EXPERT GROUP MEETING ON CUMULATIVE ENVIRONMENTAL IMPACTS OF DESALINATION ON THE MEDITERRANEAN. Brussels 23 June 2014.

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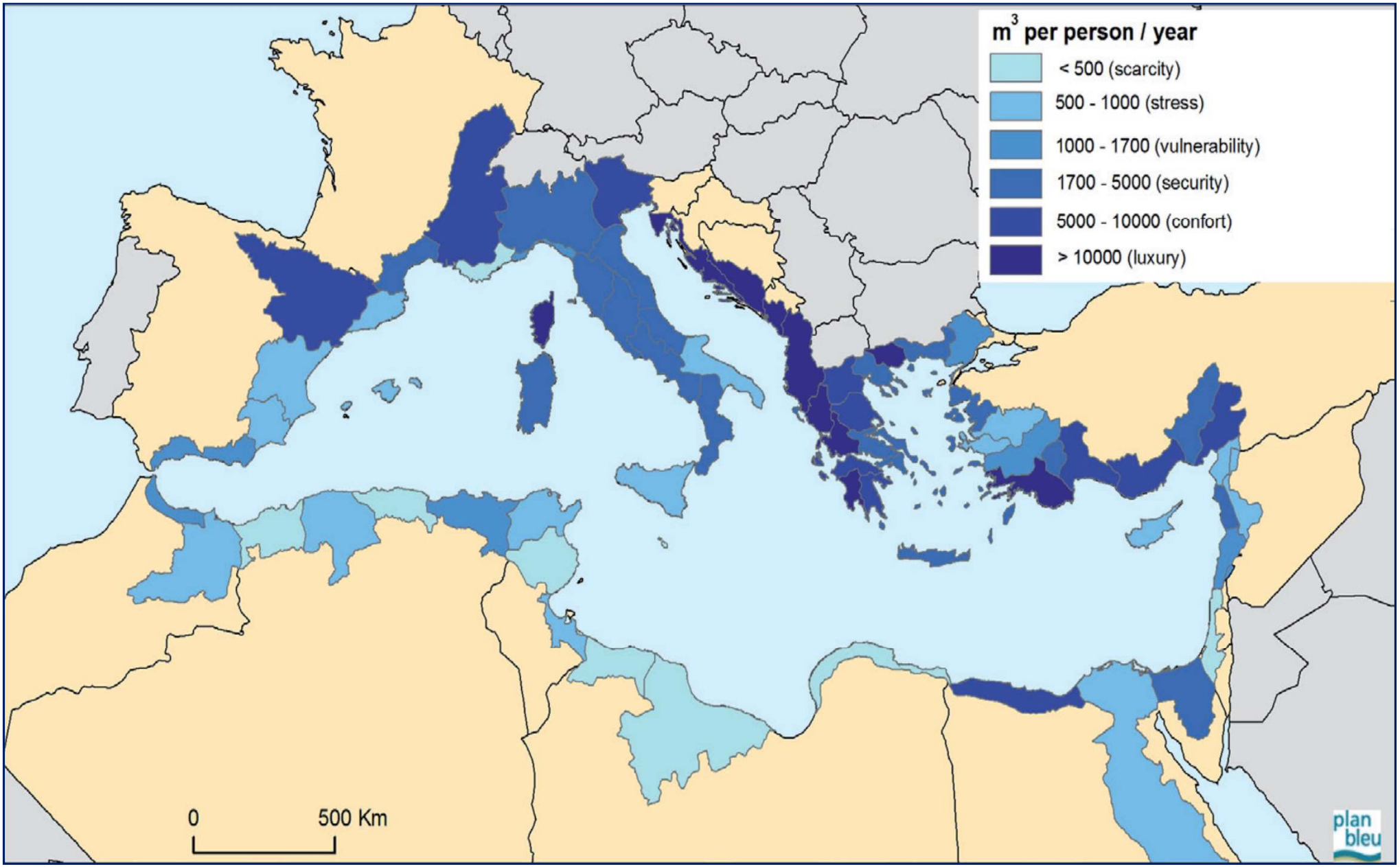
STATE OF DESALINATION IN SOUTH MEDITERRANEAN COUNTRIES

I- STATUS OF WATER RESOURCES IN SMCs

- 180 million inhabitants suffer water stress and have access to less than 1,000 m^3/year/capita and
- 80 million inhabitants face water scarcity with less than 500 m^3/year/capita.
- Desalination is assumed to play an ever-increasing role in filling the water-supply gaps in the South Med. Region.



