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Institute for Integrated Management of Material Fluxes and of Resources

TECHNISCHE UNIVERSITÄT DRESDEN

ADVANCING A **NEXUS APPROACH** TO THE SUSTAINABLE MANAGEMENT OF **WATER, SOIL** AND **WASTE**

INTERNATIONAL KICK-OFF WORKSHOP

11-12 NOVEMBER 2013

DRESDEN, GERMANY

ADVANCING A **NEXUS APPROACH**
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OF **WATER, SOIL** AND **WASTE**

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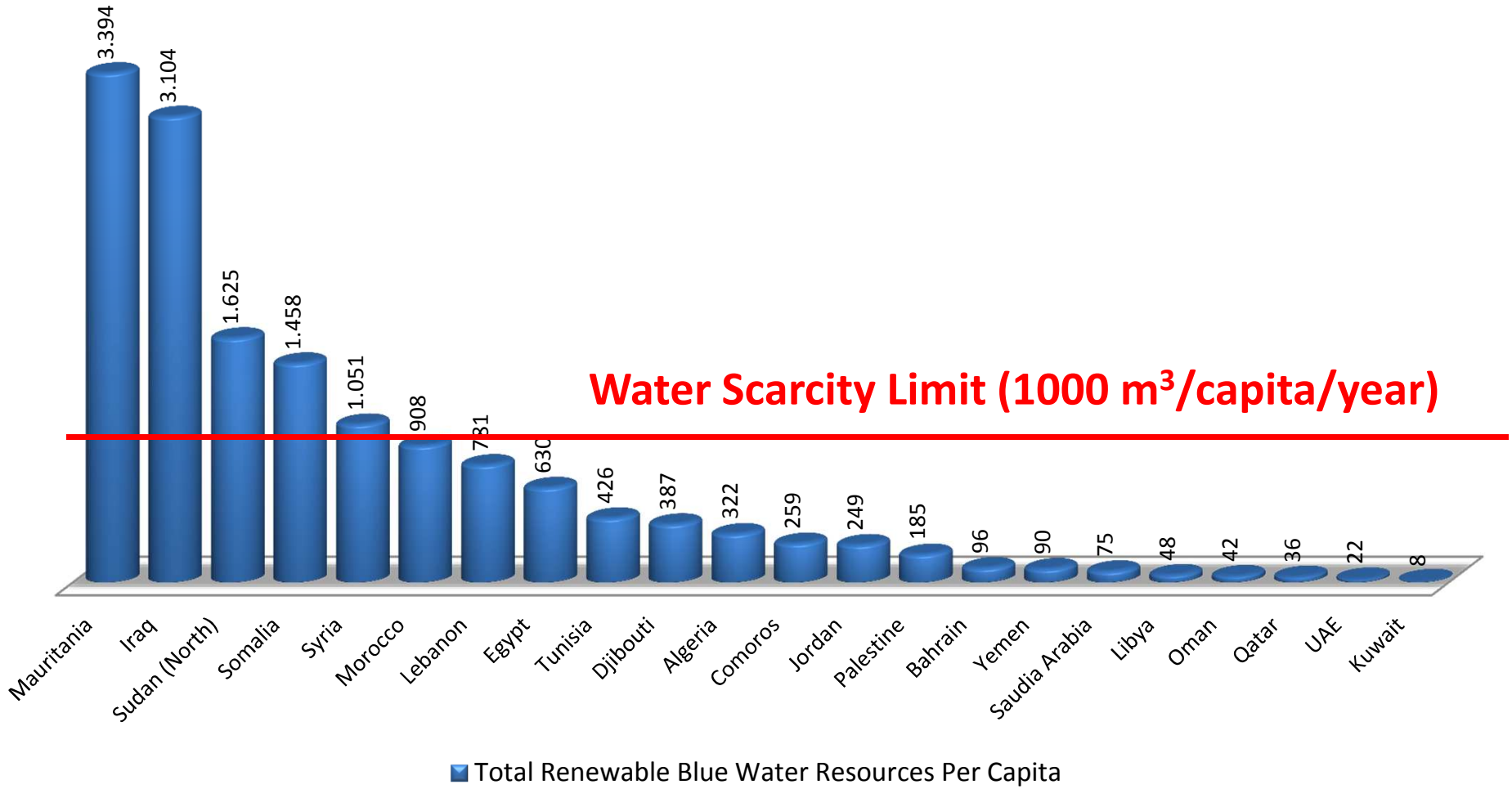
Water-Soil-Waste Nexus Workshop
11-12 November, 2013

Water-Land-Waste Nexus in the Arab Region

Khaled M. AbuZeid, Ph.D, PE, PMP
Regional Program Manager, CEDARE

Total Renewable Blue Water Resources Per Capita (CM/capita)



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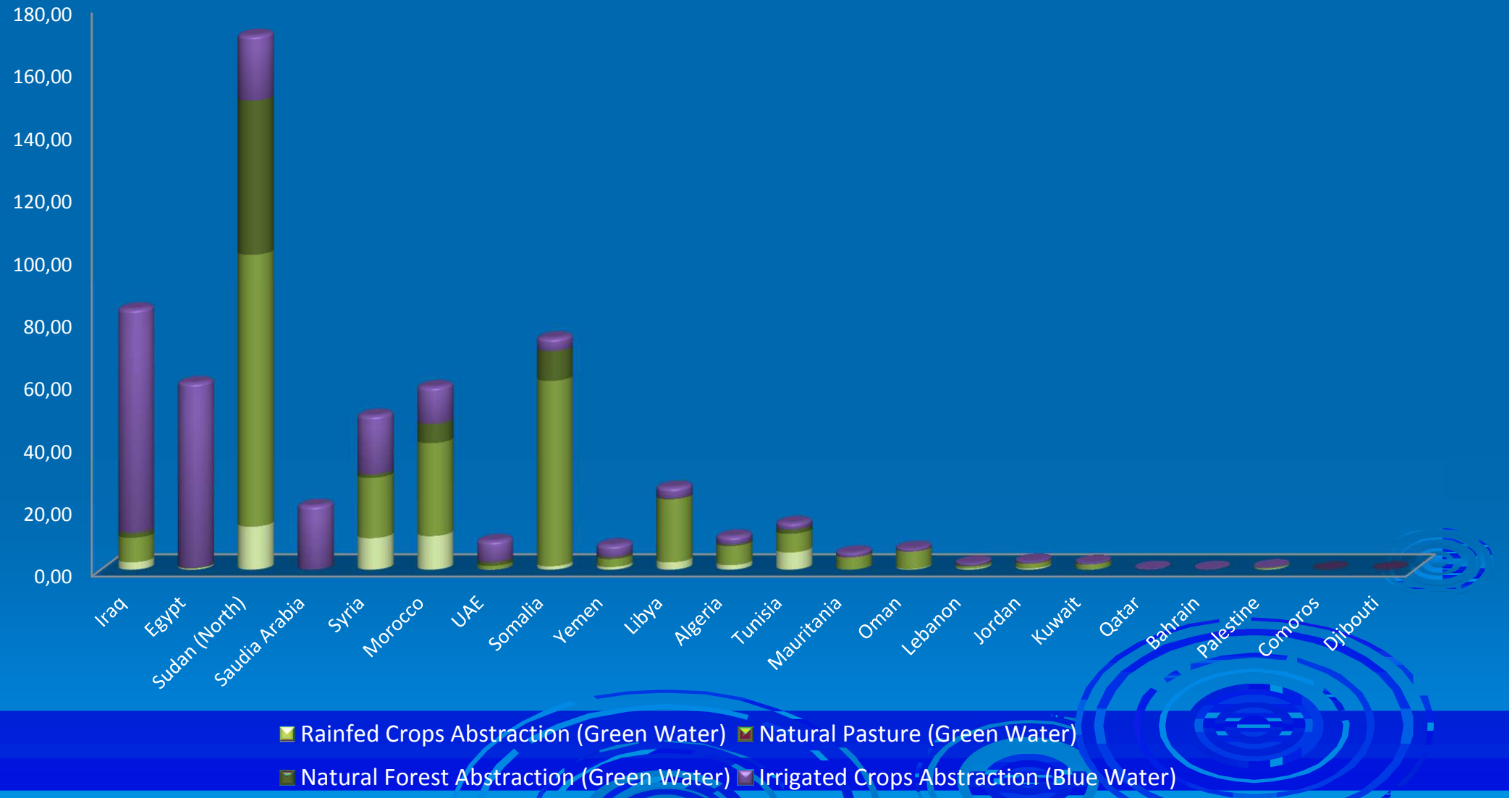
Water Resources Management Programme, CEDARE

Blue & Green Water Use in Arab Region (for Green Cover)



