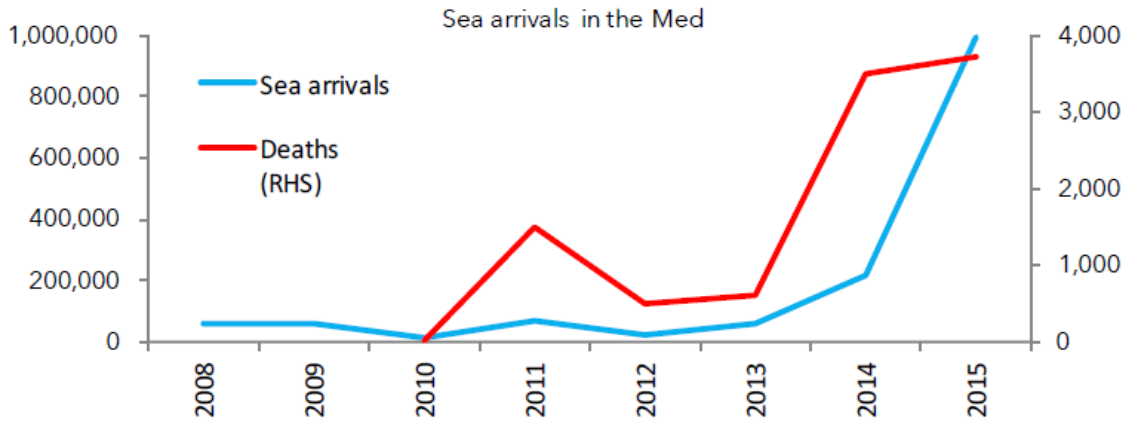
EU vs. non-EU Mediterranean countries (2015 data)[78]

[78] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 7.

3.3. Population: density and migration

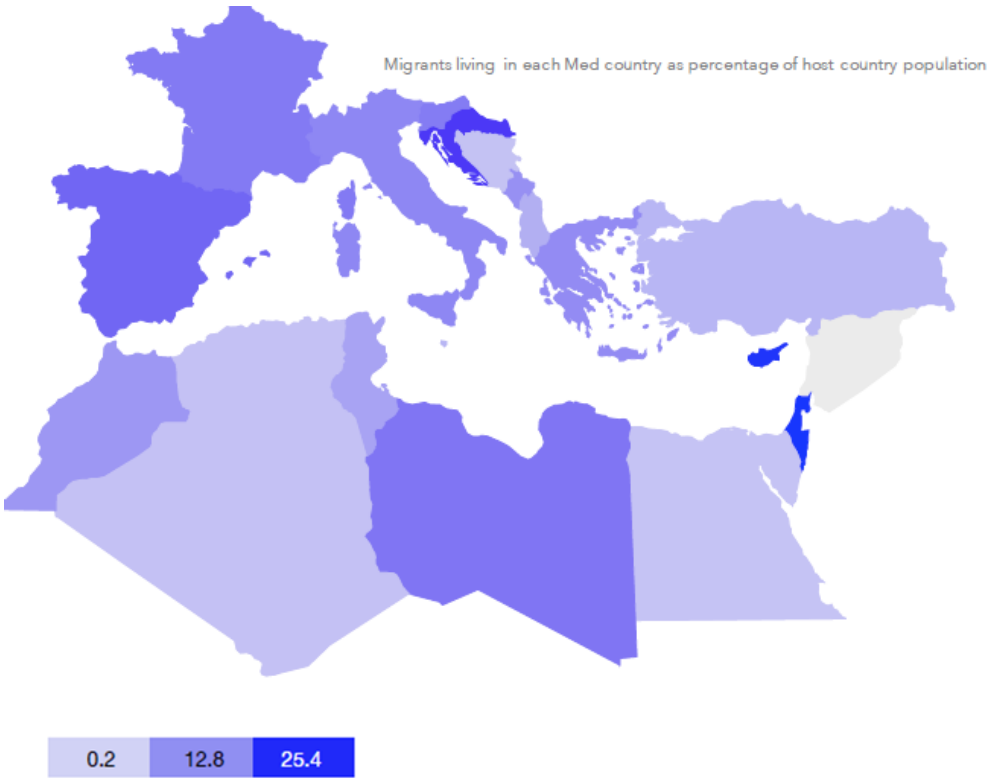


Population density per country (2016)[79]

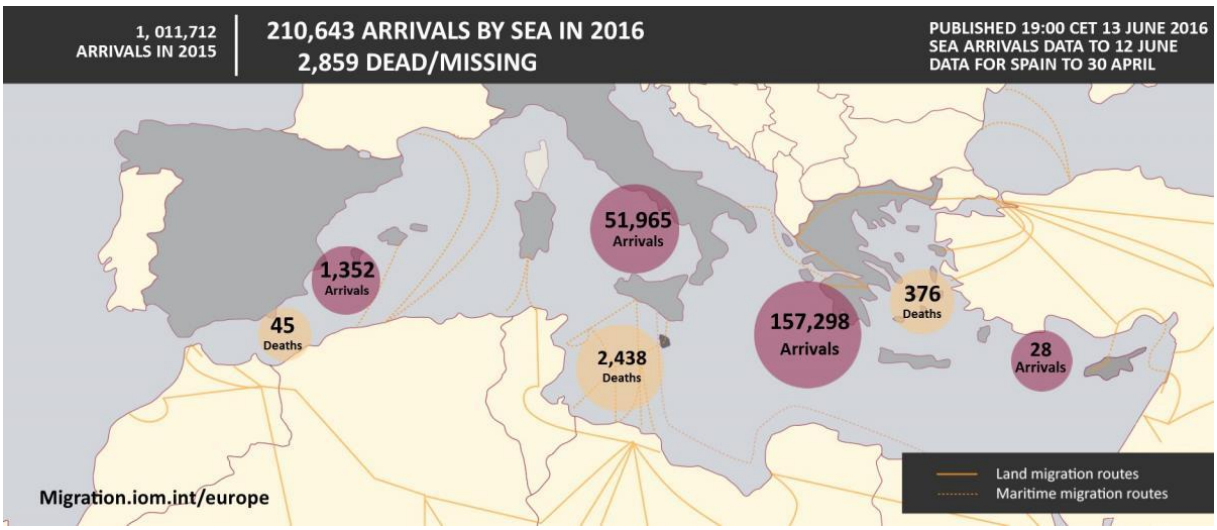


Recent migration figures in the Mediterranean region[80]

[79] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 4.
[80] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 11



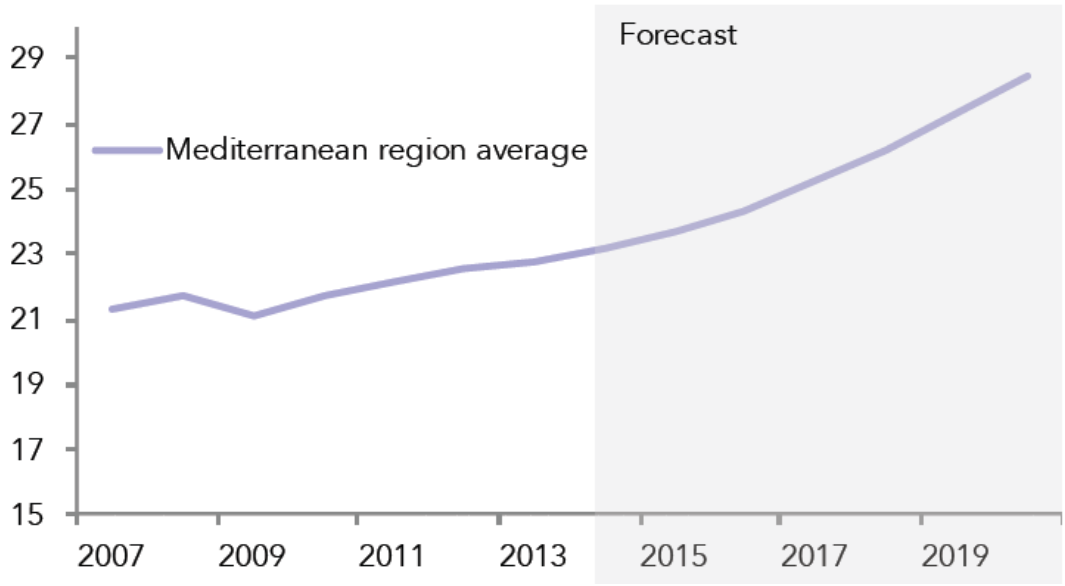
Migrants living in each Med country as % of population (2013 data)[81]