Renewable natural water resources per inhabitant in Mediterranean Countries (Source: Blue Plan Notes 2010).

II- ENVIRONMENTAL SENSITIVITY OF THE MED SEA

- The duration of the entire water cycle within the Med basin is approximately **80 to 100 years**.
- Due to the small number of major rivers feeding the Med Sea, **evaporation** is greater than the inflow of water from rivers producing an annual water deficit of approximately **2500 cubic km**. This water deficit is resulting in more saline water (**39** PPT) compared to the connected Atlantic Ocean of only **(36** PPT).
- According to UNEP-MAP the Med Sea already suffers from pollution including the discharge of raw or inadequately treated industrial and domestic wastewater in addition to diffusive runoff from agricultural uses, etc.

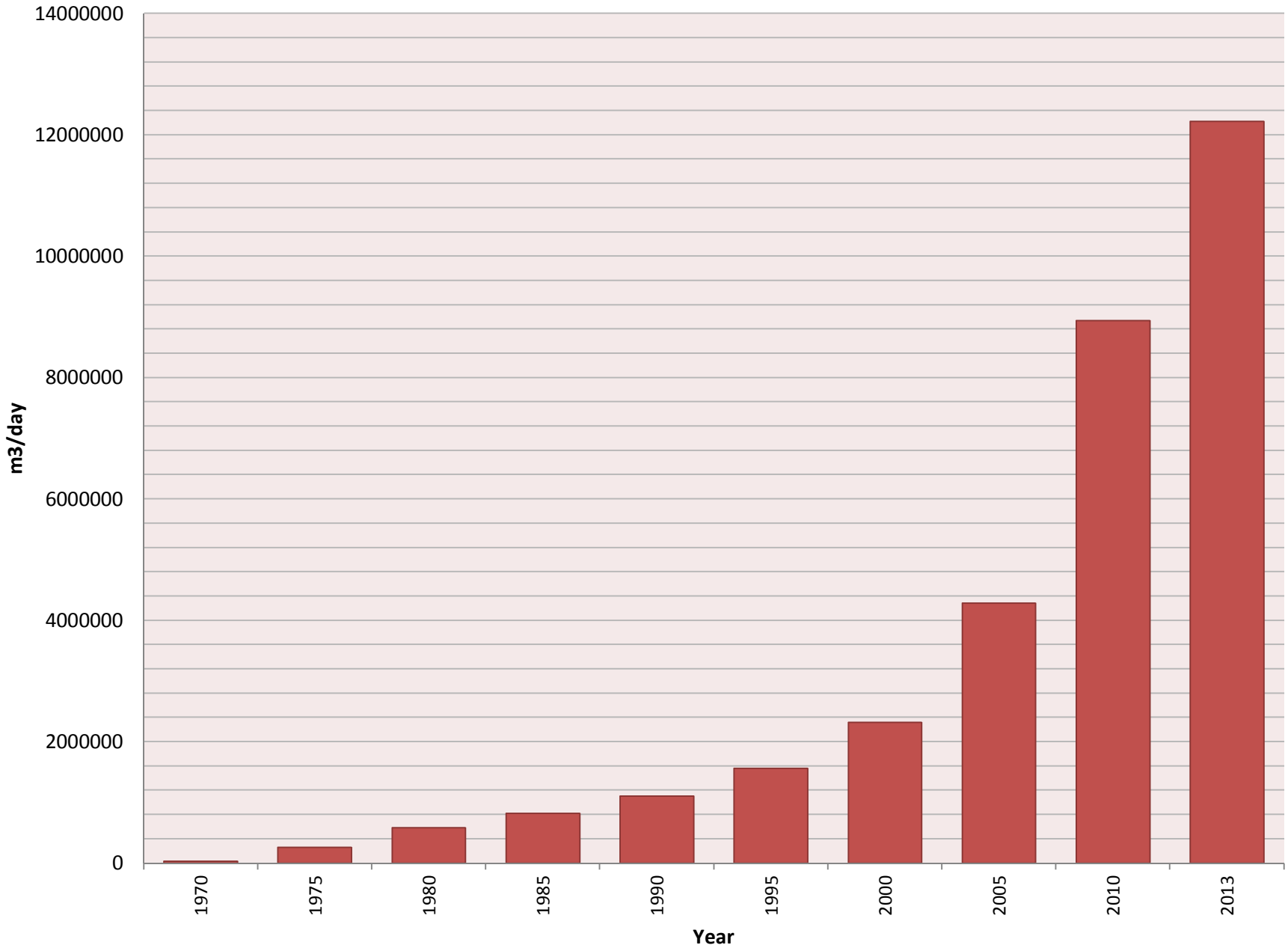
- Mediterranean is home to 7 to 8% of known marine species, while representing 0.8% of the planet's ocean surface.
- The Med Sea sustains more than **1000 species** of macro-flora; approximately 20% of these are endemic to the Med Sea.
- Two remarkable ecosystems, magnoliophytes grassbeds (**Posidonia**) and coralligenics can be found **in coastal zones**.
- Some **19 %** of known Med species are threatened.
- the Med Sea emblematic monk seal is classified as a species in critical risk of extinction.
- Cartilaginous fish, with 42% of shark species are threatened with extinction.
- More than 63 % of the fish and 60% of the mammals listed in the Protocol concerning Specially Protected Areas and Biological Diversity have endangered status.