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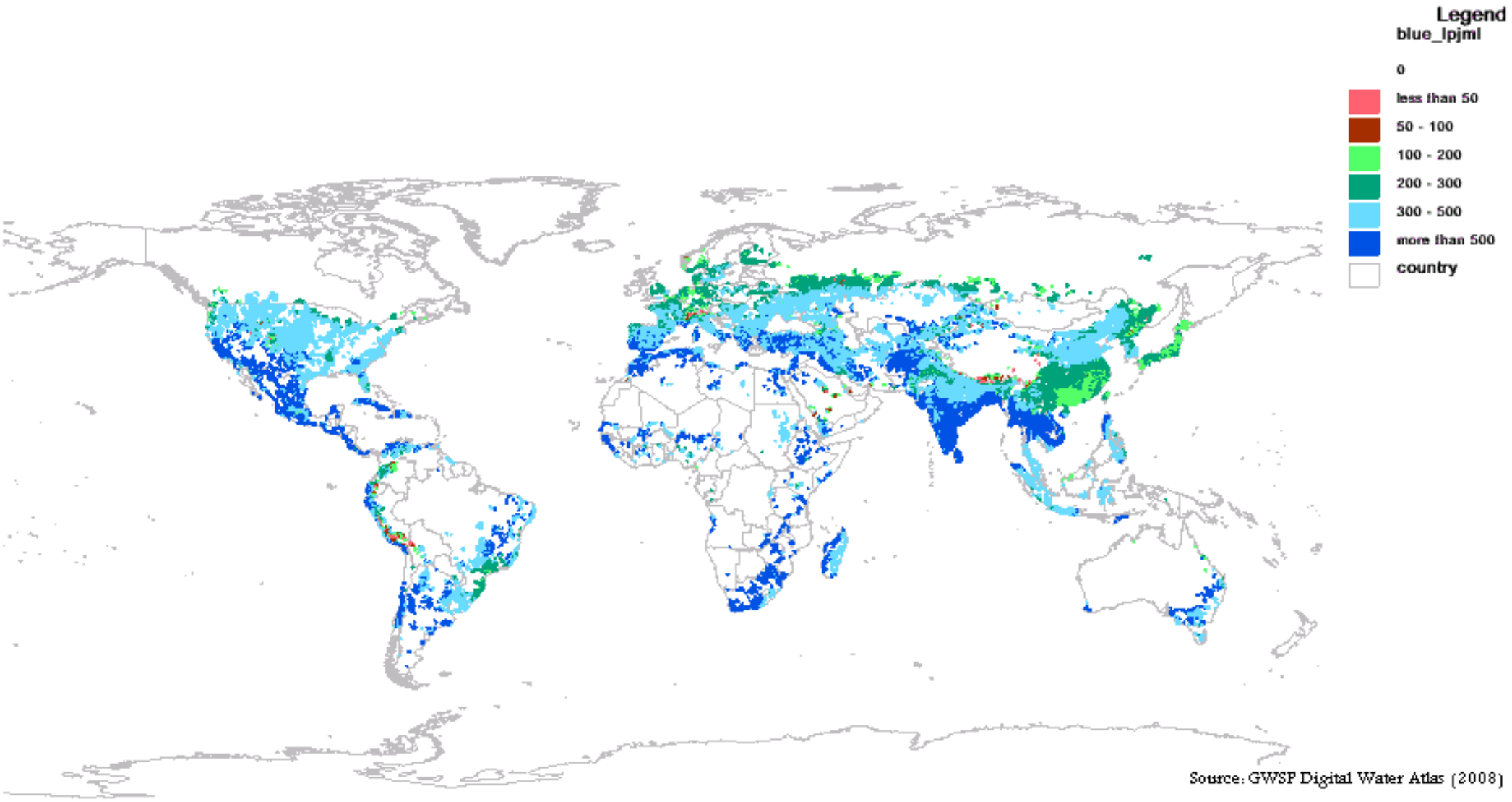
Blue Water for Crop Consumption



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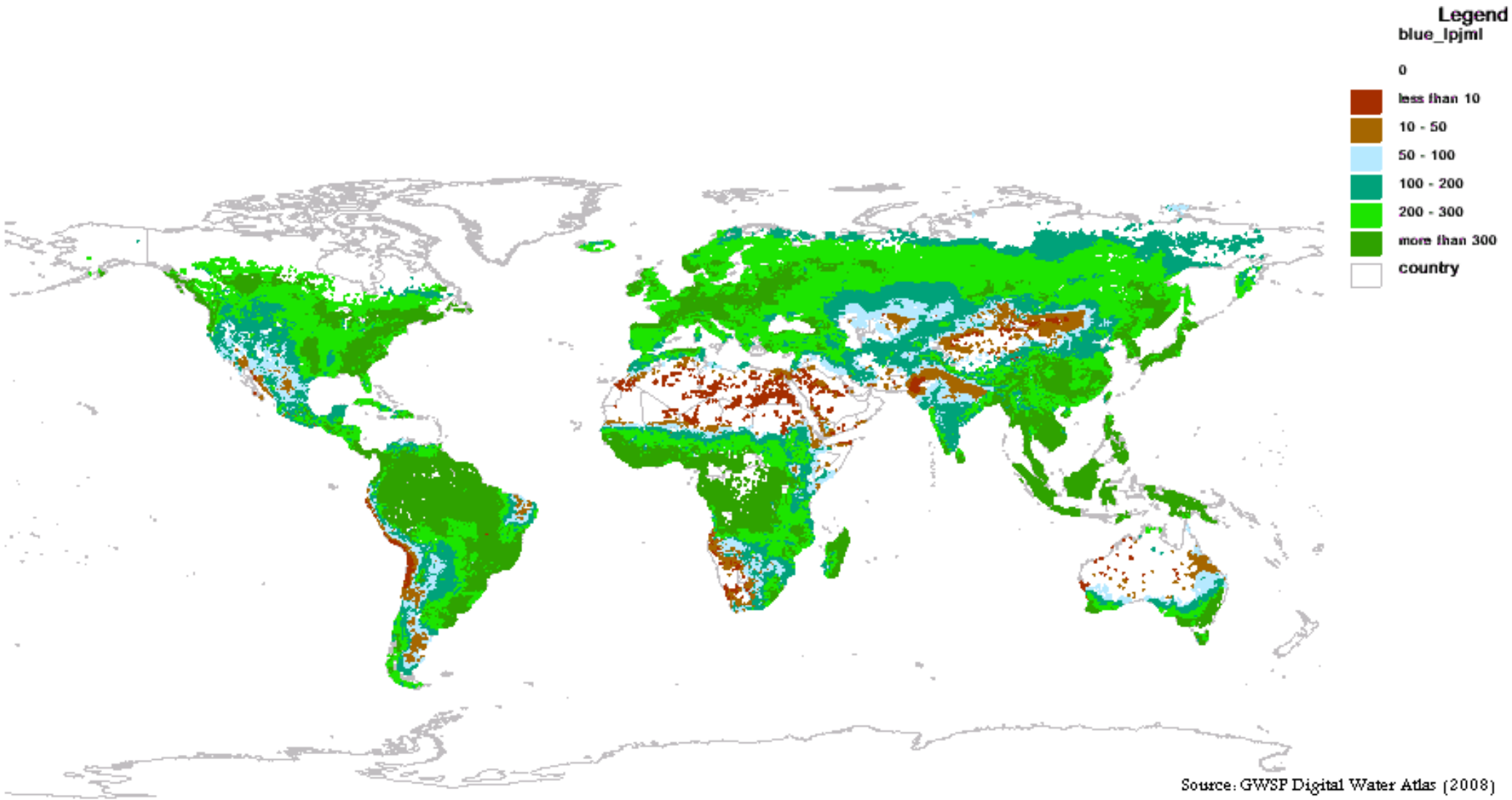
Green Water for Crop Consumption



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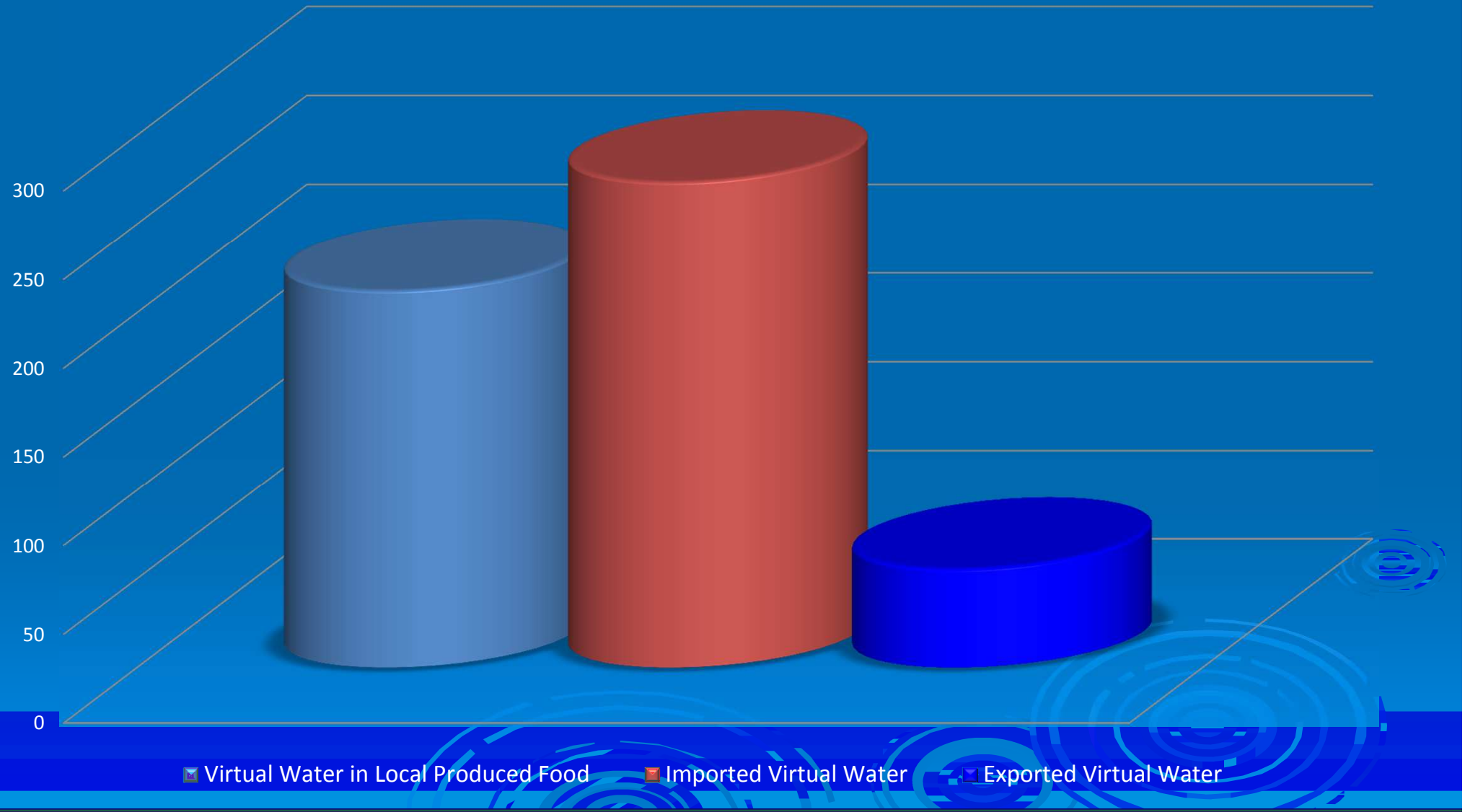
Land Use Change & the Blue-Green Water Transformation