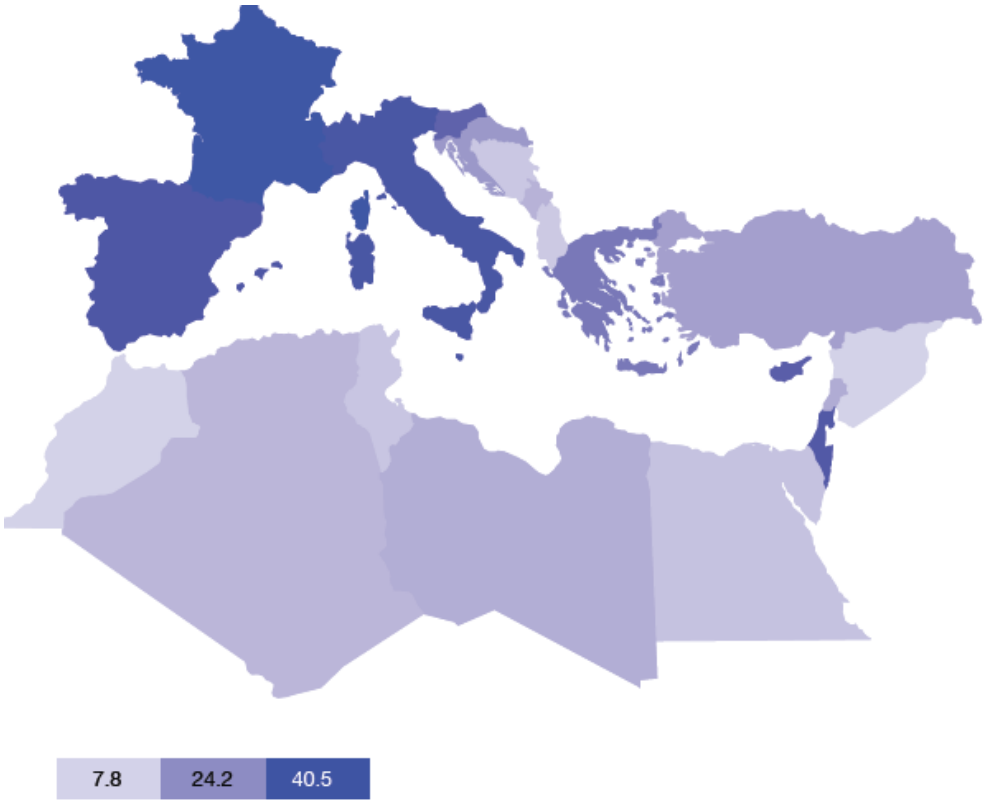
Arrivals by sea in 2016[82]

[81] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 33.
[82] International Organization for Migration (IOM) (2016): http://migration.iom.int/europe/

3.4. GDP

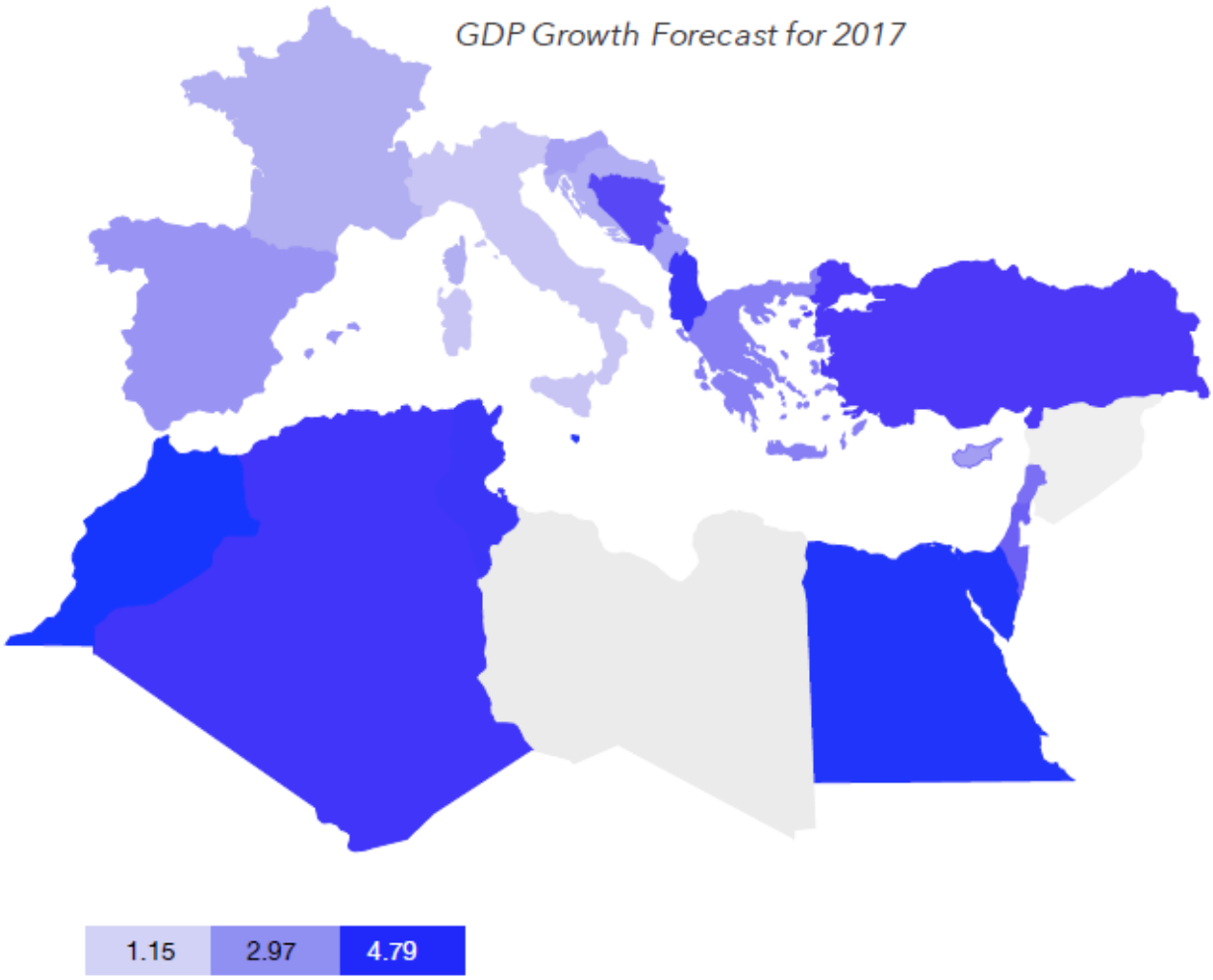


GDP per capita (PPP US$ thousand)[83]



GDP per capita (PPP US$ thousand – latest available data for each country) [84]

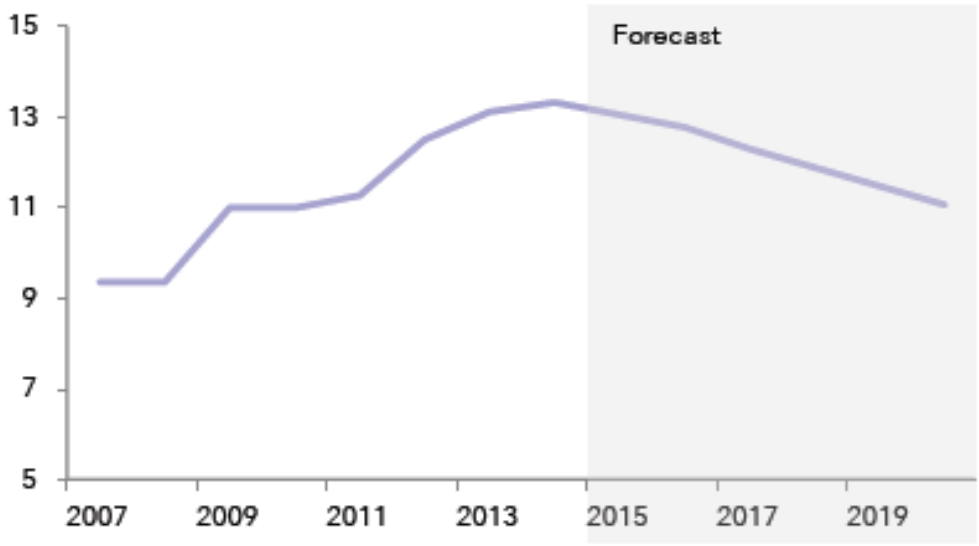
[83] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, 16.
[84] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 16.

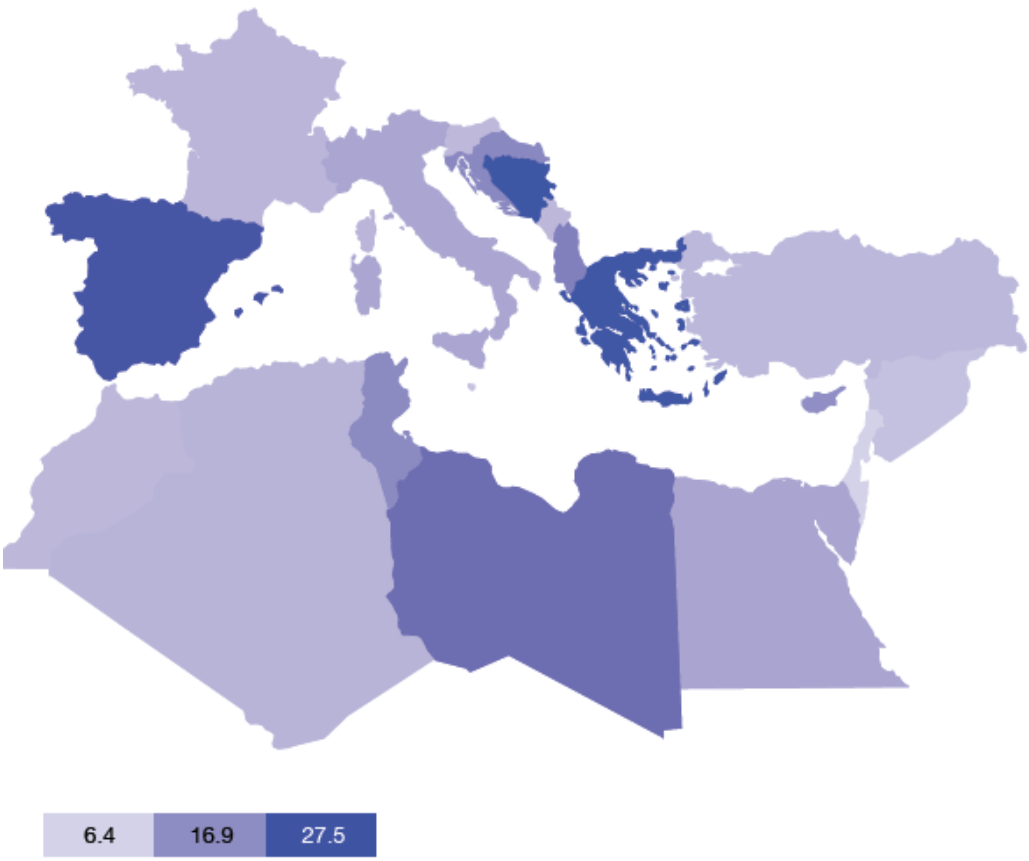


GDP growth forecast for 2017[85]

[85] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 15.