Unique sea grass Posidonia Oceanica forming «prairie" meadows in shallow near-shores of the Mediterranean Sea.
Source: WWF (2007) Young plants of Posidonia oceanica © WWF-Shoreline

- Posidonia plays a vital role in the sustainability of the Med ecosystem by 1- retaining the soil and 2- ensuring more than 1000 different species feed and reproduce themselves.
- The Posidonia prairies are listed as priority habitats under the European Union's Habitat Directives.
- For Posidonia to thrive, two essential conditions are required: 1- sun, for which it needs to grow in low depth waters **close to the coast**, and 2- **a constant level of salinity**.
- Posidonia prairies have come into conflict with the rapid expansion of seawater desalination in Spain.

III- Status of Desalination in the Mediterranean

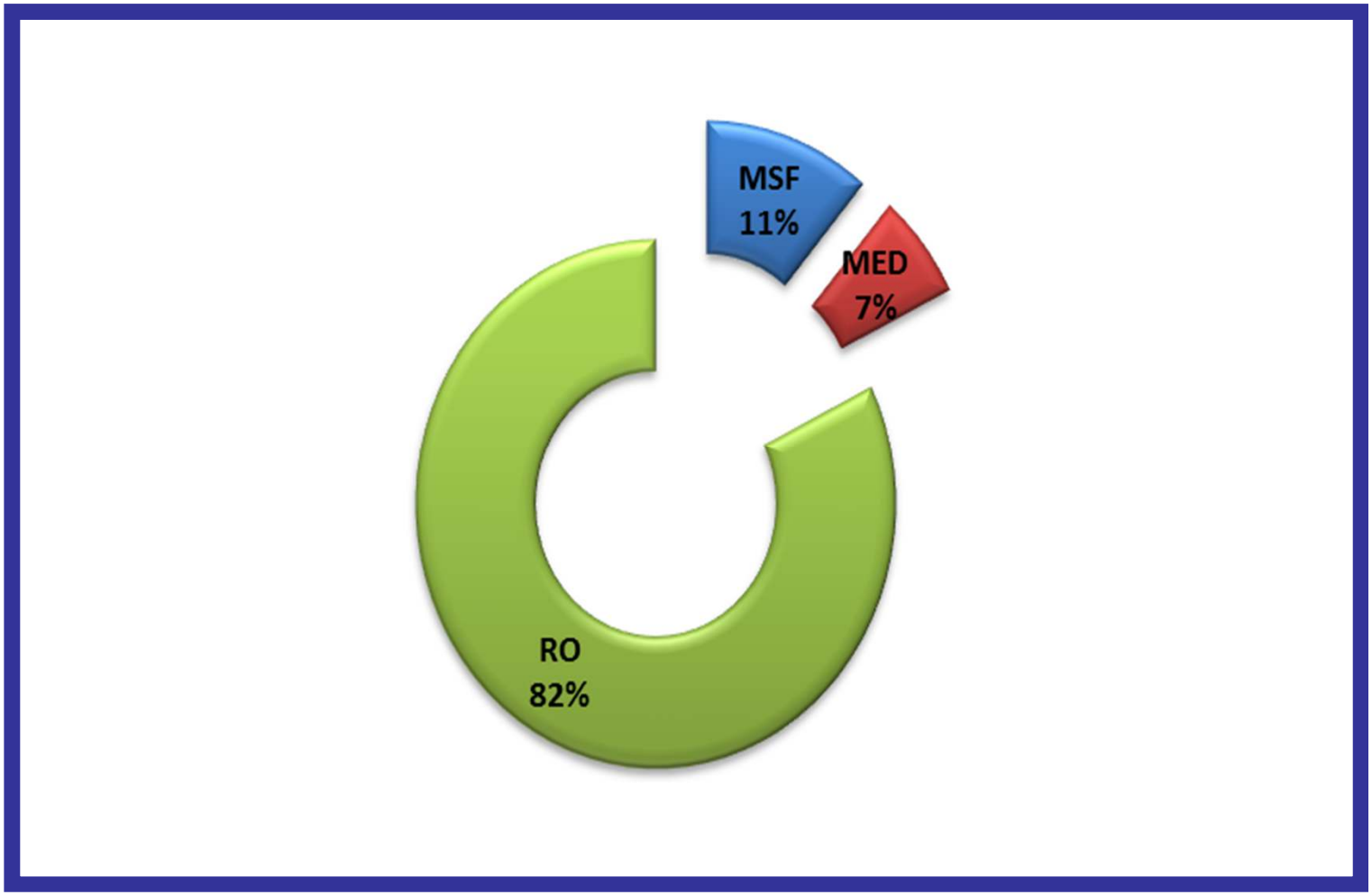
- Starting from 1970 to the year 2013, over 1532 seawater desalination plants had been installed around the Med Sea.
- These plants have a total cumulative installed capacity of some 12 Million m^3/day.
- In the last 13 years (2000 to 2013), the reported installed capacity has dramatically increased by an outstanding 560%.



