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**HARMFUL SUBSIDIES AND THE
MEDITERRANEAN: BALANCING
ENVIRONMENTAL SUSTAINABILITY,
ECONOMY, AND EQUITY**

TUESDAY, 30TH OF JANUARY 2024

FROM 8:45 AM TILL 5:00 PM

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**Water Subsidies,
Desalination, and
Sustainable Resource
Management:**

Policy Evidence from Algeria

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Outline



Motivation & Objective



Context &
Methodology



Scenarios



Policy
recommandations

Motivation & Objectives

Why Algeria?

- **Climatic aridity** and issues related to climate change.
- One of the **most urbanized** countries on the African continent (70% of the population).
- **The water stress** index is low, with a water availability ratio of 411 m³/year/person.
- Water policy is marked by a **disproportionate approach to managing water resources**, prioritizing increasing water supply rather than optimizing the use of existing resources.
- Extremely reliant on **hydrocarbons, nearly exclusively natural gas**.
- **Subsidy Policy** based on **Social spending**.
- The "Water Emergency Plan 2021" in Algeria.

Motivation & Objectives

The research aims to provide a projection scenario to determine the potential beneficiaries of subsidies in the desalination industry in Algeria.

Algeria's difficulty in ensuring the long-term viability of water subsidies.

Context & Methodology

Brief literature review

Very few studies have been carried out on the theme itself, but we have used directly or indirectly related indexed published articles to contextualize this research in particular:

- Kertous, M., et al., (2022). *Clean water pricing policy reform and consumers' welfare in Algeria.*
- Drouiche, N., et al.,(2022). *Desalination technologies and water reuse in Water-Energy-Food nexus*
- Boukhari and de Miras, (2019). *Water utilities in Algeria: inherent limitations, institutional obstacles, and inadequate recovery of operational costs.*
- Maliki, S. B. et al (2009). *Households poverty and water linkages: Evidence from Algeria.*
- Blue Plan (2011). *Water use efficiency and economic approach: national study, Algeria.*

Context & Methodology

Scenario estimation approach (Kertous et al., 2022)

- *We first estimate the drinking water demand function on a sample of households, using panel data econometrics.*

$$\ln \text{CONS}_{it} = \beta_0 + \beta_1 \ln(P_{it}) + \beta_2 \ln(R_{it}) + \sum \beta_s \ln(Z_{it}) + \sum \beta_f \text{For}_{it}$$

We will then use the results of these estimates to simulate **six scenarios**:

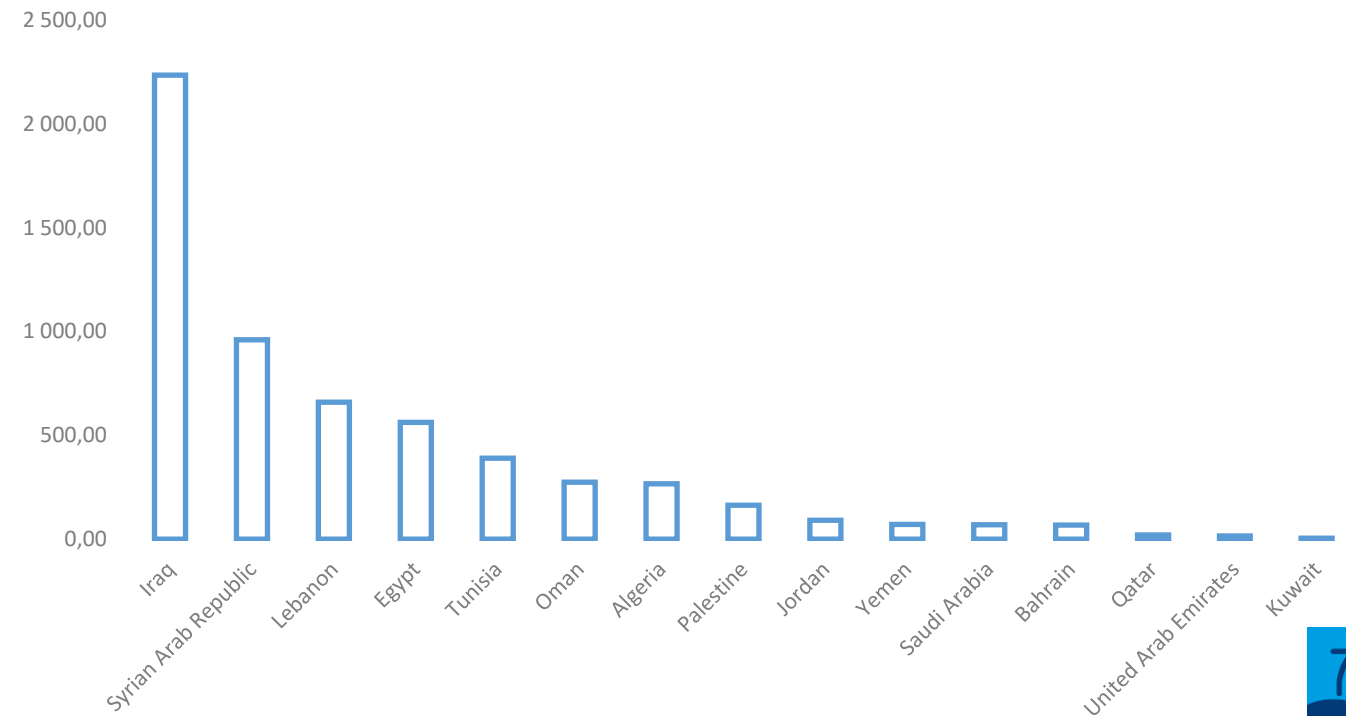
- In the first and the second scenario, we will simulate **an increase** in the average price of **10% and 20%**, and estimate the **welfare** loss engendered by these changes.
- In a third scenario, we will simulate a **variation in the price** of the first and second blocks, which we will index to the cost of production, and we will estimate the welfare loss engendered by these variations.
- Finally, in the last three scenarios, we will measure the impact of a **restrictive policy on the well-being** of local populations.