3.5. Unemployment

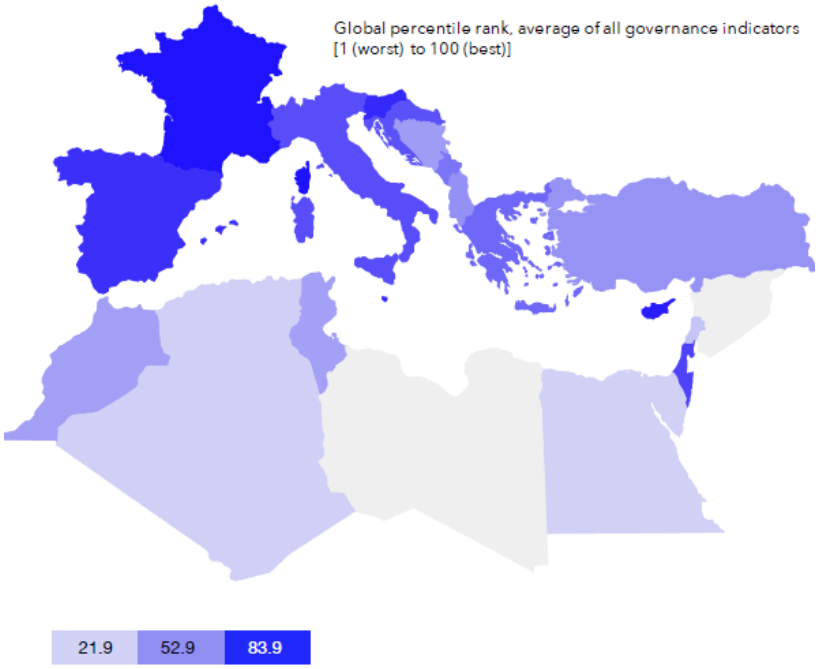




Regional Unemployment (latest available data for each country)[86]

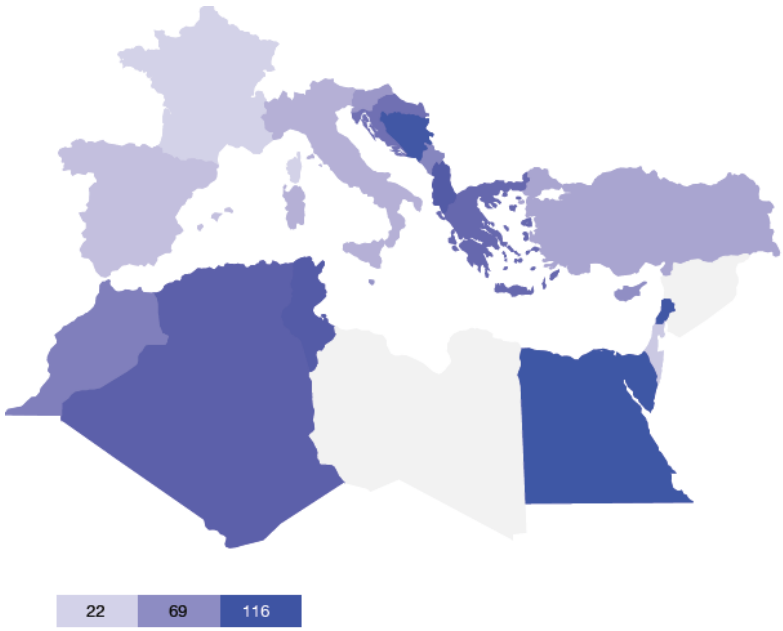
[86] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 18.

3.6. Governance



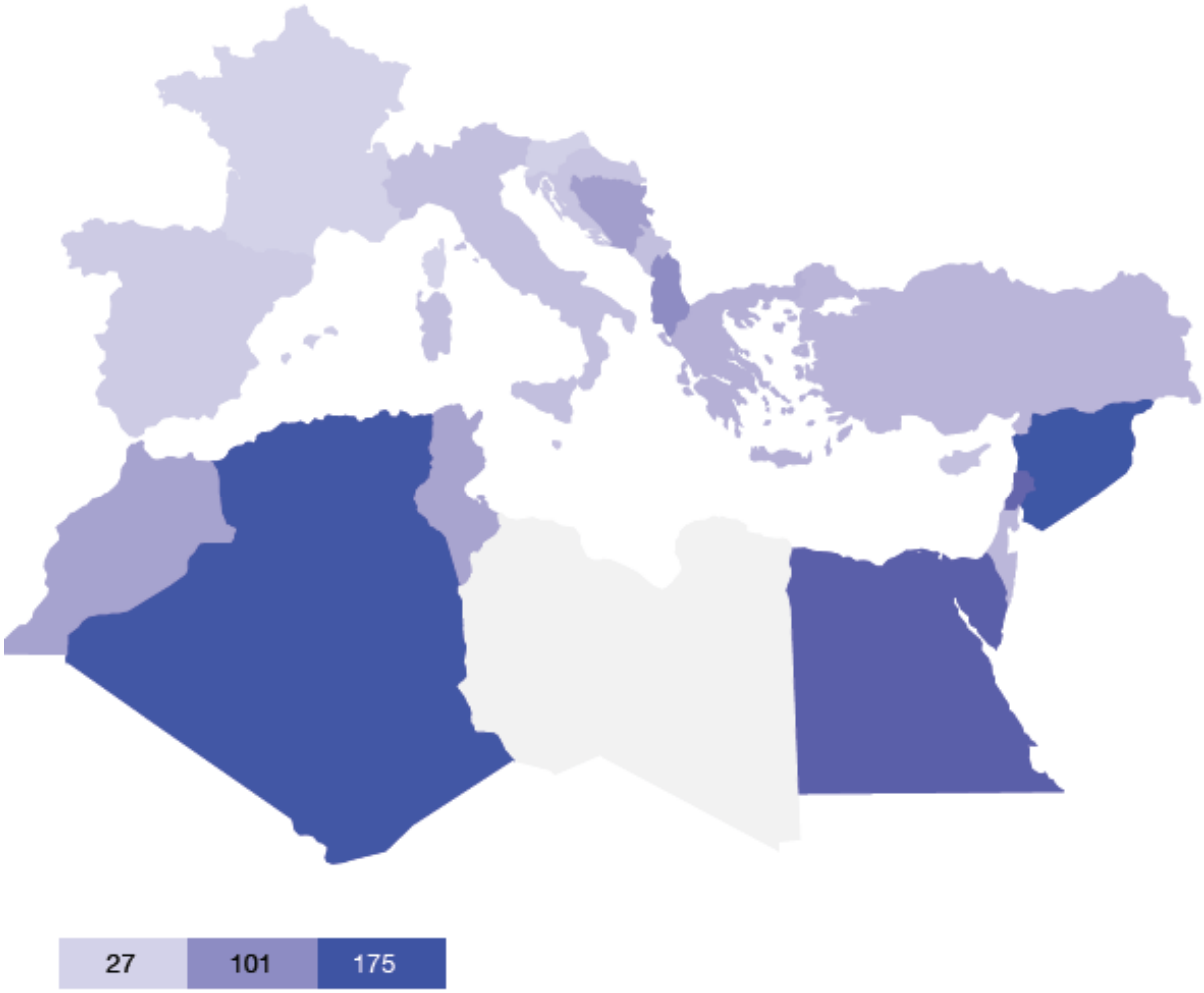
Governance (2014 data) [87]

3.7. Competitiveness



Global competitiveness index ranking (2015 data)[88]

[87] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 24.
[88] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 23.



