**AF80 - Triffa**

### Geography
- Total area TBA (km²): 9 100
- No. countries sharing: 2
- Countries sharing: Morocco, Algeria
- Population: 770 000
- Climate Zone: Mediterranean
- Rainfall (mm/yr): 280

### Hydrogeology
- Aquifer type: Single layered
- Degree of confinement: Unconfined
- Main Lithology: Sediment – gravel

Map and cross-section are only provided for illustrative purposes. Dimensions are only approximate.
### TWAP Groundwater Indicators from Global Inventory

<table>
<thead>
<tr>
<th>Recharge (mm/yr) (1)</th>
<th>Renewable groundwater per capita (m³/yr/capita)</th>
<th>Natural background groundwater quality (%) (2)</th>
<th>Human dependency on groundwater (%)</th>
<th>Groundwater depletion (mm/yr) (3)</th>
<th>Groundwater pollution (%) (3)</th>
<th>Population density (Persons/km²)</th>
<th>Groundwater development stress (%) (4)</th>
<th>Transboundary legal framework (Scores) (5)</th>
<th>Transboundary institutional framework (Scores) (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X A value was provided in the questionnaire, but it was considered un-realistic and therefore removed from the table.</td>
<td></td>
</tr>
<tr>
<td>Morocco</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X A value was provided in the questionnaire, but it was considered un-realistic and therefore removed from the table.</td>
<td></td>
</tr>
<tr>
<td><strong>TBA level</strong></td>
<td>4</td>
<td>40</td>
<td>150</td>
<td>84</td>
<td>360</td>
<td>150</td>
<td>D</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

1. Recharge: This is the long term average recharge (in m³/yr) divided by the surface area (m²) of the complete country segment of the aquifer (i.e. not only the recharge area).
2. Natural background groundwater quality: Estimate of percentage of surface area of aquifer where the natural groundwater quality satisfies local drinking water standards.
3. Groundwater pollution: A. No pollution has been identified; B. Some pollution has been identified; Positive number: Significant pollution has been identified (% of surface area of aquifer).
5. Legal framework: A. Agreement with full scope for TBA management signed by all parties; B. Agreement with limited scope for TBA management signed by all parties; C. Agreement under preparation or available as an unsigned draft; D. No agreement exists, nor under preparation; E. Legal Framework differs between Aquifer States (see data at National level).
6. Institutional Framework: A. Dedicated transboundary institution fully operational; B. Dedicated transboundary institution in place, but not fully operational; C. National/Domestic institution fully operational; D. National/Domestic institution in place, but not fully operational; E. No institution exists for TBA management; F. Institutional Framework differs between Aquifer States (see data at National level).

### Key parameters table from Global Inventory

<table>
<thead>
<tr>
<th>Distance from ground surface to groundwater table (m)</th>
<th>Depth to top of aquifer formation (m)</th>
<th>Full vertical thickness of the aquifer (system)* (m)</th>
<th>Degree of confinement</th>
<th>Predominant aquifer lithology</th>
<th>Predominant type of porosity (or voids)</th>
<th>Secondary Porosity</th>
<th>Transmissivity (m/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td></td>
<td></td>
<td></td>
<td>Whole aquifer unconfined</td>
<td>Sediment - Gravel</td>
<td>Very high primary porosity gravels/pebbles</td>
<td>860</td>
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<tr>
<td>Morocco</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Weathering</td>
<td></td>
</tr>
<tr>
<td><strong>TBA level</strong></td>
<td>23</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* Including aquitards/aquicludes

### Aquifer description

**Aquifer geometry**

This is a single-layered system and the entire aquifer is unconfined. The average depth to the water table is 23 m. While data is not available on the average depth to the top of the aquifer, the average vertical thickness of the aquifer system is recorded to be 75m within Algeria.
AF80 - Triffa

Hydrogeological aspects
The predominant aquifer lithology consists of sediment – gravel that has a very high primary porosity with secondary porosity: weathering. It is also characterised by a high horizontal and vertical connectivity. The average transmissivity value is 860 m²/d. The average recharge volume into the aquifer, that is 100% due to natural conditions, is 31.54 Mm³/yr.