Virtual Water in food in the Arab Region (BCM)



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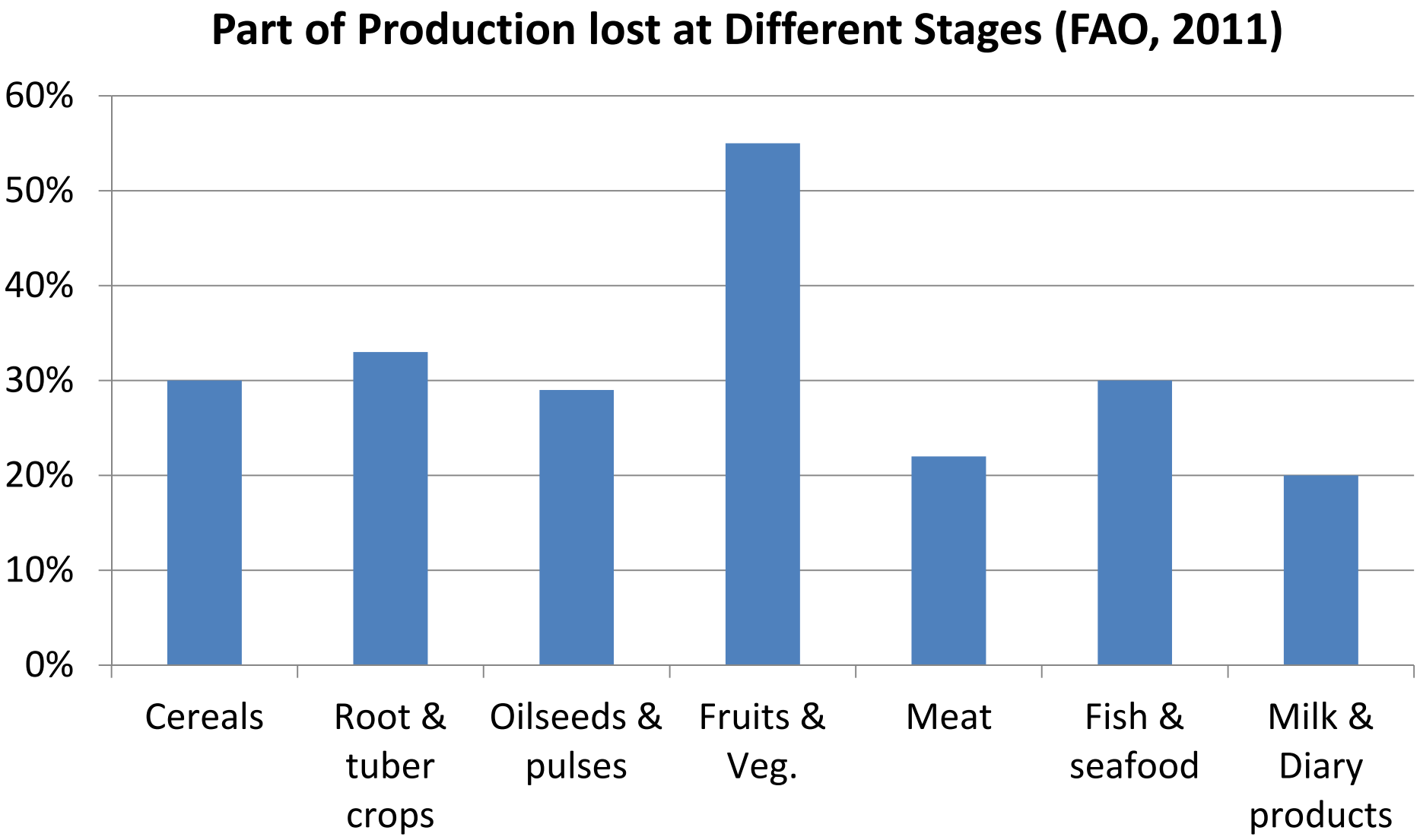
Food Products Wastage % in North Africa, West & Central Asia



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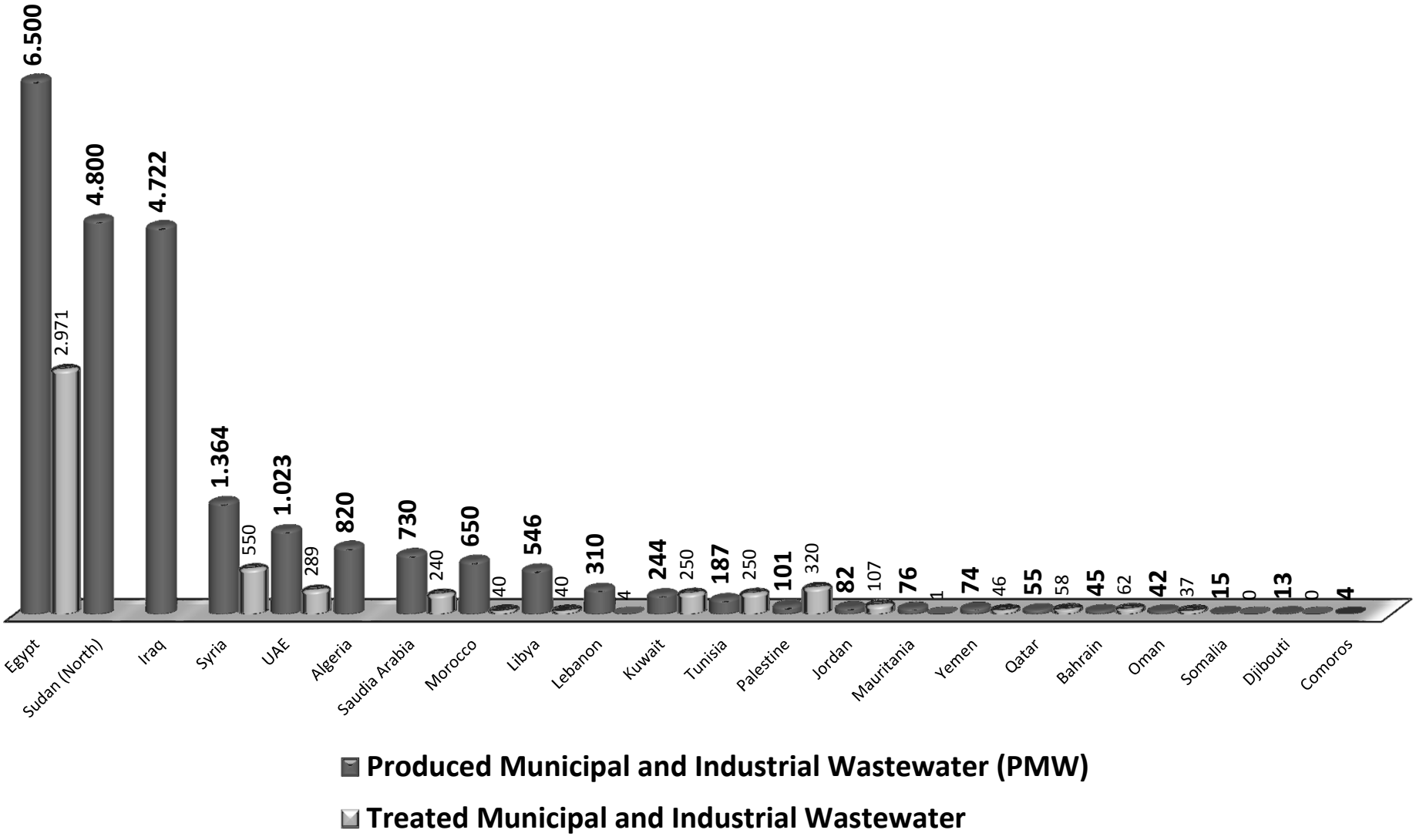
Produced and Treated Wastewater in Arab Region (MCM/Y)