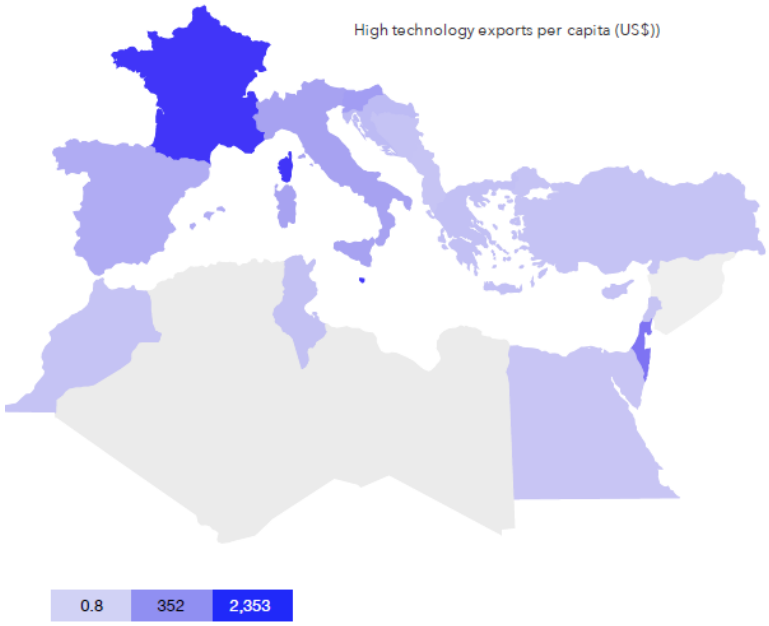
Ease of doing business ranking (2015 data)[89]

3.8. Trade

International trade accounts for between 20%-40% of GDP for most Mediterranean countries

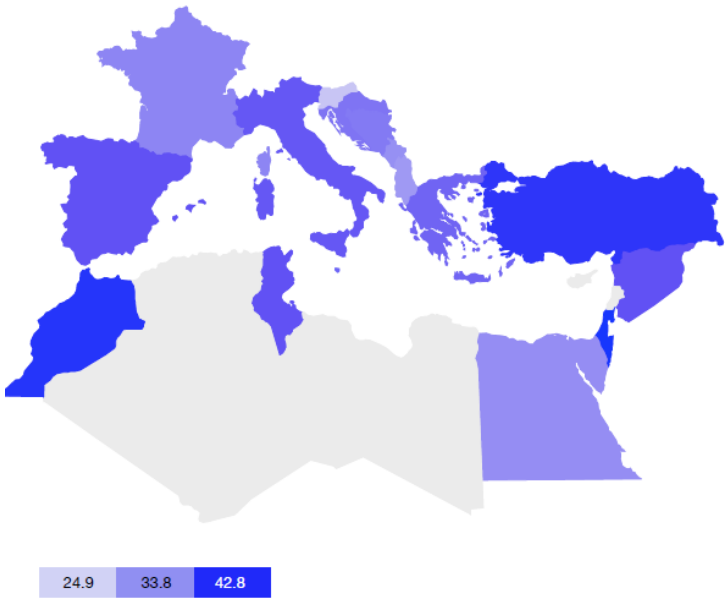
Less than a third of total international trade in the region is between Med countries, leaving substantial scope for expansion in intra-Med economic ties in the future[90]

[89] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 22.
[90] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 8.



High technology exports (2014 data)[91]

3.9. Inequality



Inequality (Gini coefficient – latest available data for each country) [92]

[91] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 25.
[92] Litus Advisory / Alma Economics (2016) Mediterranean Growth Initiative, p. 28.

Annex 4: Mapping of on-going programmes in areas to be addressed by the PRIMA Joint Programme (other than Horizon 2020)

A non-exhaustive list of the main programmes of scientific and technological collaboration between EU Member States and third countries in areas to be addressed by the PRIMA Joint Programme is shown below.

	TYPE		PRIMA THIRD COUNTRIES								TOPIC				INSTRUMENT				BUDGET
Name of the initiative	**EU Multilateral**	**Bilateral**	**Algeria**	**Egypt**	**Israel**	**Jordan**	**Lebanon**	**Morocco**	**Tunisia**	**Turkey**	**Water Provision**	**Food Systems**	**Sustainable Development**	**Other**	**Collaborative Research**	**Demonstration**	**Mobility**	**Policy Dialogue**	**EUR**
The European Neighbourhood Programme for Agriculture and Rural Development (ENPARD)	X		X	X		X	X	X	X			X	X	X	X				4 million
ENI Cross-Border Co-operation (CBC) – Mediterranean Sea Basin Programme	X		X	X	X	X	X	X	X	X	X		X	X	X	X			209 million
ENPI SWIM (Sustainable Water Integrated Management)	X		X	X	X	X	X	X	X		X	X			X	X			15 million
ENPI SWITCH-Med Programme	X		X	X	X	X	X	X	X				X		X	X		X	20 million
Programmes d'Appui aux Politiques Sectorielles	X		X	X				X	X		X	X	X	X	X			X	Defined according to sectors
EU-Africa R&I Partnership on Food and Nutrition Security and Sustainable Agriculture	X		X	X					X			X	X		X			X	70 million
The Nexus Dialogue EU Programme	X		X	X	X	X	X	X	X		X	X				X		X	6 million
Czech Republic – Israel Industrial R&D Cooperation Framework		X			X									X	X				N.A.
France - 6 Partenariats Hubert Curien + 1 Bilateral programme with Israel		X	X	X	X		X	X	X	X			X	X			X		up to 0.6 million per year
Germany - Africa Strategy + 2 bilateral scientific cooperation programmes		X	X	X	X	X		X	X		X				X				1 million per year
Italy – Bilateral programmes		X		X			X				X	X	X	X	X		X		Defined on a yearly basis
Portugal – Bilateral call for mobility actions		X							X				X	X			X		6,000 per year
Spain – Bilateral programmes		X			X						X	X		X	X				according to national schemes

Table 1: Synoptic table of the main programmes of scientific and technological collaboration in areas to be addressed by the PRIMA Joint Programme

The details of the identified programmes between EU Member States and third countries related to PRIMA Joint Programme are reported are tables 2 and 3.

The European Neighbourhood Programme for Agriculture and Rural Development (ENPARD)	
Countries	Algeria, Egypt, Jordan, Lebanon, Morocco, Tunisia
Focus	rural livelihoods; agricultural productivity, food safety and quality standards; organisational and institutional capacities – national multi-annual programmes – no demonstration
Budget	4 million €
Duration	2015-2020
ENI: Cross-Border Co-operation (CBC) – Mediterranean Sea Basin Programme	
Countries	Algeria, Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Lebanon, Libya, Malta, Morocco, Palestine, Portugal, Spain, Syria, Tunisia, Turkey, United Kingdom (Gibraltar)
Focus	environmental protection and climate change adaptation and mitigation, water management – strengthening the linkages between research and industry – demonstration
Budget	over 209 million €
Duration	2014-2020
ENPI: SWIM (Sustainable Water Integrated Management) + H2020 Supporting Mechanism (Phase II) and SWIM DEMOS II	
Countries	Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia
Focus	Contribute to reduced marine pollution and a more sustainable use of scarce water resources; water co-operation, river basin management, water demand management, the water-energy-food-security nexus, broad stakeholder participation and open access to data – demonstration
Budget	18 million €
Duration	until January 2019
ENPI SWITCH-Med Programme	
Countries	Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia
Focus	sustainable consumption and production patterns – policy support – demonstration
Budget	20 million €
Duration	2012-2015
Programmes d'Appui aux Politiques Sectorielles (PAPS)	
Countries	Algeria, Egypt, Morocco, Tunisia
Focus	different policies, including water management, environment and research
Budget	e.g. 34 million € for the Environment PAPS Algeria
Duration	e.g. 2012-2016 for the Environment PAPS Algeria

EU-Africa R&I Partnership on Food and Nutrition Security and Sustainable Agriculture	
Countries	EU-Africa (including Algeria, Egypt, and Tunisia)
Focus	food and nutrition security and sustainable agriculture
Budget	70 million € between 2014 and 2017
Duration	complete establishment between 2018 and 2020, with an operational life well beyond 2020
The Nexus Dialogue EU Programme	
Countries	EU, Africa (Nile, Niger and SADC), Latin America (Andean Region), Asia (Mekong Area), Central Asia (Aral Sea region), Neighbourhood (with particular focus on the Mediterranean region)
Focus	water-energy-food nexus: policy recommendations and action plans, small pilot projects, human capacity development
Budget	6.17 million €
Duration	2016-2018 (Phase I)

Table 2: Multi-lateral Programmes involving EU Member States and Third Countries

Czech Republic – Israel Industrial R&D Cooperation Framework	
Countries	Israel
Focus	The program supports joint commercially-focused joint industrial R&D projects between Israeli and Czech companies in all technological fields
Budget	n.a.
Duration	On-going
France – 6 Partenariats Hubert Curien + 1 Bilateral Scientific Cooperation Programmes with Israel	
Countries	Algeria, Egypt, Lebanon, Morocco, Tunisia, Turkey + Israel
Focus	- mobility of researchers in the frame of projects only generally relevant to PRIMA, e.g. sustainable development, social sciences, environment, health (Partenariats Hubert Curien) - 2014 call: R&D collaboration between French and Israeli companies interested in jointly developing and commercializing new, innovative products, applications or services (Israel)
Budget	- 58,000 € /year - 610,000 € /year (Partenariats Hubert Curien) - Funding depends on national schemes and whether the project meets the technical and economic evaluation criteria (Israel)
Duration	On-going
GERMANY – The Africa Strategy + 3 Bilateral Scientific Cooperation Programmes	

Countries	Algeria, Egypt, Tunisia+ Israel, Jordan, Palestine,
Focus	water, water technology, agricultural science, natural resources management and climate change (Algeria, Israel, Jordan and Palestine) Food security, climate change, water and renewable energy (Egypt)
Budget	1 million € /year per side
Duration	On-going
ITALY – 2 Bilateral Agreement & Cooperative Programmes	
Countries	Lebanon, Israel
Focus	Topics of the 2015 call for proposals: marine sciences & biodiversity, management of natural resources, renewable energy, food security, archaeology and water (Lebanon) Areas of the 2016 "Industrial Track" call for proposals: any other area of mutual interest, including agriculture and food science, environment and water treatment, innovation in production processes (Israel).
Budget	Funding availability to be set each year covering mobility costs (50-70%) and implementation costs (50-305): to date, there have been three successful calls for proposals, and a total of 12 projects have been funded (4 completed and 8 on-going) – Lebanon Each project that is selected can be financed up to 50% of the documented and eligible costs of research and development and depends on national schemes- Israel
Duration	On-going since 2011
PORTUGAL Bilateral call for mobility actions	
Countries	Tunisia
Focus	mobility of researchers in the frame of projects only generally relevant to PRIMA
Budget	6,000 € /year
Duration	On-going since 2013
SPAIN – Bilateral Agreement & Cooperative Programmes	
Countries	Israel
Focus	2016 Call for Proposal: developing innovative products and applications in all technological and application areas, with special focus on agrotechnology, Biotechnology and life sciences, Cleantech (environmental, new energy sources and natural resource use and Water management technologies), ICT, Nanotechnology
Budget	Depends on national schemes
Duration	On-going

Table 3: Bi-lateral Programmes between EU Member States and Third Countries

Annex 5 : Analysis of FP7 Projects in the Themes of the PRIMA Operational Objectives

5.1. Introduction

An analysis has been performed on the participation of non-EU Mediterranean countries in FP7. The analysis performed in this Annex targeted the countries participating in the PRIMA Consortium: Algeria, Egypt, Jordan, Lebanon, Morocco, and Tunisia. It is important to note that Turkey has long been an Associated Country to the Framework Programmes. As a consequence, the participation of Turkey in FP7 is very large, and covers all programmes within FP7.