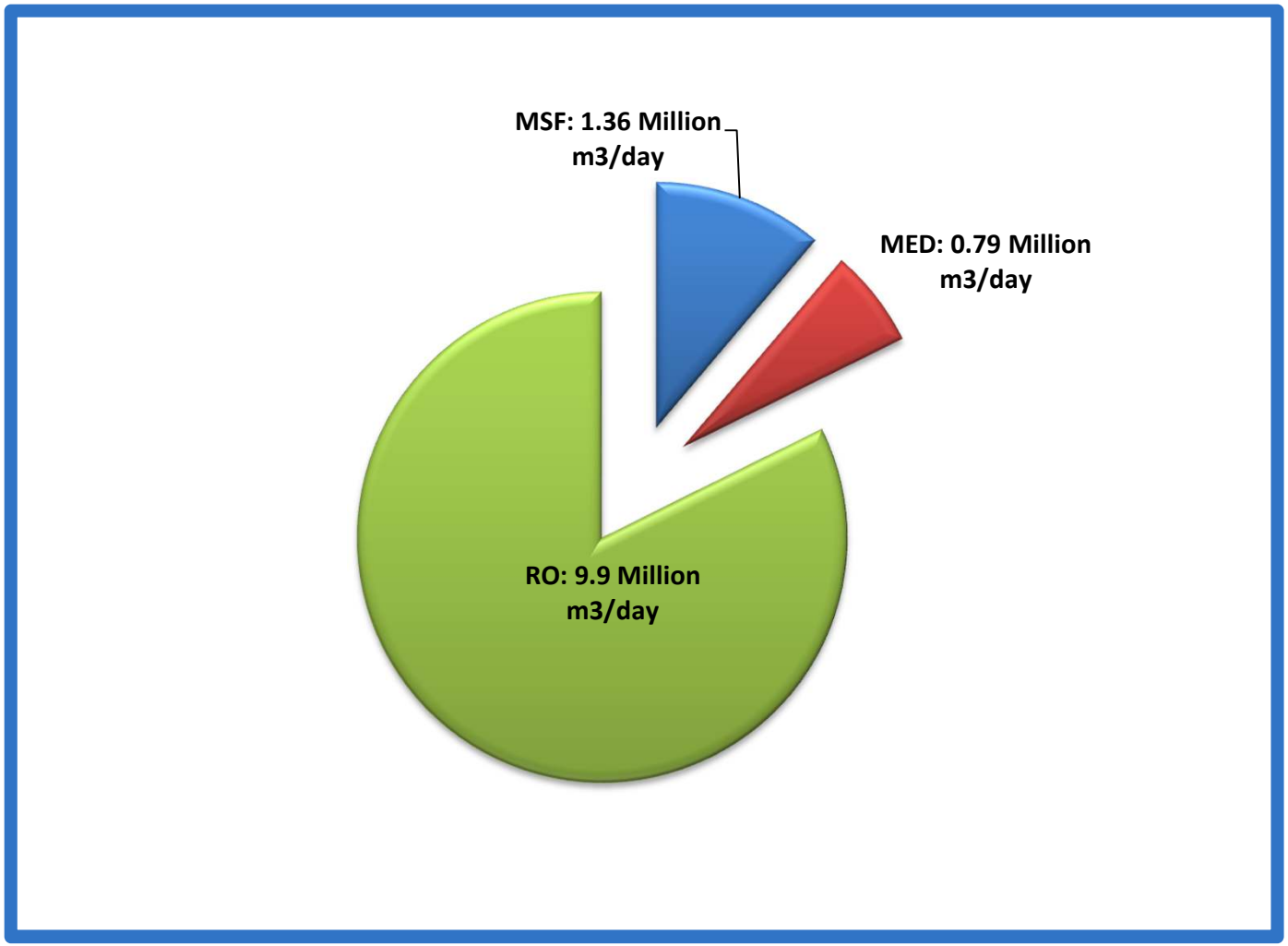
Cumulative installed production capacity of desalinated water in Mediterranean Countries from 1970 to 2013 from seawater. *Source of data: GWI-Desal-Data (2013).*

IV- SEAWATER DESALINATION TECHNOLOGIES IN USE IN THE MED REGION

- RO is becoming the most common desalination technology in use in the Med region accounting for some 82.3% of total installed capacity, or roughly 9.9 Million m^3/day.
- The second-most common desalination technology in use in the region is MSF with nearly 11.2 % producing some 1.4 Million m^3/day,
- This is followed by the MED with only 6.5 % producing 0.8 Million m^3/day.



Cumulative installed seawater desalination capacity using different technologies in m3/day from 1970 to 2013 for all Mediterranean countries. Source of data: GWI-Desal-Data (2013).