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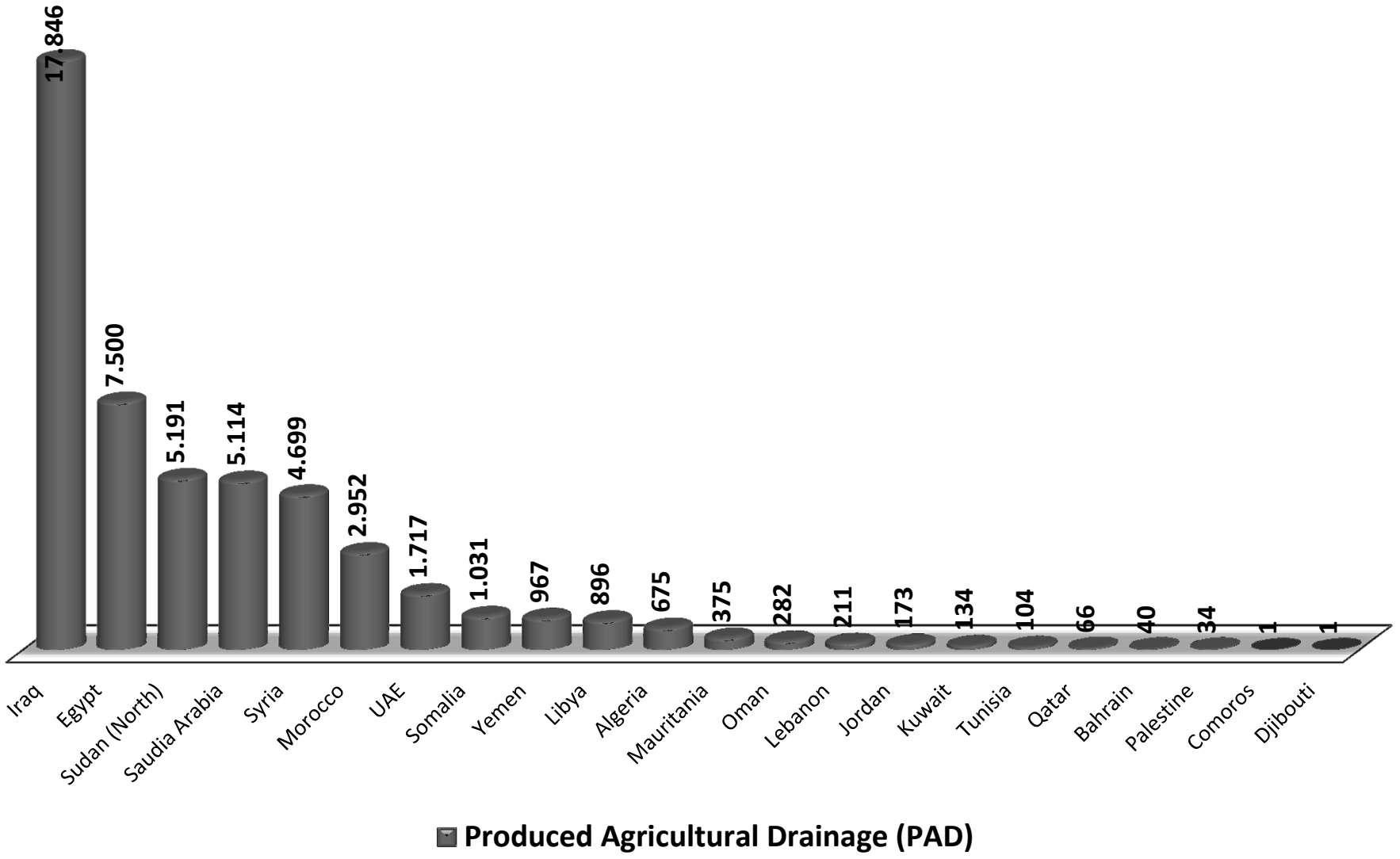
Produced Agricultural Drainage in the Arab Region (MCM/Y)



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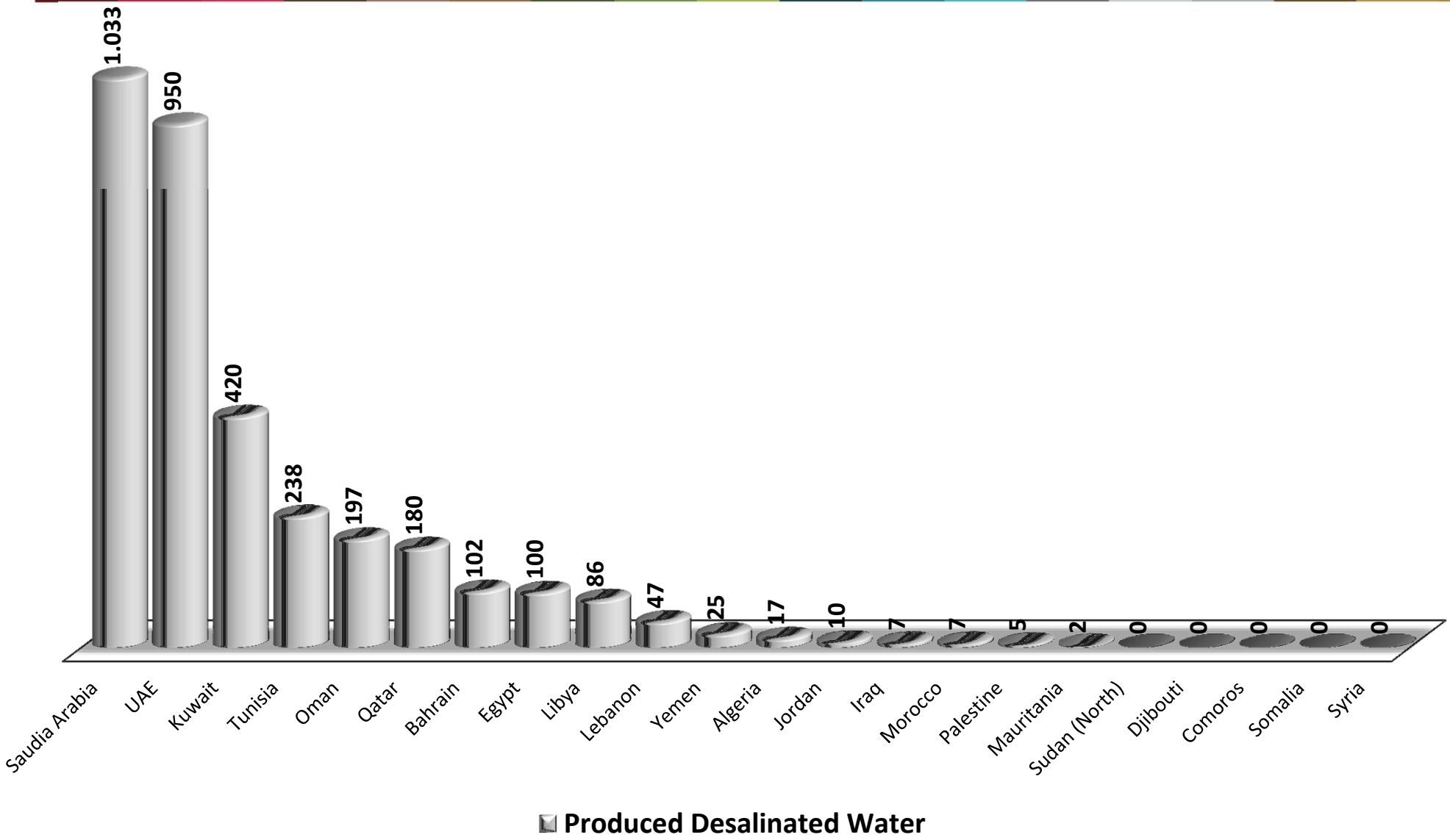
Produced Desalinated Water in Arab Region (MCM/Year)



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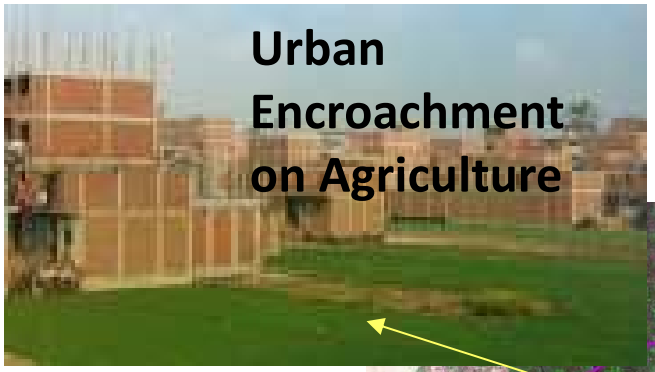
Water-Solid Wastes-Municipal Wastewater-Industrial Wastewater-Land Nexus



Urban Encroachment on Agriculture

Municipal Wastewater

Industrial Wastewater

Solid Wastes in Waterways

Wastewater Injection in Groundwater

Extensive Irrigation Infrastructure

Desert Water Scarce Areas

Fertile Nile Delta Agriculture Land

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Egypt 2030 Wastewater Reuse Strategic Vision: Facing the Water-Wastewater Nexus