An analysis was performed of the participation of these countries in FP7. For each project related to PRIMA that had one of these countries as partner or coordinator, the acronym, the FP7 Programme and the EC Contribution were recorded. Additionally, the project was related to the closest Operational Objective of PRIMA. The eight Operational Objectives are the following:

1	Overexploitation of natural resources and unsustainable ways of farming	To develop smart and sustainable farming systems to maintain natural resources and to increase production efficiency
2	On-farm irrigation inefficiencies	To test and stimulate adoption of context-tailored water-saving solutions, in particular in agriculture
3	Changes in food demand and their consequences on food supply chains, nutrition and health	To innovate in the Mediterranean food products based on Mediterranean diet heritage and to enhance the links between nutrition and health
4	Food and water losses and wastes	To find context-adapted solutions to increase food and water chain efficiency, and reduce losses and wastes
5	Animal and plant diseases	To design and promote the adoption of novel approaches to reduce the impact of pests and pathogens in farming, including their consequences on human health
6	Business Food systems unable to create employment and economic growth	To conceive and implement innovative, quality oriented models in agro-business as potential sources of new jobs and economic growth
7	Soil erosion and mismanagement of water cycle at the watershed level	To improve land and water sustainability in arid and semi-arid watersheds
8	Inequitable water allocation and un-sustainable water management	To elaborate and stimulate adoption of new policies and protocols for the governance of water management systems

Table 1. *The eight objectives of the PRIMA Initiative. Source: PRIMA proposal.*

An additional Objective, Labelled "0. Horizontal" was added to classify projects related to PRIMA, but which could not be associated to any of the 8 Operational Objectives. This applied to a number of Mediterranean ERANETS and Coordination and Support Actions, as well as to projects with a wide thematic scope.

A total of 151 projects were found. An analysis was performed of the investment per Operational Objective and in total.

It is important to note that the scope of the Operational Objectives is wider than the topic of PRIMA overall aim (Food production and water provision).

5.2. *Investment in FP7 PRIMA related projects*

The total EC contribution to the identified projects was 408 M€ over the seven-year duration of FP7. This Figure exceeds the proposed contribution of the PRIMA partners of 200 M€ for a ten year Article 185 initiative. The following Figure presents the EC Investment per Operational Objective:

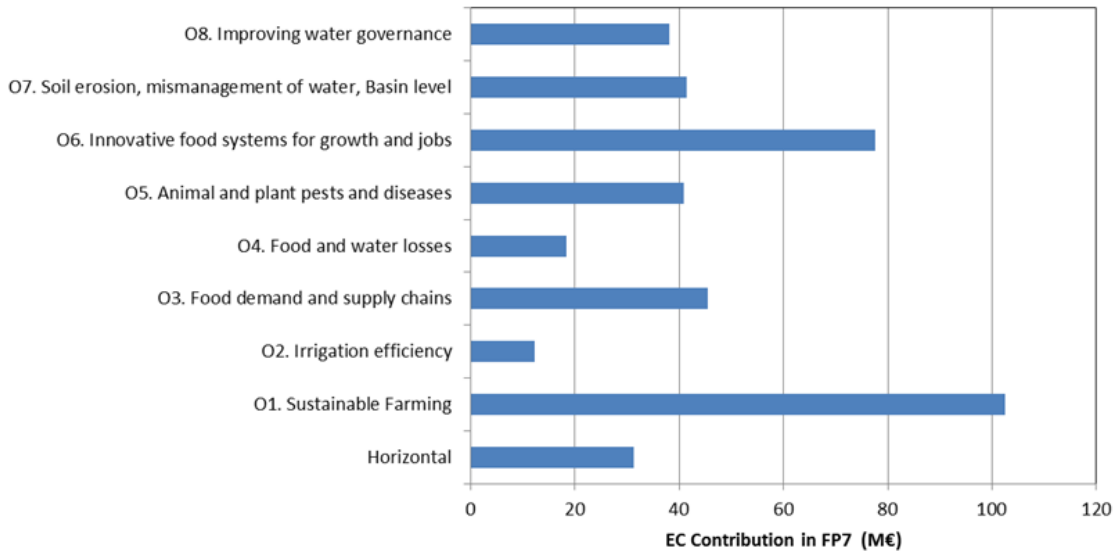


Figure A7.1. *Classification of the EC investment in FP7 projects with non-EU Mediterranean partners according to the PRIMA Objectives. An additional, horizontal objective was added (Elaborated by the Expert Group from consultation of the CORDIS database).*

The Figure shows the variation between the operational objectives. "Sustainable farming' (Obj. 1) was the most funded objective, followed by 'innovative food systems for growth and jobs' (Obj. 6) and then by 'Food demand and supply chains' (Obj. 3).

5.3. *Participation of non-EU Mediterranean Countries in PRIMA-related FP7 projects*

The following figure presents the participation of each country in the funded FP7 projects:

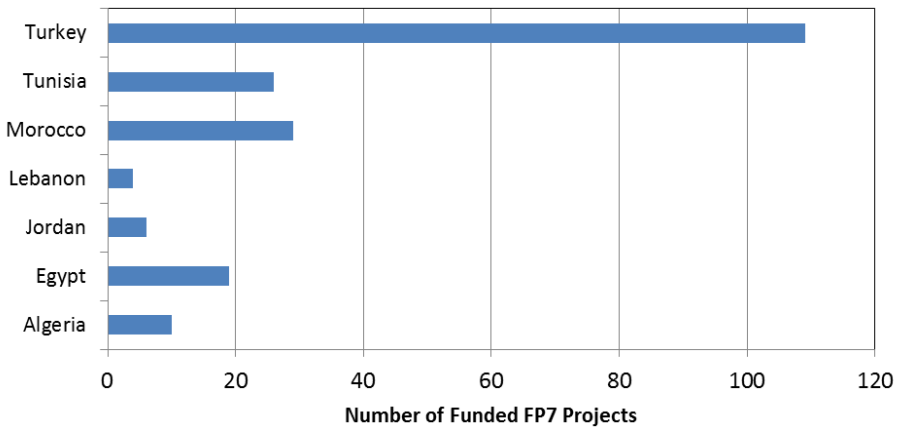


Figure A7.2. *Number of FP7 projects with non-EU Mediterranean partners, classified by country (Elaborated by the Expert Group from consultation of the CORDIS database).*

5.4. List of projects per Operational Objective

A list of the identified projects in each Operational Objective follows:

0. Horizontal (31.30 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
ARIMNET	KBBE	1.00	x	x			x	x	x
ARIMNET2	KBBE	2.00	x	x			x	x	x
CORE ORGANIC II	KBBE	0.99							x
CORE ORGANIC PLUS	KBBE	2.99							x
ERA-ARD II	KBBE	0.97							x
ERANETMED	INCO	2.50	x	x	x	x	x	x	x
FACCE CSA	KBBE	1.99							x
FORESTERRA	KBBE	2.00	x				x	x	
FRACTALS	ICT	6.90							x
IASON	Environment	0.99							x
MedSpring	INCO	4.00	x	x	x	x	x	x	x
MIRA	INCO	3.99	x	x	x	x	x	x	x
VISION RD4SD	Environment	0.99							x

1. Sustainable Farming (102.48 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
TriticeaeGenome	KBBE	5.30							x
3TO4	KBBE	6.80							x
AGINSURANCE	People	0.10							x
AGRICAB	Environment	3.50						x	
AgriPolicy	KBBE	0.99							x
ANIMALCHANGE	KBBE	9.00						x	
AQUALITY	SME	2.09							x
AQUAMED	KBBE	1.00	x	x			x	x	x
AQUATRACE	KBBE	2.99							x
AWARE	KBBE	0.99							x
BIOBIO	KBBE	3.00						x	
BIOPROTECH	INCO	0.50						x	
CAPRI-RD	KBBE	2.29							x
CHAMPI-ON	SME	1.09							x
DEGRICOL	SME	1.71							x
DROPS	KBBE	5.99							x
ECO-ZEO	Environment	2.01							x
EFISHENT	SME	1.00							x
ENVIGUARD	KBBE	5.52							x
FORCE	INCO	0.50		x					
HEALTHYMINORCEREALS	KBBE	4.92							x
IAM4MARS	People	0.10							x
ICT-AGRI 2	KBBE	1.99							x
LOWINPUTBREEDS	KBBE	6.00						x	
MAP2ERA	INCO	0.44					x		
NEXTGEN	KBBE	3.00					x		
NUE-CROPS	KBBE	5.99							x
OSCAR	KBBE	3.00					x		
PHENOLIVE	SME	1.14							x
PRESTO GMO ERA-NET	KBBE	0.99							x
Pro-Eel	KBBE	3.00						x	
RICE-GUARD	SME	1.40							x
ROOTOPOWER	KBBE	2.99							x
RURAGRI	KBBE	0.99							x
SAFI	SPACE	1.96					x		
STAR TREE	KBBE	5.99							x
Stone	People	0.22							x
SUSTAINMED	KBBE	2.00					x	x	x