Context & Methodology

Stylized facts

- Water for population
- In Algeria, desalination currently provides 17% of Algeria's water supply.
- Increasing the contribution of desalination to 50%.
- A cubic meter of water costs between AD60 and AD80 to produce, while the state only charges AD18 to sell to the consumer

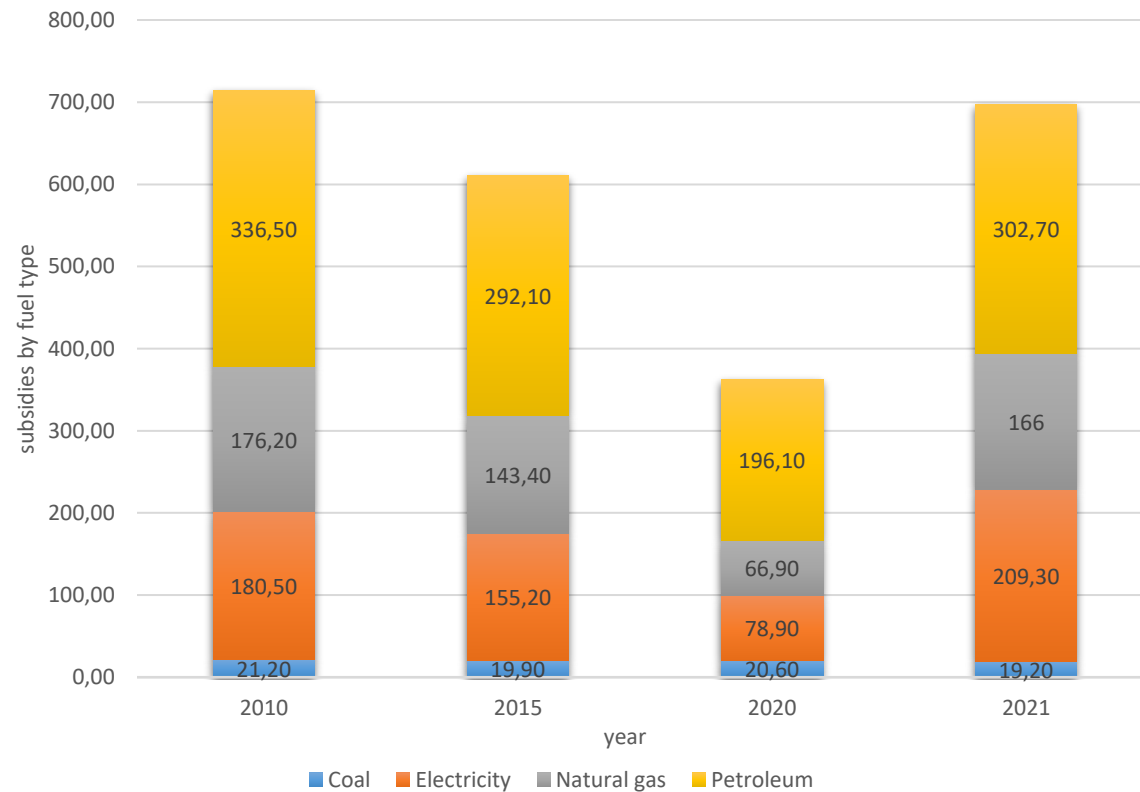
Figure 1: Volume of renewable water per capita in the Middle East and North Africa region in 2020, by country (in cubic meters per inhabitant per year)