Linkages with other water systems
The predominant source of recharge within Algeria is through precipitation over the aquifer area while the main discharge mechanism is through spring discharge.

Environmental aspects
With regard to the natural groundwater quality, it is unsuitable for human consumption within parts of the superficial layers due to elevated levels of natural salinity and nitrates, but the data is not available to determine the percentage of the aquifer area that has been affected. A significant amount of anthropogenic groundwater pollution over a significant part of the aquifer has been observed but the data is not available to determine the percentage of the aquifer area that has been affected. It is mainly due to agricultural practices that have led to salinisation and high nitrate contents. No data is available on the percentage of the aquifer area that has shallow groundwater and the coverage of groundwater dependent ecosystems.

Socio-economic aspects
Within Algeria the mean annual abstraction from the aquifer was 114 Mm³/yr and this is based on data from database and/or dedicated studies. Data is not available on the total amount of fresh water abstraction over the aquifer area.

Legal and Institutional aspects
Currently no Transboundary Agreement is in place nor is it under preparation. Furthermore according to the information that was provided no institution exists for TBA management.

Priority Issues
Groundwater pollution seems to be extensive over parts of the aquifer and this should be further investigated. Assistance should be given towards Transboundary cooperation by assisting with the development of a TBA Agreement between the TBA countries and with Institutional support.

Contributors to Global Inventory

<table>
<thead>
<tr>
<th>Name</th>
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<th>Role</th>
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<td>Regional coordinator</td>
</tr>
</tbody>
</table>

Considerations and recommendations
Most data in the tables and text above have been provided by national and regional experts (listed above) or have been derived from the global WaterGAP model. See colophon for more information, including references to data from other sources.

For this transboundary aquifer no data are available at the level of country segments. All data were provided at the level of the complete aquifer only.

Data gaps and also differences between data from national experts (Global Inventory) and data derived from WaterGAP highlight the need for further research on transboundary aquifers.
Colophon

This Transboundary Aquifers information sheet has been produced as part of the Groundwater Component of the GEF Transboundary Water Assessment Programme (GEF TWAP). GEF TWAP is the first truly global comparative assessment of transboundary groundwater, lakes, rivers, large marine ecosystems and the open ocean. More information on TWAP can be found on: www.geftwap.org. The Groundwater component of TWAP carried out a global comparison of 199 transboundary aquifers and the groundwater systems of 41 Small Island Developing States. The data used to compile this transboundary aquifer information sheet has been made available by national and regional experts from countries involved in the TWAP Groundwater project. For aquifers larger than 20,000 km² and which are not overlapping, additional data are available from modelling done by the Goethe University Frankfurt (Germany) as part of TWAP Groundwater. All data were compiled by UNESCO-IHP and the International Groundwater Resources Assessment Centre (IGRAC – UNESCO Category II Institute). Values given in the fact-sheet represent an approximate guide only and should not replace data obtained from recent local assessments. The editors of this information sheet are not responsible for the quality of the data.

For more information on TWAP Groundwater and for more data, please have a look at the TWAP Groundwater Information Management System which is accessible via www.twap.isarm.org or www.un-igrac.org.

Request:
If you have additional data or information about this transboundary aquifer that can improve the quality of this information sheet and the underlying database, please contact us via email at info@un-igrac.org. If appropriate, the information will be uploaded to the database of transboundary aquifers and will also be used in new versions of this information sheet.

References:
- Climate: Climate indicates the major climate zone which occurs in the aquifer area. If more than 1 climate zone is present the zone with the largest surface area was selected. Source climate data: ArcGIS Online (2015), Simplified World Climate zones. Owner: Mapping Our World GIS Education. Original map: National Geographic World Atlas for Young Explorers (1998).
- All other data: TWAP Groundwater (2015).

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