2. Irrigation efficiency (12.31 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
EAU4FOOD	KBBE	3.99						x	
ENORASIS	Environment	2.01							x
SIRIUS	SPACE	2.49							x
SIRRIMED	KBBE	3.00		x		x	x		
SMART-PADDY	SME	0.82							x

3. Food demand and supply chains (45.57 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
AGFORISE	Regions	0.92							x
CERTCOST	KBBE	2.73							x
Finish	ICT	6.10							x
Fispace	ICT	13.49							x
FLABEL	KBBE	2.86							x
NU-AGE	KBBE	8.99							x
OPTIFEL	KBBE	2.99							x
ORGANICDATANETWORK	KBBE	1.49							x
VEG-I-TRADE	INCO	5.999		x					

4. Food and water losses (18.32 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
BIOWASTE4SP	KBBE	2.99		x			x		
BIOWASTE4SP	KBBE	2.99							x
CB-WR-MED	INCO	0.49						x	
ETOILE	SME	0.89							x
FUSIONS	KBBE	3.99							x
NOSHAN	KBBE	2.99							x
ORION	SME	2.98							x
WATERBIOTECH	KBBE	1.00	x	x			x	x	

5. Animal and plant pests and diseases (40.95 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
SharCo	KBBE	2.94							x
ARBO-ZOONET	KBBE	1.00							x
BCA_grape	SME	0.77							x
C-IPM	KBBE	1.99							x
DETANMITE	People	0.13							x
ECOSYN	SME	0.89							x
EMIDA	KBBE	1.00							x
ENTOMATIC	SME	2.19							x
EUPHRESCO	KBBE	0.99							x
ICONZ	KBBE	5.99					x		
MARS	KBBE	0.99							x
PALM PROTECT	A	3.00		x					
PARAVAC	KBBE	8.94					x		
PIROVAC	KBBE	2.99							x
SMS	KBBE	4.14					x		
VMERGE	KBBE	3.00					x	x	

7. Soil erosion, mismanagement of water, Basin level (41.52 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
AFROMAISON	Environment	3.34						x	
CA2AFRICA	KBBE	1.00					x		
CLARA	Environment	2.00					x	x	
CLIMB	Environment	3.15						x	x
E-SOTER	Environment	2.60					x		
Floodstat	People	0.08							x
GLOBAQUA	Environment	7.59					x		
JORIEW	INCO	0.50			x				
LEDDRA	Environment	3.06					x		
MAQUA	KBBE	2.91							x
MIRAGE	Environment	3.50					x		
POLLINS	SME	2.21							x
REFRESH	Environment	6.99							x
SOILMOISTURE	People	0.10							x
SUDSOE	INCO	0.50		x					
WAHARA	Environment	2.00						x	

8. Improving water governance (38.20 M€)

Acronym	Programme	Budget, EC contribution	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia	Turkey
AQUAWARN	SME	0.94							x
BEWATER	SIS	2.93						x	
CLAIM	KBBE	1.50							x
Dewfora	Environment	3.45		x			x		
FP4BATIW	INCO	0.99		x	x			x	
Genesis	Environment	6.99							x
MARS	Environment	8.99							x
MOICT	INCO	0.49					x		
PEGASO	Environment	6.99							x
WASSERMED	Environment	2.93		x	x			x	
WATEUR	Environment	1.99							x

Annex 6: Screening of the options

Scope	R&I activities related to water provision	R&I activities related to food systems	R&I activities integrating water provision and food systems
Legal feasibility	**Yes**	**Yes**	**Yes**
Technical feasibility	**n.a.**	**n.a.**	**n.a.**
Previous policy choices	**n.a.**	**n.a.**	**n.a.**
Coherence with other EU policy objectives	**Yes**	**Yes**	**Yes**
Effectiveness and efficiency	**Medium**	**Medium**	**High**
Proportionality	**n.a.**	**n.a.**	**n.a.**
Political feasibility	**Low**	**Low**	**High**
Relevance in achieving the specific objectives	**Medium** cross-sectorial nature requires integrated approach	**Medium** cross-sectorial nature requires integrated approach	**High** integrated approach addresses cross sectorial dimension

Geographical coverage	Actions with EU Member States only	Actions with EU Member States and Associated third countries	Actions with EU Member States, Associated third countries and third countries
Legal feasibility	**No** None of the identified approaches allows to exclude legal entities established in Associated Countries	**Partially** Most of the identified approaches do not allow to exclude participation of legal entities established in third countries	**Yes**
Technical feasibility	**n.a.**	**n.a.**	**n.a.**
Previous policy choices	**n.a.**	**n.a.**	**n.a.**
Coherence with other EU policy objectives	**Low**	**Medium**	**High**
Effectiveness and efficiency	**Low**	**Medium**	**High**
Proportionality	**n.a.**	**n.a.**	**n.a.**
Political feasibility	**Low**	**Low**	**High**
Relevance in achieving the specific objectives	**Low** Participation would strongly limit scale and scope of resources, and would not address the geographic area concerned by the common challenges	**Medium** Participation would limit scale and scope of resources, and would not address the geographic area concerned by the common challenges	**High** Full participation would ensure scale and scope of resources, and would adequately address the geographic area concerned by the common challenges

Approach	Support to coordination between Participating States: ERA-NET Cofund	Support to coordination between Participating States: EJP Cofund	Support to integration between Participating States: Article185	Support to public-private partnerships
Legal feasibility	Yes	**Yes**	**Yes**	**No** Precondition for a JTI (strong commitment and leadership of industry not met).
Technical feasibility	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Previous policy choices	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Coherence with other EU policy objectives	**High**	**Medium**	**High**	**Low**
Effectiveness and efficiency	**Medium**	**Low**	**High**	**Medium**
Proportionality	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Political feasibility	**Medium**	**Low**	**High**	**No**
Relevance in achieving the specific objectives	**Medium** Medium support to common long-term R&I agendas, some support to National alignment, contributes to Critical mass of actors and resources, little support to Strengthening innovation capabilities	**Low** Little support to common long-term R&I agendas, little support to National alignment, limited Critical mass of actors and resources, no support to Strengthening innovation capabilities	**High** Based on common long-term R&I agendas, high support to National alignment, Critical mass of actors and resources, strong support to Strengthening innovation capabilities	**Low** No support to common long-term R&I agendas, no support to National alignment, contributes partially to Critical mass of actors and resources, medium support to Strengthening innovation capabilities

European Joint Programme Cofund (EJP Cofund)

EJP Cofund is a new type of action introduced in Horizon 2020 that is currently only used in selected pilots (one in 2016, a second under preparation for 2017). The EJP Cofund aims at pooling a critical mass of resources of publically funded research programmes with a focus on governmental research organisation in highly similar areas of expertise (mission driven research). The participation is limited to public entities that are mandated by their governments to participate, typically one or two per country.

Public-Private Partnerships

The EU can establish public-private partnerships as so-called Joint Technology Initiatives (JTIs). They provide a way of creating new partnerships between publicly and privately-funded organisations involved in research, focussing on areas where research and technological development can contribute to European competitiveness and quality of life. They are designed to establish European leadership in certain technologies that are strategic to Europe's future and rely on the leadership and strong financial commitment from industry.

Annex 7: Who is affected by the initative and how

The following Tables 7.1 to 7.3 present an analysis of the actors affected by the initiative, considering the three Policy Options:

- Policy Option 0. Baseline scenario;
- Policy Option 1.ERA-NET Cofund action;
- Policy Option 2. Article 185 TFEU.

The list of actors does not change with the Policy Option, but the type of effect, the actions needed to comply and the related uncertainties may change. In specific cases distinctions are made between the EU and third countries' stakeholders of a given type.

Policy Option 0: Baseline Scenario			
Who is affected	**How it is affected**	**Actions needed to comply**	**Related uncertainties**
R&I Ministries of the partner countries (National R&I policy makers)	Ministries will develop their policies following national interests exclusively. They will lose prospects for co-management or co-ownership of Mediterranean R&I programmes.	No specific action is required to comply	National policies may become disconnected from Mediterranean efforts. Fragmentation and duplication will increase. This Policy Option puts an end to Mediterranean R&I cooperation.
R&I Programmes of the Partner Countries (R&I Funding Organisations)	R&I programmes will continue with their national programing. Mediterranean ERA-NETs will be discontinued, with increased funding for national activities and discontinued participation in ERA-NET meetings.	No specific action is required to comply	National policies may become disconnected from Mediterranean efforts. Fragmentation and duplication will increase.
Public R&I performing organisations	Discontinuation of Mediterranean ERA-NETs will decrease opportunities for regional cooperation. Opportunities for national activities could increase.	No specific action is required to comply	The public R&I system may be disconnected from regional R&I activities. This is particularly important for third countries.
Large companies	Large companies could obtain support from Horizon 2020 calls within specific topics.	No specific action is required to comply	The private R&I system may be disconnected from regional R&I activities. This is particularly important for third countries.
SMEs	SMEs could obtain support from Horizon 2020 calls within specific topics.	No specific action is required to comply	SMEs may be disconnected from regional R&I activities. This is particularly important for third countries.
NGOs representing farmers, consumers, citizens…	NGOs representing farmers, consumers, citizens could obtain support from Horizon 2020 calls within specific topics.	No specific action is required to comply	NGOs may be disconnected from regional R&I activities. This is particularly important for third countries.
Farmers	Farmers rarely participate in R&I activities in Horizon 2020 or at national level. Indirectly they will be negatively affected: local innovations may be disconnected from Mediterranean state of the art.	No specific action is required to comply	Farmers may have limited access to innovations in the national market, and will have to resort to technology imports.
Citizens	Citizens rarely participate in R&I activities in Horizon 2020 or at national level. Indirectly they will be negatively affected: local innovations may be disconnected from Mediterranean state of the art.	No specific action is required to comply	Citizens will have limited access to innovations in the national market. Food security, diet quality and environmental conservation may be affected.

