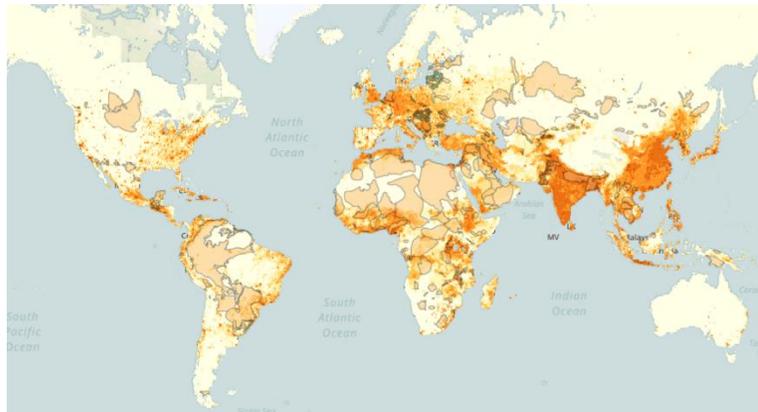


Population and areal statistics for 199 Transboundary Aquifers

At present 366 Transboundary Aquifers (TBAs) and 226 Transboundary Groundwater Bodies - as defined in the European Union Water Framework Directive - have been delineated (IGRAC and UNESCO-IHP, 2015). Progress in research and efforts towards joint management of Transboundary aquifers are steadily increasing, although there are still few TBAs which have been studied in detail or which are covered by some form of international agreement.

With increasing pressure on water resources in general, the often little or even unexploited resources of TBAs will become more important to basic human needs and socio-economic developments. Nijsten et al. (2018) highlighted that in Africa alone the currently known 72 TBAs underlie about 40% of the continent and that about 33% of the African population lives in these areas, which in the case of Africa are often also located in arid or semi-arid regions with high dependence on groundwater. It also appears that most of these TBAs are in areas of high storage and higher yielding aquifers, which indicates that the amount of groundwater stored within these TBAs is thus of importance for the development of Africa.



To highlight the (potential) importance of TBAs worldwide, IGRAC now compiled similar statistics for all continents with TBAs (see table 1). The analysis indicates that in particular in Africa and South America, TBAs cover substantial parts of the continents (approx. 40% and 39% respectively) and percentage of population living in these areas is also significant (approx. 30% and 21%). It isn't a surprise that numbers are lower for North America as the United States of America and Canada already make up 88% of the surface area of the North American continent, which means that there is less 'chance' of TBAs occurring. Asia takes an intermediary position with the TWAP TBAs covering about 13% of the surface area of Asia and about 17% of the population living in these areas. For Europe the numbers are not representative as only 8 TBAs were covered in TWAP (see notes of caution below). Overall the analysis confirms what Nijsten et.al. (2018) already indicated for Africa that TBAs are potentially of importance to a significant proportion of the world's population.

Table 1: Population and areal statistics of 199 TWAP TBAs, per continent.

	Continents		TWAP TBA's			TWAP TBA's as % of whole continent	
	Area [1000 km ²]	Population [million capita]	No. TBAs	Area [1000 km ²]	Population [million capita]	Area	Population
Africa	29 026	1187.9	64	11 634	353.9	40 %	30 %
Asia*	48 974	4491.2	70	6 237	751.6	13 %	17 %
Europe	5 958	598.3	8	254	33.1	4 %	6 %
North America	24 073	567.7	32	1 471	26.4	6 %	5 %
South America	17 718	416.2	25	6 862	88.8	39 %	21 %

* Asia including Papua New Guinea (as Papua New Guinea shares a TBA with Indonesia).

Notes of caution:

For now, the analysis was limited to the 199 Transboundary Aquifers which were covered in the worldwide indicator-based assessment of TBAs under the Transboundary Waters Assessment Programme (UNESCO and UNEP, 2016). As the analysis did not include all known TBAs and EU groundwater bodies, the numbers should be used with caution and should be regarded as approximate numbers.

With a few exceptions the 199 (out of 366) TBAs selected for TWAP are the largest TBAs and therefore the numbers in the table will be fairly representative. This is the case for Africa, Asia, North America and South America. For Europe the numbers in the table below are not representative at all as only 8 European TBAs were considered in TWAP.

Furthermore, calculation of population numbers in TBA areas were done per TBA. This means that in the case of partially overlapping TBAs, double counting of population has taken place, resulting a slight exaggeration of the amount of people living on top of the 199 TBAs. The same holds for the total reported surface area of TBAs. Furthermore, there may be some small inconsistencies resulting from TBAs across borders of continents.

In 2019, IGRAC aims to do a full analysis on all known TBAs to update the statistics provided in this pamphlet.

Data sources:

Area calculations are all based on sinusoidal projection. Areal calculations of the continents based on the shapefile of FAO-GAUL 2014. Population data per continent are derived from World Development Indicators for 2015 (<https://data.worldbank.org/indicator/SP.POP.TOTL>). Population data TWAP TBAs are derived from grid data from CIESIN estimates for 2015. TBA surface areas are based on the TBA map of the world, edition 2015.

Preferred citation

IGRAC (2018) Population and areal statistics for 199 Transboundary Aquifers. Delft: IGRAC.

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