Khaled M. AbuZeid, Ph.D, PE, PMP
Regional Program Manager, CEDARE

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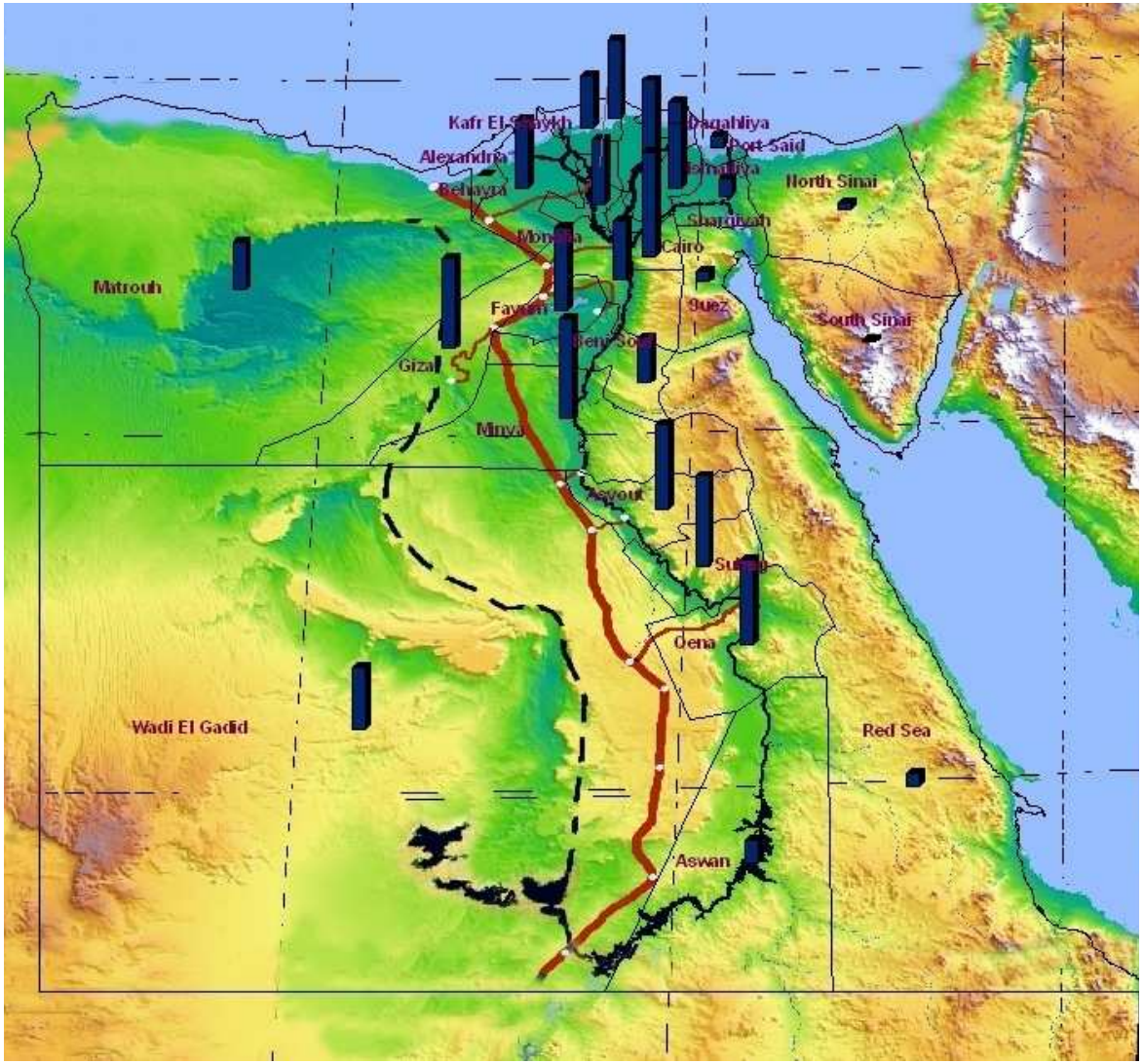
2030 Water Demand Scenario



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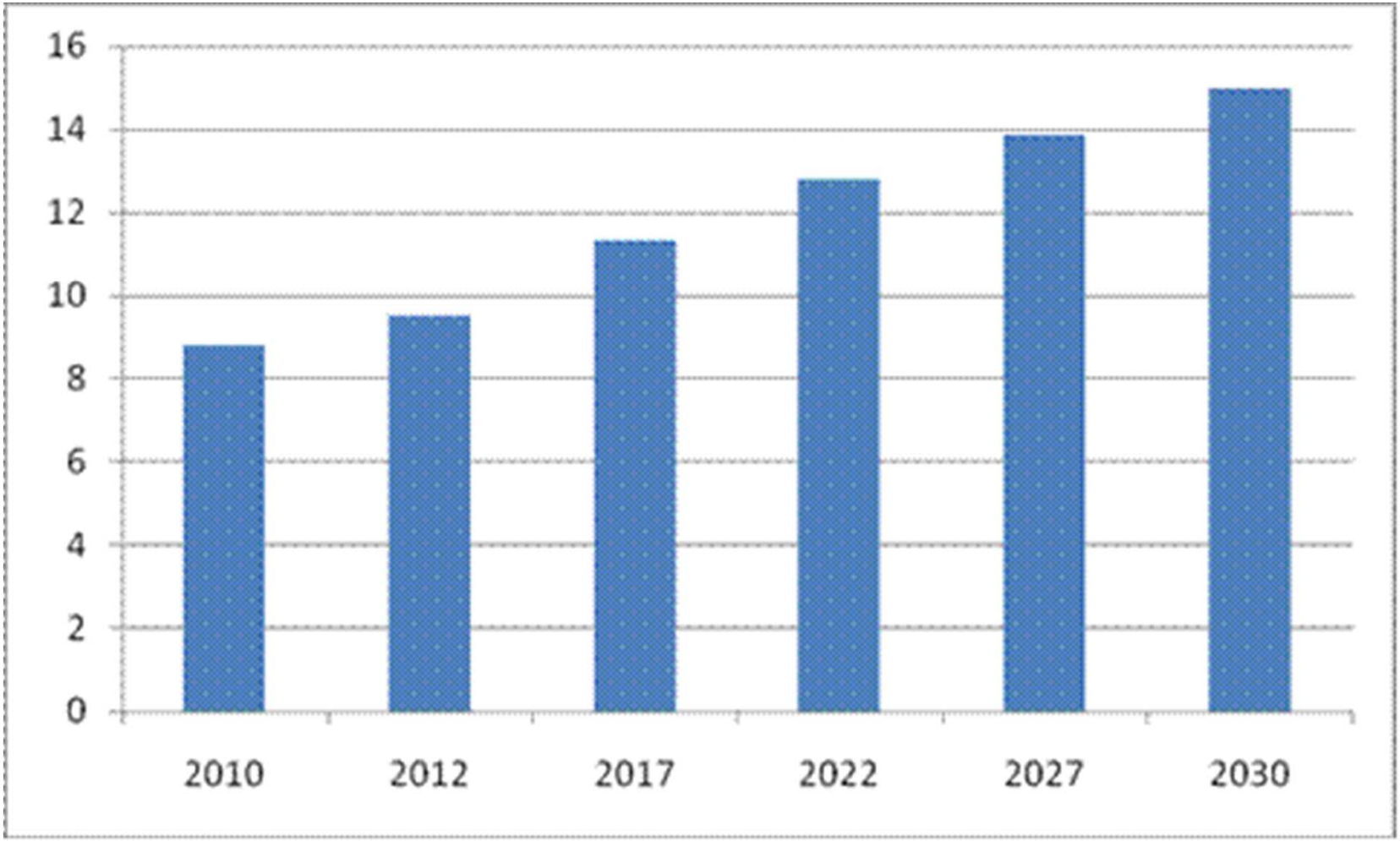
2030 Projected Water Supply Capacity (BCM)



(modified from HCWW, 2011)

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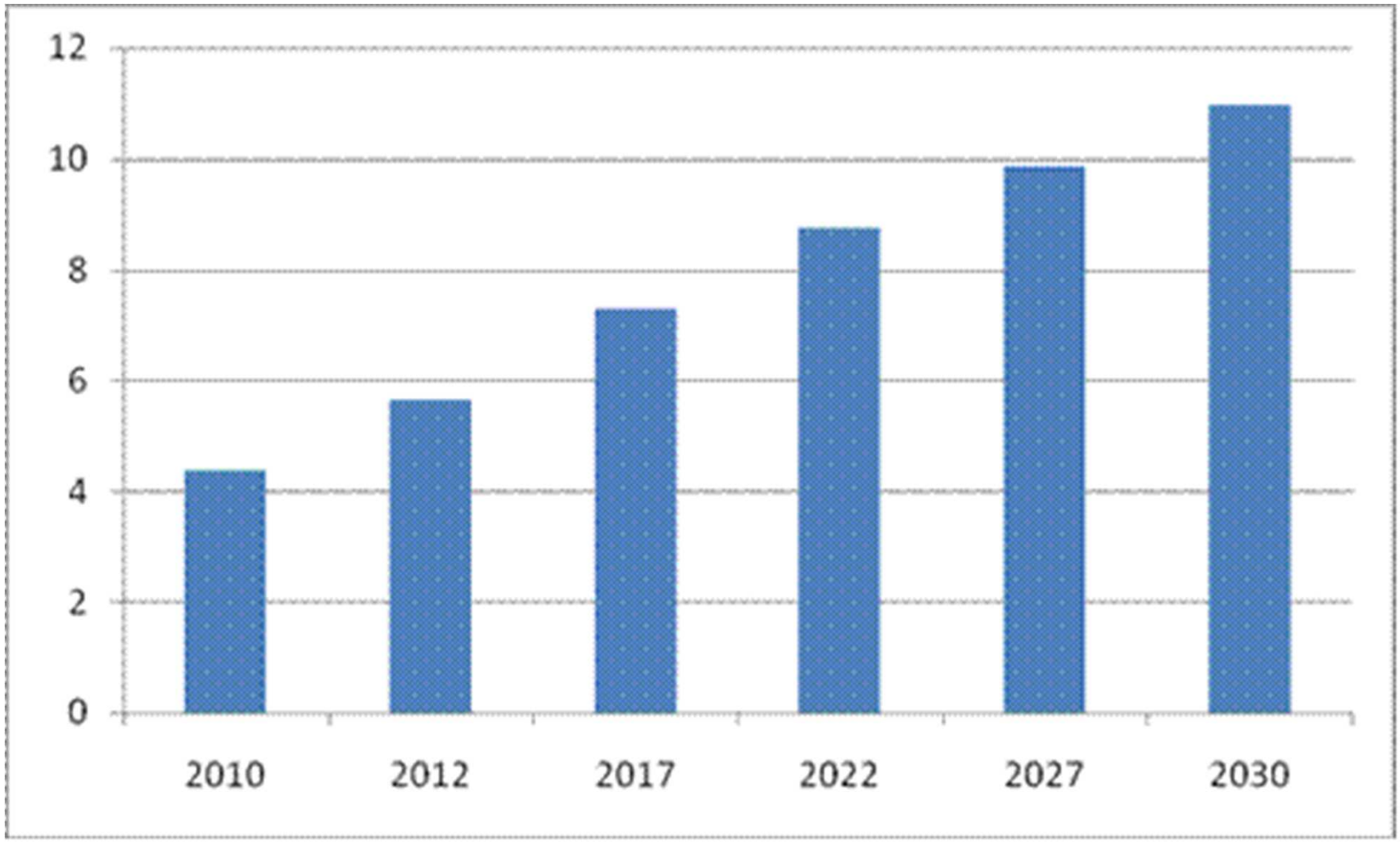
2030 Projected Wastewater collection Capacity (BCM)