Table 7.1. *Who is affected by Policy Option 0. Source: PRIMA Expert Group report.*

Policy Option 1: ERA-NETCofund actions			
Who is affected	**How it is affected**	**Actions needed to comply**	**Related uncertainties**
R&I Ministries of the partner countries (National R&I policy makers)	Policy makers will combine internal interests and the interest of a series of Mediterranean ERA-NETs.	All EU and most Mediterranean third countries, national policy makers are familiar with the activities of the ERA-NETs. In general, no specific actions will be needed to comply	This Policy Option does not imply meaningful progress in Mediterranean R&I cooperation.
R&I Programmes of the Partner Countries (R&I Funding Organisations)	R&I programmes will apply funds and managerial efforts to national and ERA-NET efforts. This is the current situation in all EU and most Mediterranean third countries.	All EU and most Mediterranean third countries, national R&I programmes are familiar with the activities of the ERA-NETs. In general, no specific actions will be needed to comply	This Policy Option does not imply meaningful progress in Mediterranean R&I cooperation.
Public R&I performing organisations	This is the current situation in EU and Mediterranean third countries (Associated). Further Mediterranean ERA-NETs will increase opportunities for regional cooperation.	All EU and most Mediterranean third countries, national public R&I performers are familiar with the activities of the ERA-NETs. In general, no specific actions will be needed to comply	-
Large companies	Large companies are hardly involved in calls launched by ERA-NET (Cofund), due to the national rules of the NfB involved in such ERA-NETs.	In general, no specific actions will be needed to comply	In many countries large countries find problems to participate in ERA-NET calls for proposals.
SMEs	SMEs companies are hardly involved in calls launched by ERA-NET (Cofund), due to the national rules of the NfB involved in such ERA-NETs	No specific actions will be needed to comply	In many countries SMEs find problems to participate in ERA-NET calls for proposals.
NGOs representing farmers, consumers, citizens…	NGOs representing farmers, consumers, citizens are unlikely to receive support from ERA-NETs due to the national rules of the NfB involved.	No specific actions will be needed to comply	In many countries NGOs find problems to participate in ERA-NET calls for proposals.
Farmers	Farmers rarely participate in R&I activities. This Policy Option will not affect them respect to the current situation.	No specific action is required to comply	-
Citizens	Citizens rarely participate in R&I activities. This Policy Option will not affect them respect to the current situation.	No specific action is required to comply	-

Table 7.2. *Who is affected by Policy Option 1. Source: PRIMA Expert Group report.*

Policy Option 2: Article 185 TFEU			
Who is affected	**How it is affected**	**Actions needed to comply**	**Related uncertainties**
R&I Ministries of the Participating States (National R&I policy makers)	This Policy Option sets a transition path towards integration of thematic Mediterranean R&I programmes.	A relevant effort is required from policy makers to set up the dedicated implementation structure of this initiative (DIS)and the grant management, establish a governance structure and provide financial guarantees..	Risks have been identified associated with the commitment level of participating countries and their will to build an effective management structure, based on central grant management.
R&I Programmes of the Participating States (R&I Funding Organisations)	This Policy Option sets a transition path towards integration of thematic Mediterranean R&I programmes.	A relevant effort is required from policy makers to ensure coordination between national activities, transnational activities carried out in other contexts (e.g. JPIs) and the activities of the Article185 initiative.	Risks have been identified associated with the commitment level of participating countries and their will to build an effective management structure.
Public R&I performing organisations	More thematic funding will be available. Consortia consisting of European and third countries will be required in all cases. This Policy Option will count on more funds for R&I, therefore having a strong positive effect.	Adaptation to the call for proposal and grant management rules applied by the DIS.	The success ratio may be different in the context of a programme focussing on the Mediterranean region. Proposal and grant procedures will be similar to Horizon 2020.
Large companies	More thematic funding will be available. European consortia will be required in all cases. Project management will be centralised in a DIS. This Policy Option will count on more funds to produce R&I, therefore having a strong positive effect. Large companies will be able to apply in transnational consortia consisting of European and third countries.	Adaptation to the call for proposal and grant management rules applied by DIS.	The success ratio may be different in the context of a programme focussing on the Mediterranean region. Proposal and grant procedures will be similar to Horizon 2020. procedures will be different The success ratio may be different in the context of a Mediterranean evaluation. Proposal and grant procedures will be different
SMEs	SMEs will be able to apply in transnational consortia consisting of European and third countries. More thematic funding will be available. European consortia will be required in all cases. Project management will be centralised in a DIS. This Policy Option will count on more funds to produce R&I, and has committed to pay specific attention to SMEs, therefore having a strong positive effect		

NGOs representing farmers, consumers, citizens…	More thematic funding will be available. European consortia will be required in all cases. Project management will be different and centralised in a DIS. This Policy Option will count on more funds to produce innovations, therefore having a strong positive effectNGOs can in principle apply to apply in transnational consortia consisting of European and third countries.		
Farmers	Farmers rarely participate in R&I activities. This Policy Option will count on more funds to produce innovations, therefore having a strong positive effect, even if, specific actions to involve them could be design and launched rely on innovative solutions coming from the increased R&I efforts that will provide benefits for farmers.	No specific action is required to comply	-
Citizens	Citizens rarely participate in R&I activities. This Policy Option will count on more funds to produce innovations, therefore having a strong positive effect, even if, specific actions to involve them could be design and launched	No specific action is required to comply	-

Table 7.3. *Who is affected by Policy Option 2. Source: PRIMA Expert Group report.*

Annex 8: Synergies

The thematic aspects of PRIMA are defined by the intersection of the Mediterranean focus and each of the eight objectives described in the proposal. Two types of cross-border initiatives are related to PRIMA:

- Cross-border initiatives focusing on the Mediterranean which partially cover the thematic pillars of PRIMA; and
- Cross-border initiatives partially covering the thematic pillars of PRIMA which count on non-EU Mediterranean countries.

Some cross-border initiatives focusing on the Mediterranean partially cover the thematic pillars of PRIMA

The Expert Group Report presents three INCO-NETs and three KBBE ERA-NETs addressing Mediterranean Cooperation. In Table 10.1 the results of three calls in ARIMNet, ARIMNet2 and ERANETMED are presented. More information on these calls is provided in Annex 9. On-going Mediterranean initiatives include:

- MedSpring. Its objective is to encourage and strengthen the Euro-Mediterranean Cooperation on Research and Innovation by creating a dialogue and coordination platform of governmental institutions, research organizations, associations and civil society. It focuses its efforts around three major societal challenge themes: resource efficiency (particularly water), high quality affordable food and energy. MedSpring does not fund R&I projects.

- ERANETMED. The main aim of the project is to enhance Euro-Mediterranean co-ownership through innovation and competitive research in the societal challenges of the region. The project aims at reducing fragmentation of programming in the Mediterranean region by increasing coordination among national research programmes of European Member States, Associated Countries and Mediterranean Countries.
    - Call 2014: 13.42 million EUR (thee topics), one related to PRIMA
    - Call 2016 (open): 11.45 million EUR (four topics), one related to PRIMA

- ARMINET2. Continuing from ARIMNet, this ERA-NET aims to establish itself as a source of funding for international collaboration responding to global stakes and challenges facing Mediterranean agriculture.
    - Call 2015: 7 million EUR, three topics, all three related to PRIMA
    - Call 2016 (open): 5.8 million EUR, two topics, both related to PRIMA

PRIMA Objective	MedSpring	ERANETMED	ARIMNet2
1. To develop smart and sustainable farming systems to maintain natural resources and to increase production efficiency	Societal challenge "food" focuses on organic farming, traditional agriculture and tolerance to abiotic stresses		Call 2015. A topic on sustainable production under stress. Call 2015. A topic on food chain: from production to consumption. Call 2016 (open). A topic on Promoting sustainable agriculture for socio-economic development
2. To test and stimulate the adoption of context-tailored water-saving solutions, in particular in agriculture	Societal challenge "scarcity of resources" has a strong focus on water	Call 2014: a topic on Water resources management.	Call 2015. A topic on sustainable management of landscape and resources
3. To innovate in Mediterranean food products based on Mediterranean diet heritage and to enhance the links between nutrition and health	Societal challenge "food" focuses on innovations in local Mediterranean food chains		Call 2015. A topic on food chain: from production to consumption. Call 2016 (open). A topic on Valorising local products through food value chains improvement.
4. To find context-adapted solutions to increase food and water chain efficiency, and reduce losses and wastes	Societal challenges "food" and "scarcity of resources" target food and water efficiency	Call 2014: a topic on Water resources management.	Call 2015. A topic on food chain: from production to consumption. Call 2016 (open). A topic on Valorising local products through food value chains improvement.
5. To design and promote the adoption of novel approaches to reduce the impact of pests and pathogens in farming, including their consequences on human health			
6. To conceive and implement innovative, quality oriented models in agro-business as potential sources of new jobs and economic growth			Call 2015. A topic on food chain: from production to consumption.
7. To improve land and water sustainability in arid and semi-arid watersheds	Societal challenge scarcity of resources addresses water sustainability	Call 2014: a topic on Water resources management. Call 2016: a topic on "Land &Water/ Food" and Environment	Call 2015. A topic on sustainable management of landscape and resources
8. To elaborate and stimulate adoption of new policies and protocols for the governance of water management systems	Societal challenge "scarcity of resources" is directly related to policy making	Call 2014: a topic on Water resources management.	Call 2015. A topic on sustainable management of landscape and resources

Table 10.1. Synergies related to ERA-NETs

All these ERA-NETs will be finished by the end of 2017.