Source : FAO (Aquastat), 2023

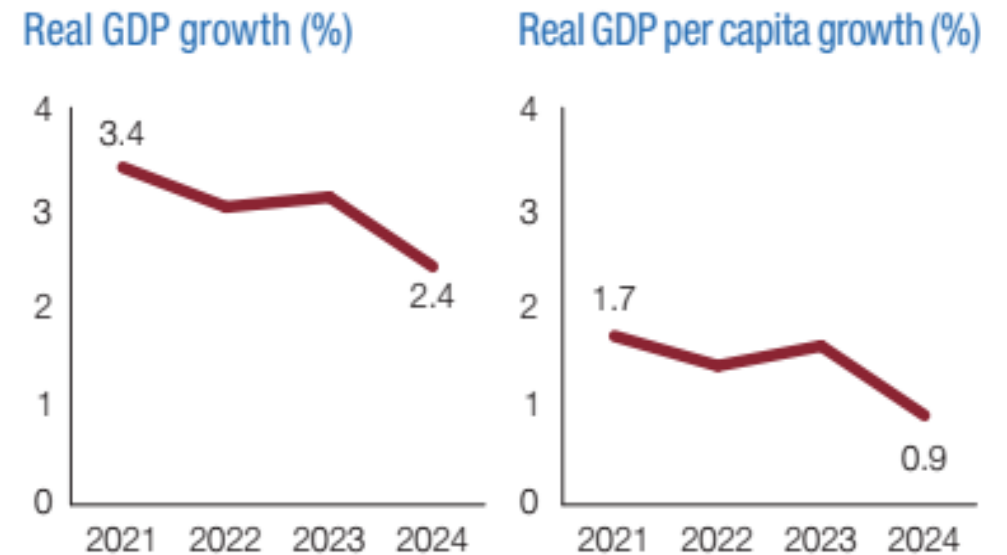
Subsidies, energy and water management in Algeria

Graph 1: Subsidies for fossil fuels worldwide from 2010 to 2021, by fuel type (in billion U.S. dollars)



Source: OECD; IEA, 2023

Figure 2: Real GDP growth (%) and Real GDP per capita growth (%) for Algeria



Source: African Economic Outlook, 2023



Different scenarios for sustainability and subsidies nexus

Advantages of Water Subsidies in Algeria

- **Affordable Water Access:** Algerian water subsidies, which have some of the most accessible prices in the region, ensure that water remains readily accessible to the entire population, particularly those with modest financial resources.
- **Promotion of Agricultural Development:** Government subsidies in the agricultural sector, including for irrigation, provide financial assistance to promote the growth and modernization of agriculture. This is crucial for ensuring the country's food security and promoting rural development.
- **Improving water quality:** Desalination technology can produce high-quality drinking water, which is particularly important in regions where existing water supplies may be contaminated or saline.

Disadvantages of Water Subsidies in Algeria

- **High Cost of Water Management:** Although consumer costs are low, the cost of providing water is considerable. The price of one cubic meter of water in dams is around \$0.50, and additional distribution charges range from \$0.25 to \$0.30. This disparity requires substantial government funding and subsidies, which may stress the national budget.
- **Inefficiency and Lack of Targeted Support:** The extensive subsidy system indiscriminately helps all income brackets, regardless of necessity, potentially increasing inequality and failing to target the most disadvantaged segments of society adequately.
- **Dependency on Government Investment:** The government's investment plays a crucial role in ensuring water resources' long-term sustainability and safety. Due to the reduction in subsidies and the increasing costs, there is a growing requirement for private investment to maintain the water supply.

Different scenarios for sustainability and subsidies nexus

Scenario	Description	Mean	Min	Max PM	Av.
1	Increase average price: 10%	144	27	539	127
2	Increase average price: 20%	284	53	1057	250
3	Increase the second tariff block to 28.45 DA/m ³	52	0	368	738
4	Increase the first and the second tariff blocks to 28.45 DA/m ³	733	40	1785	1349
5	Reduction of water supply time by 1 h	140	23	361	134
6	Reduction of water supply time by 50%	519	71	2244	503

Source: Kertous et al., 2022

The optimal scenario concerns adopting a policy that aligns the second tariff block with production costs, balancing social equity and sustainable water management.

Policy recommendations

- The complex interplay between water subsidies, ecosystem dynamics, and sustainable resource management in Algeria.
- The bilateral relationship between social subsidies and the environment.
- The involvement of the population in bearing part of the costs of water production.
- The water funding strongly correlated with oil prices...would induce ceteris paribus (Water Scarcity)
- Water policy in Algeria is still in the transition phase.
- Adopting a policy that aligns with the second tariff block.
- Encouraging International Partnership (UNEP-Plan Bleu, UNDP.....)
- Share Algerian experience to better understand future water risks and challenges worldwide and in the Mediterranean region in particular