(modified from HCWW, 2011)

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Obstacles and Institutional Constraints

- The financial resources required to increase the national coverage of wastewater collection, and to upgrade the level of treatment.
- The proximity of potential arable land to wastewater treatment facilities
- The environmental and health concerns and perception of wastewater reuse for agriculture.
- The Egyptian wastewater re-use code that prohibits using secondary and tertiary treated wastewater for edible crops.
- The Irrigation & Drainage Egyptian law that prohibits conveyance of treated wastewater through irrigation canals.
- The Environmental & health regulations & laws.

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Obstacles and Institutional Constraints (2)

- The generation of new water demands by the wastewater companies due to directing wastewater to Wood and Bio-fuel tree plantations.
- The anticipated competition over treated wastewater by the Water Resources Planning sector, the Agriculture sector, and the Water and Wastewater sector.
- The risk of not being able to market the agriculture products for export to neighboring regional & international markets
- The Health & Environmental hazards associated with improper handling of the different levels of treated wastewater by users.

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PROPOSED STRATEGIC VISION FOR WASTEWATER REUSE IN EGYPT TILL 2030

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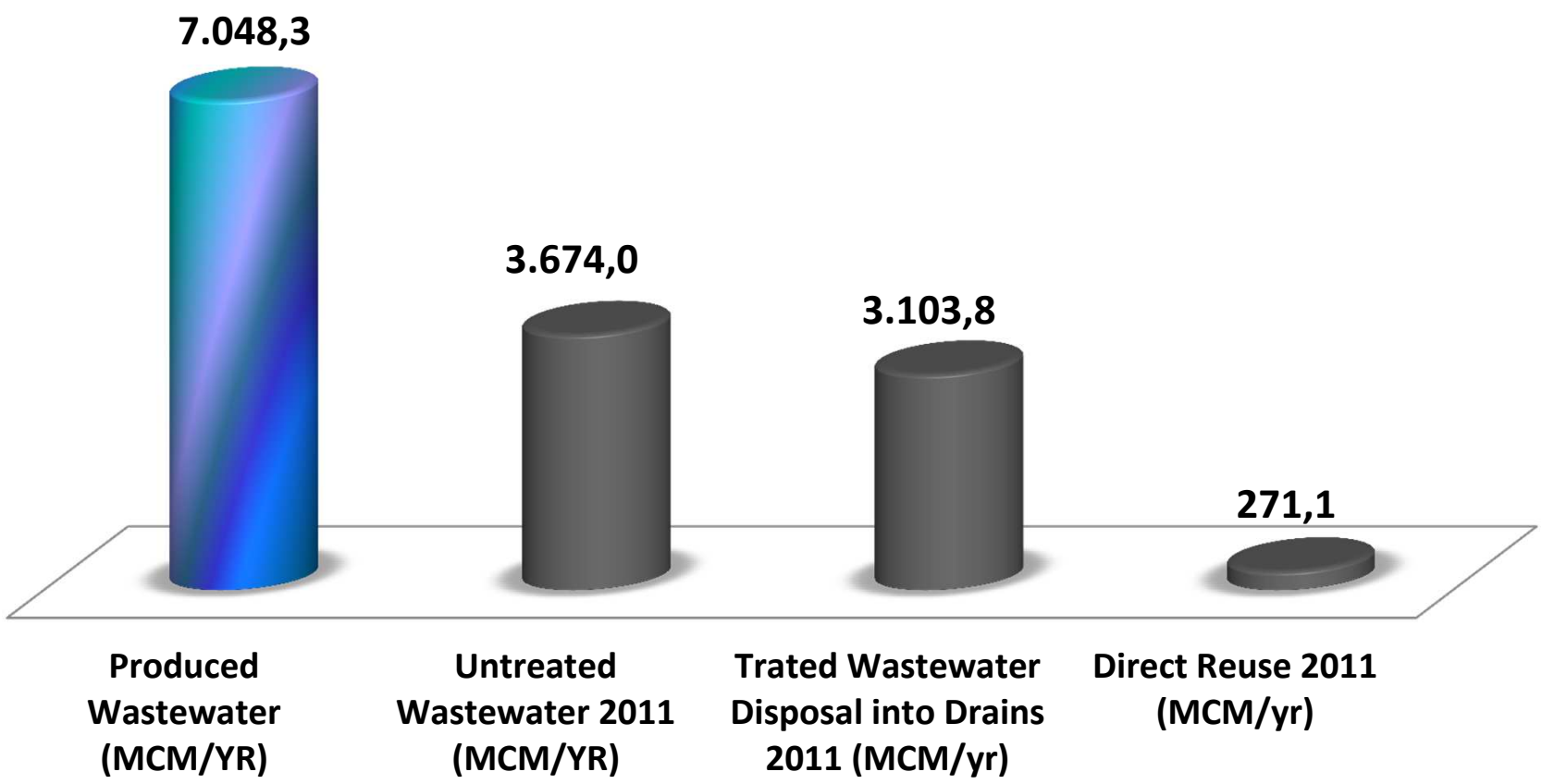
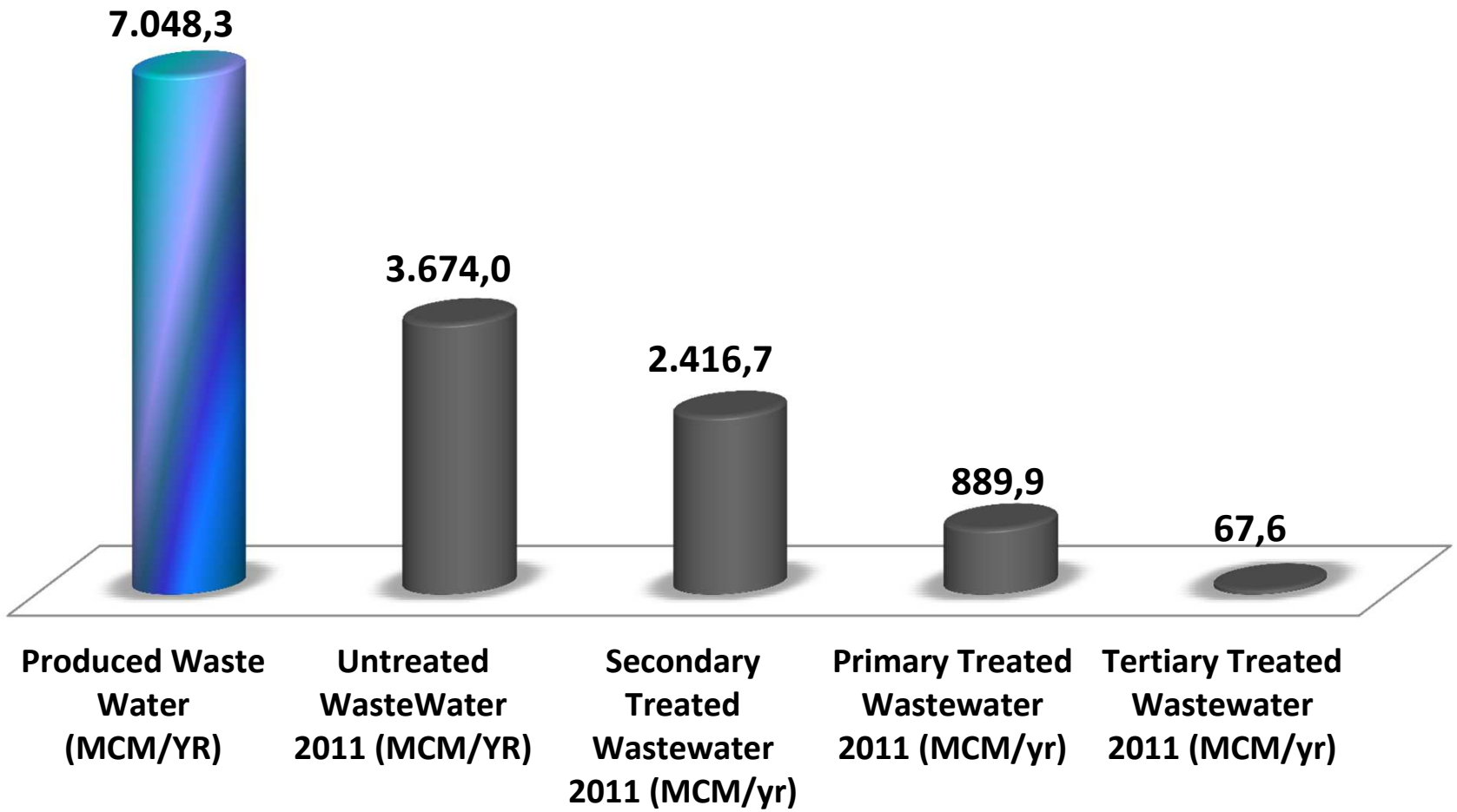
National Wastewater and Reuse Status 2011