Some cross-border initiatives partially covering the thematic pillars of PRIMA count on Mediterranean third countries

The most relevant European Initiatives approaching the topics of PRIMA are the Joint Programming Initiatives. Among the ten on-going Joint Programming Initiatives, two are particularly close to PRIMA:

- FACCE JPI explores the intersection between food, agriculture and Climate Change. This thematic focus is particularly related to PRIMA objectives 1, 2, 3, 4, 5 and 7. Two non-EU Mediterranean Countries are partners of FACCE JPI: Israel and Turkey. The WaterWorks 2015 call for proposals (launched in cooperation with Water JPI and partially focusing on water in agriculture) counted on three non-EU Mediterranean funding organizations from Egypt, Tunisia and Turkey.

- Water JPI covers all aspects related to water in Europe. Out of the five thematic areas of Water JPI, only one (Implementing a Water-Wise Bio-Based Economy) is directly related to the PRIMA objectives. Two non-EU Mediterranean Countries are partners of Water JPI: Israel and Turkey. The WaterWorks 2015 call for proposals (launched in cooperation with FACCE JPI and partially focusing on water in agriculture) counted on three non-EU Mediterranean funding organizations from Egypt, Tunisia and Turkey.

The following table presents the correspondence of the PRIMA objectives with the core themes of the Strategic Research and Innovation Agenda (SRIA) of FACCE JPI and Water JPI. Each SRIA has five core themes.

PRIMA Objective	FACCE JPI	Water JPI
1. To develop smart and sustainable farming systems to maintain natural resources and to increase production efficiency	1. Sustainable food security under climate change, based on an integrated food systems perspective: modeling, benchmarking and policy research perspective 2. Environmentally sustainable growth and intensification of agricultural systems under current and future climate and resource availability	
2. To test and stimulate the adoption of context-tailored water-saving solutions, in particular in agriculture		4. Implementing a Water-Wise Bio-Based Economy
3. To innovate in Mediterranean food products based on Mediterranean diet heritage and to enhance the links between nutrition and health	1. Sustainable food security under climate change, based on an integrated food systems perspective: modelling, benchmarking and policy research perspective 4. Adaptation to climate change throughout the whole food chain, including market repercussions	

4. To find context-adapted solutions to increase food and water chain efficiency, and reduce losses and wastes		4. Implementing a Water-Wise Bio-Based Economy
5. To design and promote the adoption of novel approaches to reduce the impact of pests and pathogens in farming, including their consequences on human health		
6. To conceive and implement innovative, quality oriented models in agro-business as potential sources of new jobs and economic growth		
7. To improve land and water sustainability in arid and semi-arid watersheds		4. Implementing a Water-Wise Bio-Based Economy
8. To elaborate and stimulate adoption of new policies and protocols for the governance of water management systems		4. Implementing a Water-Wise Bio-Based Economy

Table 10.2. Synergies related to JPIs

These JPIs do not have the same thematic focus as PRIMA, nor the same geographical coverage. JPIs focus on pan European societal challenges. These JPIs will be active beyond 2017, and therefore will be coincident in time with PRIMA. As a consequence, Synergies could be expected at different levels:

- Coordinated visibility and advocacy inside and outside Europe. Extending the ring of informal co-ordination between FACCE and Water JPI to PRIMA would add coherence to the set of initiatives and facilitate interaction with partner countries, European institutions and society at large.

- Mapping of capacities, key researchers/innovators and centres of excellence. Coordinating the mapping activities performed by these initiatives would moderate the required efforts and provide geographic continuity towards the south and east of the Mediterranean.

- Exploring the interfaces and the complementarities of the Strategic Research and Innovation Agendas. A synergic effect will derive from consideration of the well-established Agendas of the JPIs when preparing the first release of the PRIMA SRIA. Discussing the update of one of these three SRIAs with the other two initiatives will bring efficiency gains and reinforce the pan-European strategy on food systems and water resources.

- Coordinating Joint Activities. Water and FACCE JPI implemented the first coordinated Joint Call at the Joint Programming level. Coordination of activities should be extended to PRIMA to exploit thematic coincidences and to attain synergies at the implementation level. Possibilities for co-ordination cover the whole range of R&I activities.

Annex 9: EU Relationships in R&I with Non-EU PRIMA Participating States

Country	EU-Country Formal cooperation relations	Relationship in R&I Established through Agreement	Participation in Research Framework Programmes (direct flow of funds from COM to participants)	National budgets implemented through ERANETMED Call 1 (Joint Programming 2014 only) -(direct flow of funds from National Administration to participants)®
Egypt	EU-Egypt Association Agreement (OJ L304, 30/09/2004, p. 39) – Art 43 'Scientific and technological cooperation' on *access Union R&D programmes'*	EU-Egypt S&T Agreement (OJ L182, 13/07/2005, p. 12) in force since 2008.	Participant total cost (FP7: 19.070.831 EUR; Horizon 2020: 1,584,719 EUR) Participant EC Contribution (FP7: 15.019.131 EUR; Horizon 2020,:2.321.469 EUR)	1,500,000 EUR
Israel	EU-Israel Association Agreement (OJ L147, 21/06/2000, p. 3) Art 40 'Scientific, technical and technological cooperation' on *the intensification of cooperation in science and technology*	Horizon 2020 Association Agreement (OJ L 177, 17.6.2014, p. 1) applicable since 01/01/2014. (previously Associated to RFPs since 1996)	Participant total cost (FP7: 997,654,830 EUR; Horizon 2020: 282,072,106 EUR) Participant EC Contribution (FP7: 832,123,423 EUR; Horizon 2020: 357,126,581 EUR)	- not participating in ERANETMED
Lebanon	EU-Lebanon Association Agreement (OJ L143, 30/05/2006, p. 2) – Art 44 'Scientific, technical and technological cooperation' on *access Union R&I programmes* and *'study' means for Lebanon to participate in European Framework Programmes for Research*	-	Participant total cost (FP7: 3,331,925 EUR; Horizon 2020: 2,766,349 EUR) Participant EC Contribution (FP7: 842,269 EUR; Horizon 2020: 842.269 EUR)	200,000 EUR
Morocco	EU-Morocco Association Agreement (OJ L70, 18/03/2000, p. 2) – Art 45 'Regional cooperation': d) *'research in science and technology' to be fostered with a regional impact involving third countries'*	EU-Morocco S&T Agreement (L37, 10/02/2004, p. 9) in force since 2005.	Participant total cost (FP7: 17,212,149 EUR; Horizon 2020: 3,072,099 EUR) Participant EC Contribution (FP7: 13.620.383 EUR; Horizon 2020: 3.275.187 EUR)	1,000,000 EUR
Tunisia	EU-Tunisia Association Agreement (OJ L97, 30/03/1998, p. 2) Art 45 'Regional cooperation': d) *'research in science and technology' to be fostered with a regional impact involving third countries'*	EU-Tunisia S&T Agreement (OJ L 37, 10.2.2004, p. 17) in force since 2004. Horizon 2020 Association Agreement, applicable since 01/01/2016	Participant total cost (FP7: 15,250,420 EUR; Horizon 2020: 1,622,772 EUR) Participant EC Contribution (FP7: 12,055,778 EUR; Horizon 2020: 2,044,210	600,000 EUR

Table 9.1. Cooperation relationships between PRIMA Participating States

® Note: data refers solely to Call 1 of ERANETMED, an ERA-NET type joint programming projects under FP7 which started implementation in 2014. The amounts refer to national budgets being implemented by authorities. Participating Member States are Cyprus, France, Portugal, Germany, Malta, Spain, Italy and Greece. Other third countries participating are Algeria and Jordan. In total Call 1 raised 13,520,000 EUR, of which 5,020,000 EUR were contributed and are managed by non EU countries.

Annex 10: Analytical models used in preparing the impact assessment

On the Expert Group side, this Impact Assessment does not rely on modelling, given the broad range of potential impacts and a lack of adequate data sets. It was not possible to compare the potential impacts of the Policy Options using sophisticated modelling techniques. Models of the relationship between R&D inputs and economic outcomes (such as changes in productivity and employment levels) do exist, but they are typically used at macro-levels (e.g. to explore the links between total national R&D inputs and changes in productivity levels across all relevant sectors) where aggregate data exist on a relatively small number of relevant variables (typically one input and one output variable). They are not suitable for use at more disaggregated levels where data sets are rarely available and the number of variables of interest is much larger. Even if the number of variables of interest was restricted and data sets did exist across all countries in the Mediterranean region, the costs associated with collecting these data, developing appropriate models and performing the requisite analyses would be considerable, and certainly outside the scope of this exercise.

Commission views stand for a problem that it is not suited to modelling anyway, as it is too broad and complex. Models are generally suited to more narrowly-defined problems. Models available in the JRC are in the MIDAS portal: http://midas.jrc.it/discovery/midas/, which shows models to be potentially run in the Mediterranean, but in the scope of marine sciences, so they are not applicable to the complex R&I water provision and food systems problem of this impact assessment.