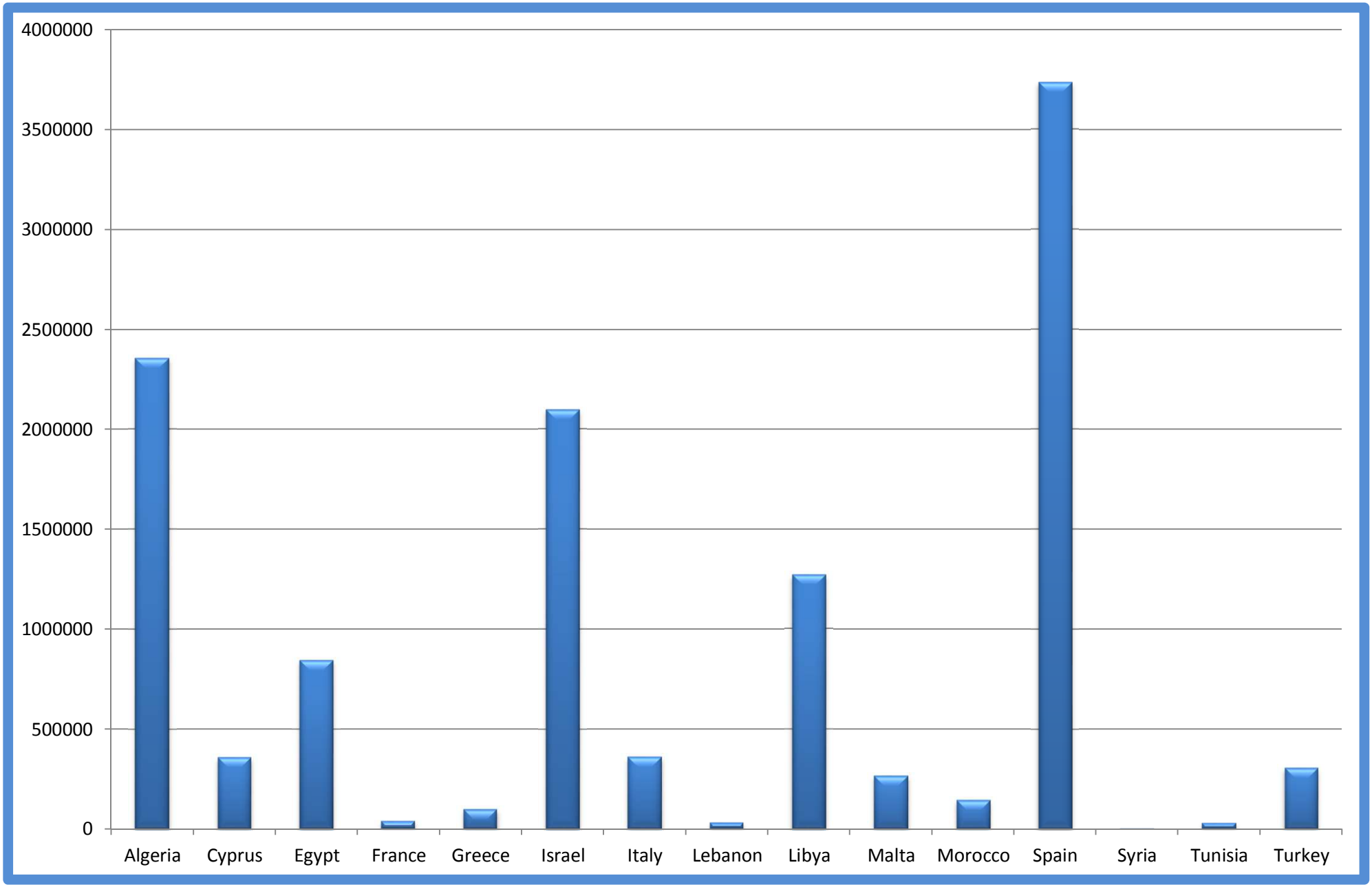


Percent distribution among desalination technologies in the Mediterranean Region in 2013. Source of data: GWI-DesalData (2013).