7.048,3
3.674,0
2.416,7
889,9
67,6
Produced Waste Water (MCM/YR)
Untreated WasteWater 2011 (MCM/YR)
Secondary Treated Wastewater 2011 (MCM/yr)
Primary Treated Wastewater 2011 (MCM/yr)
Tertiary Treated Wastewater 2011 (MCM/yr)

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Proposed 2030 Strategic Directions

- Delta and Nile Valley Governorates Plants to Dispose secondary treated Wastewater into Agriculture drains, and reuse downstream through Ag. Drainage Mixing Pumping Stations
- Desert front & Agriculture Expansion Governorates to direct future treated wastewater directly to agriculture expansion areas
- Upgrade all treatment levels to secondary treatment level by 2030
- Maintain existing tertiary treatment levels of 2011 without expansion at this stage

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Proposed 2030 Strategic Directions

- Maintain existing Wood Trees areas of 2011 without further expansion and direct future treated wastewater to Agriculture Expansion areas
- Modify Wastewater Reuse Code to allow for expansion in permissible agriculture crops cultivation on treated Wastewater according to international standards (e.g. new WHO guidelines)
- Develop governorate specific plans by matching Agriculture expansion plans with urban development plans, WSS plans, and Water Resources Management plans.
- Embrace an out-of-Valley scenario for Urban Expansion to protect Agriculture Land
- End users of treated wastewater to finance, sewage infrastructure, treatment and distribution of treated wastewater

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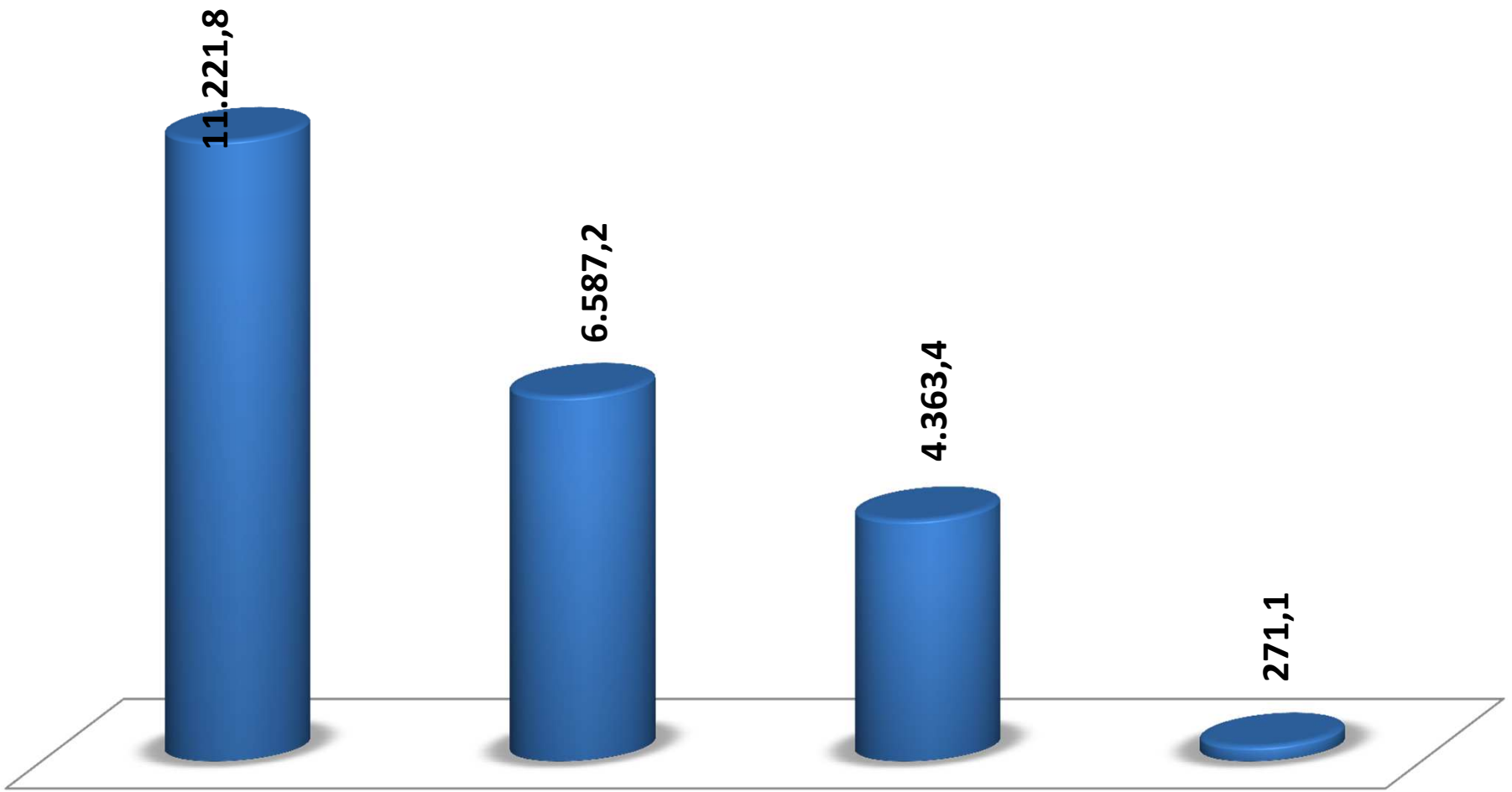
Wastewater Direct Reuse 2030 Strategic Vision



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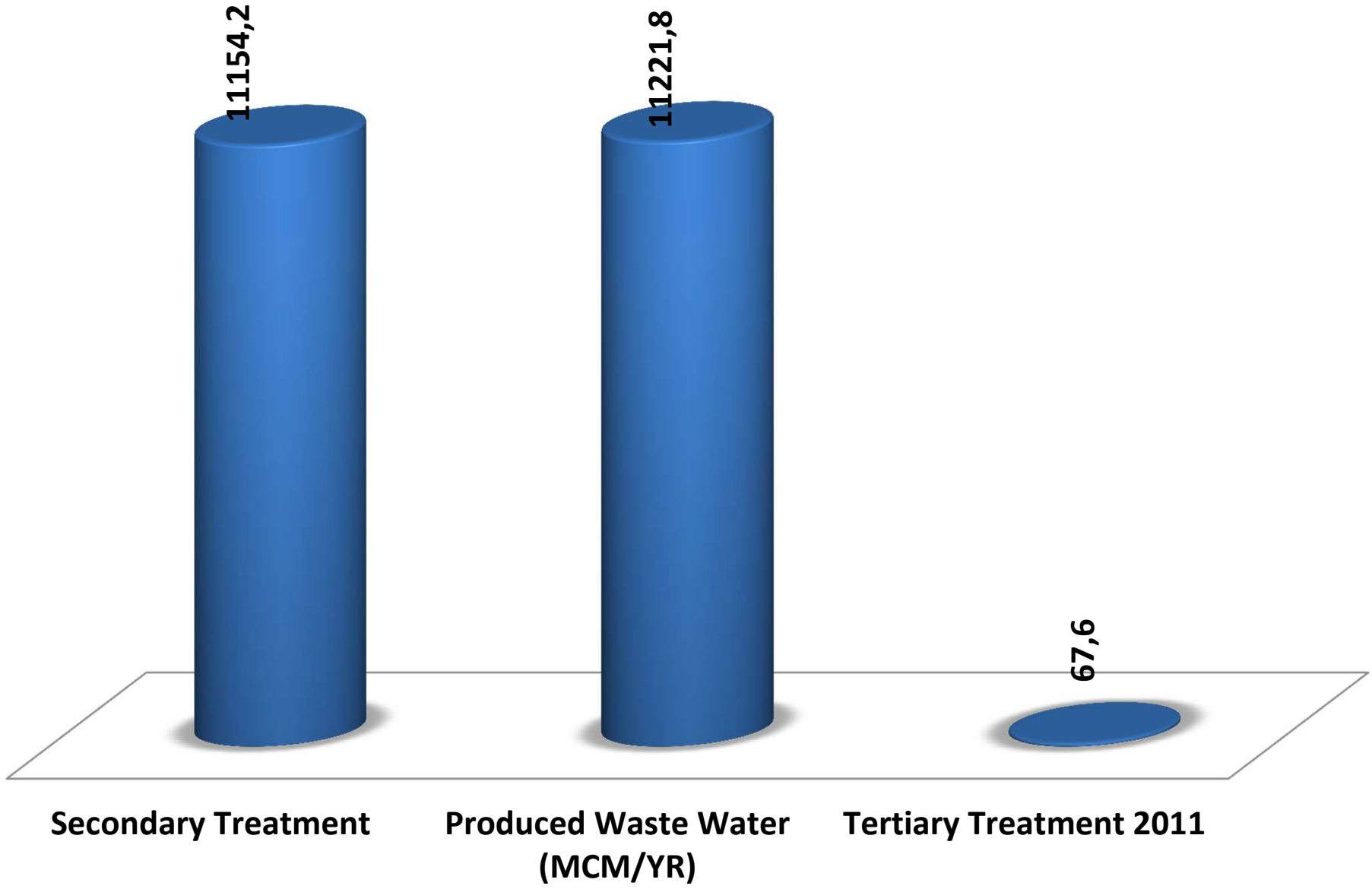
Wastewater Treatment Level 2030 Strategic Vision (MCM/Year)