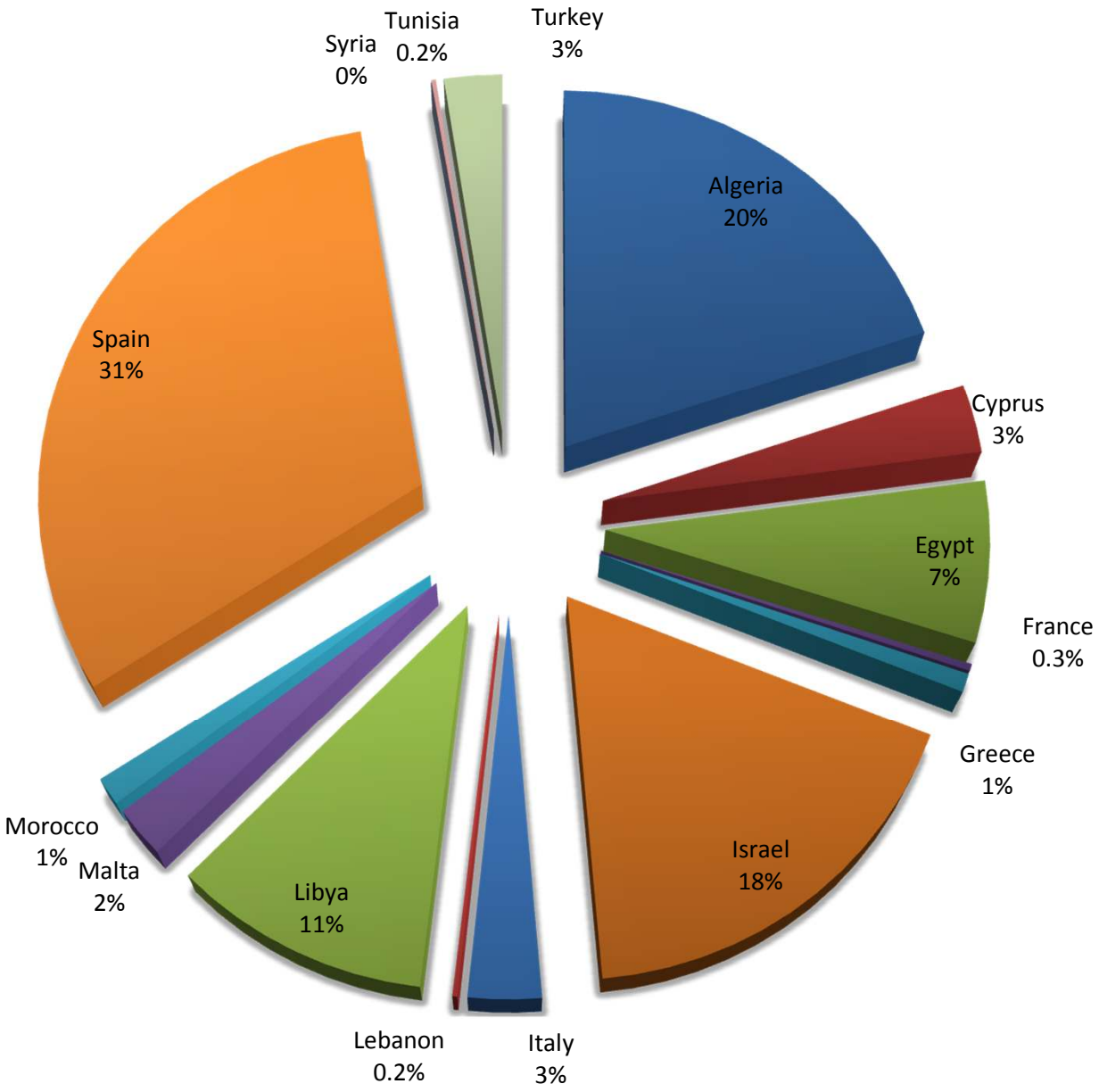
IV- MAJOR PRODUCERS OF DESALINATED SEAWATER IN THE MED REGION

1. Spain came first as the highest producer of desalinated water with an installed capacity of 3.7 Million m^3/day, followed by
2. Algeria with a daily production of some 2.4 Million m^3/day, followed by
3. Israel with a daily production of 2.1 Million m^3/day, followed by.
4. Libya with a daily production of 1.3 Million m^3day.

The installed production capacity was calculated using date from GWI-Desal-Data (2013) for desalination plants constructed from 1970 to 2013.



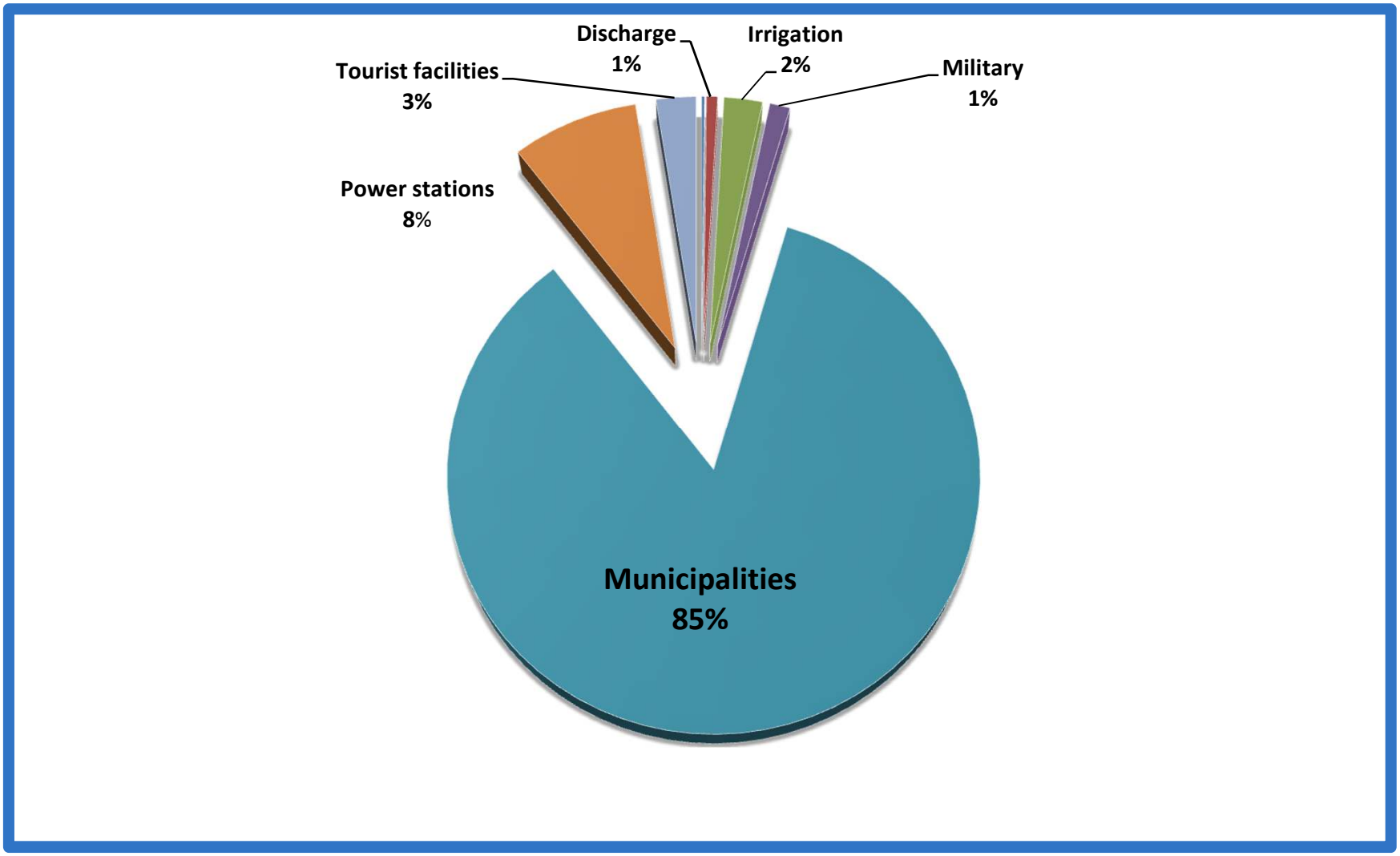
Current cumulative installed desalination capacity (1970 to 2013) in Mediterranean Countries in m3/day. Source of data: GWI-Desal-Data (2013).



Percent desalination capacity among countries in the Mediterranean region.

Source of data: GWI-Desal-Data (2013).

V-USES OF DEASALINATED SEAWATER IN THE MED REGION



Average distribution of desalinated water according to uses in the Mediterranean region. Source of data: GWI-Desal-Data (2013).

CONCLUSIONS (1)

1. The Med Region is suffering from chronic and increasing water scarcity.
2. Desalination is considered in many SWIM PCs as a convenient option to bridge the supply-demand gap.
3. The Med Sea is a very rich yet a vulnerable ecological system.
4. The Med Sea is under serious environmental pressure.
5. In 2013 the cumulative capacity of seawater desalination in the region reached 12 Million m^3/day and increased by %560 from 2000 to 2013.

CONCLUSIONS (2)

6. RO is the most prevailing desalination technology followed by MSF and MED.
7. As of 2013, Spain produce 31% followed by Algeria by 20% followed by Israel by 18% followed by Libya by 11% and Egypt by 7%.
8. 85% of the produced desalinated seawater in the Med region is consumed by the municipal sector.

مع خالص شكري
وامتناني

Thank you for your attention

Merci pour votre attention

For additional information please contact:
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