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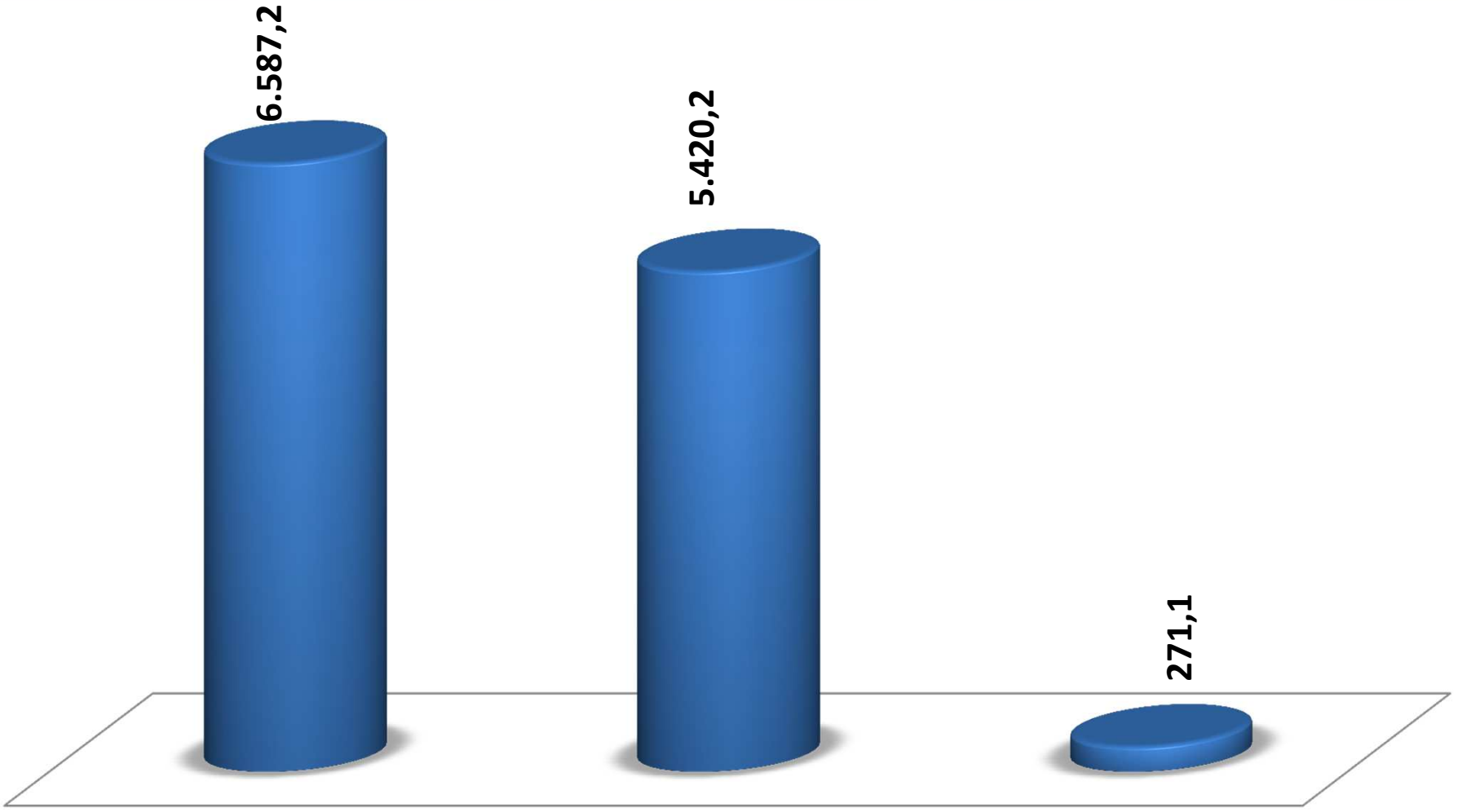
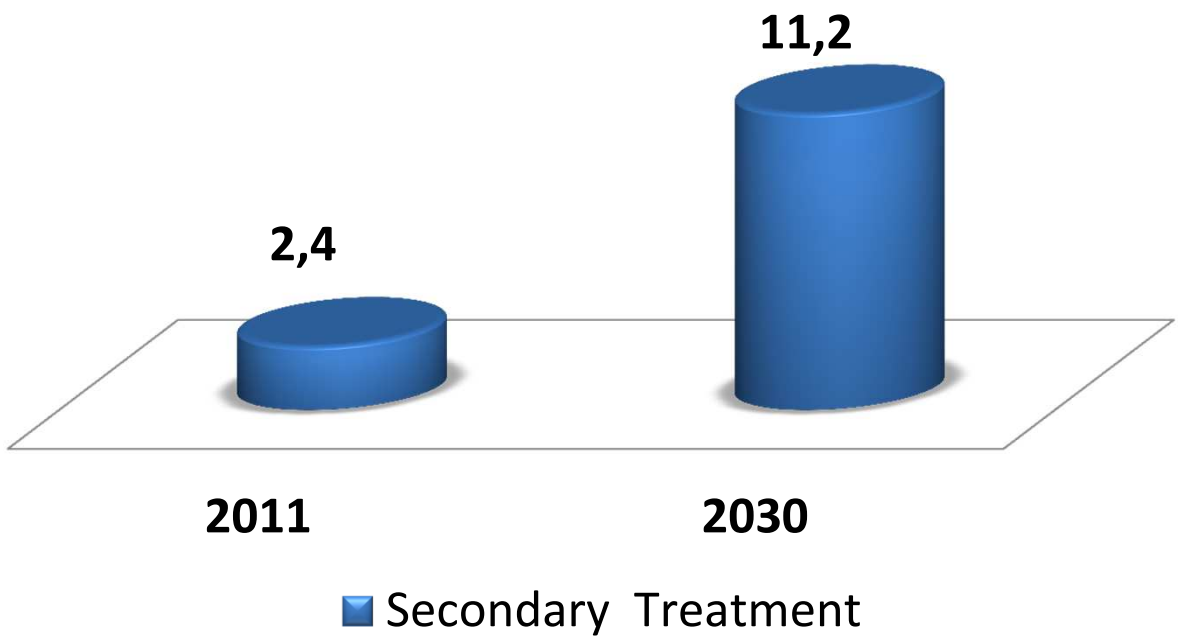
Water Demand for Existing Agriculture Expansion Plans & Reuse in 2030



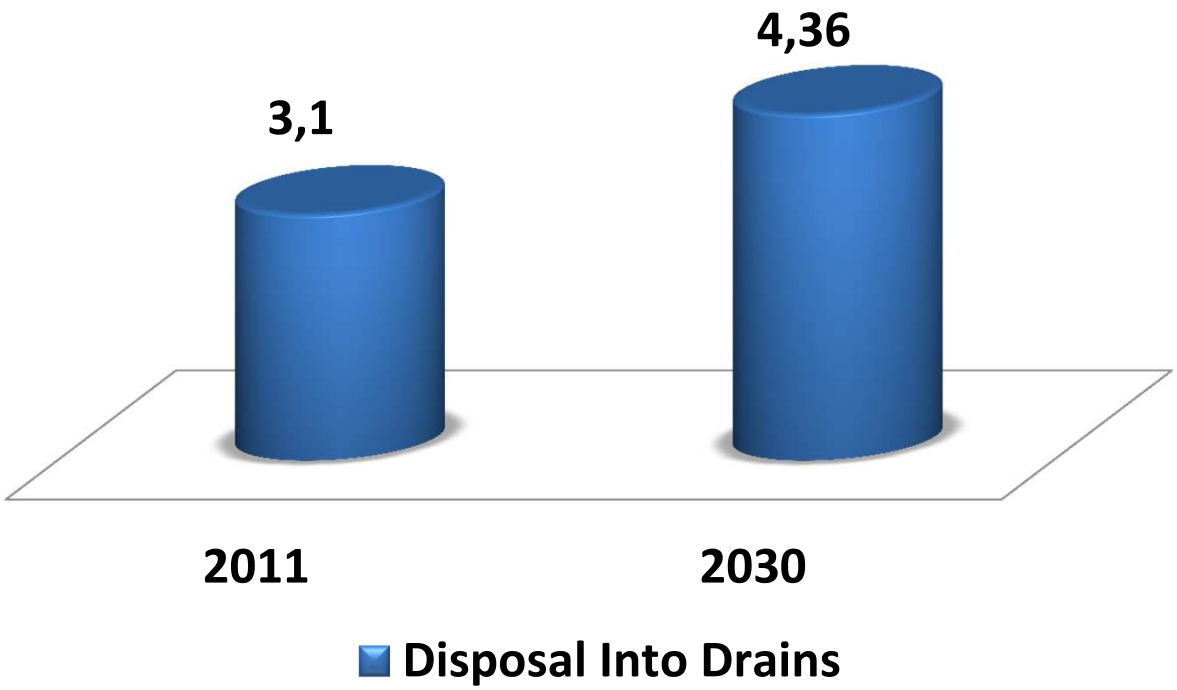
Required Investment between 2012-2030 (almost 30 Billion $, about 1.5 billion $/year)

Total Required Investment
8.8 BCM *20LE=176 Billion LE



Agriculture Drainage
Mixing Pump Expansion Requirement

Increase in Reuse Pump Capacity
4.36 BCM-3.1 BCM=1.26 BCM



Thank you for your attention

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