

WATER FROM THE CLOUDS



814 mm
per year on land
or 110 000 km³



56%

is evapotranspired
by forests and
natural landscapes



5%

is evapotranspired
by rainfed
agriculture



39%

available for human uses
(irrigation, industries, municipalities)
and the environment
or 42 920 km³



is equal to about

16 000

litres per person per day
(or 5 800 m³ per person per year)

BUT



water is unevenly
distributed geographically
and a large part is
not easily accessible



16

litres per person per day
in Kuwait



1 400 000

litres per person per day
in Iceland

Non-conventional sources of water increase the water available for use

Desalinated water, treated wastewater, agricultural drainage water



Food and Agriculture
Organization of the
United Nations

Prepared by AQUASTAT, FAO's global water information system, 2014,
<http://www.fao.org/nr/aquastat>



TRANSBOUNDARY WATER



Number of countries that have rivers flowing into their territories from upstream countries



INTERCONNECTED WATER



276

Transboundary rivers

24

Number of countries that only rely on freshwater resources that are generated from precipitation falling on the country itself (islands not included)



~300

Transboundary aquifers

27

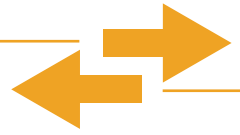
Number of countries without any water leaving to downstream countries (to sea not included)

1

Country with no internally generated freshwater resources (Kuwait)






WATER WITHDRAWAL






SOURCES OF WATER:

FRESHWATER

-  Surface water
-  Renewable groundwater
-  Fossil or non-renewable groundwater

NON-CONVENTIONAL WATER

-  Desalinated water
-  Treated wastewater
-  Agricultural drainage water

WATER WITHDRAWAL DISTRIBUTION

Withdrawal by sector

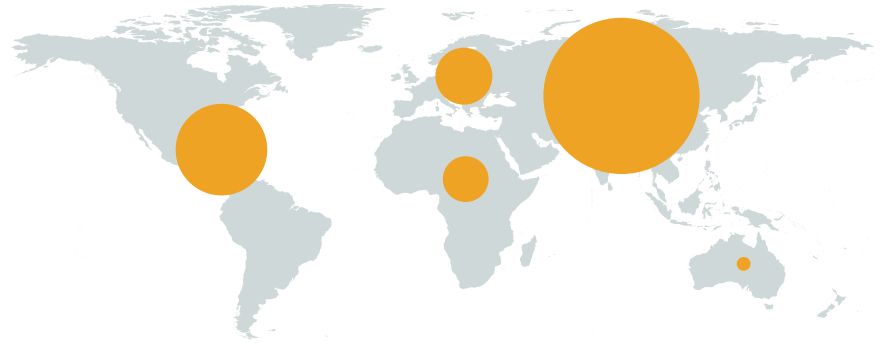


Withdrawal by continent

Withdrawal by source

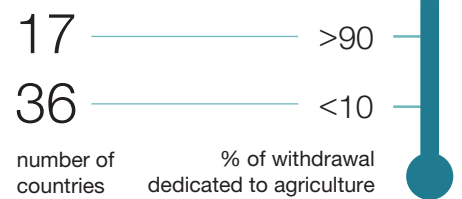
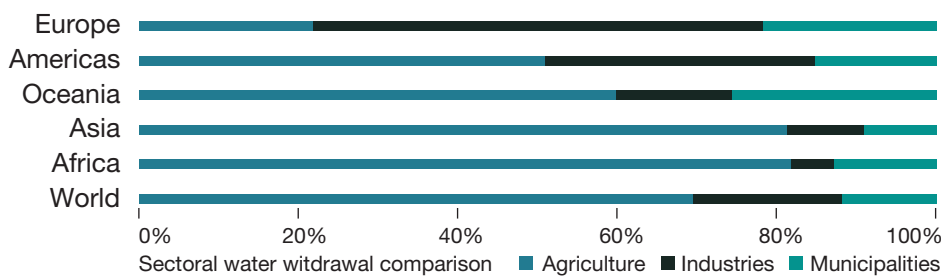


from freshwater



Percentage of water withdrawal by continent (size of spot proportional to total water withdrawal)

WITHDRAWAL FOR AGRICULTURE



Agricultural water withdrawal varies depending on climate and the place of agriculture in the economy

2/3 of countries dedicating less than 10% of their water withdrawal to agriculture are industrial countries with a moderate climate in Europe

AGRICULTURE INCLUDES:



Irrigation (including fodder and pasture for livestock)



Livestock watering and cleaning



Aquaculture



WATER STRESS



WATER STRESS CAN BE CAUSED BY:



Climate



Population

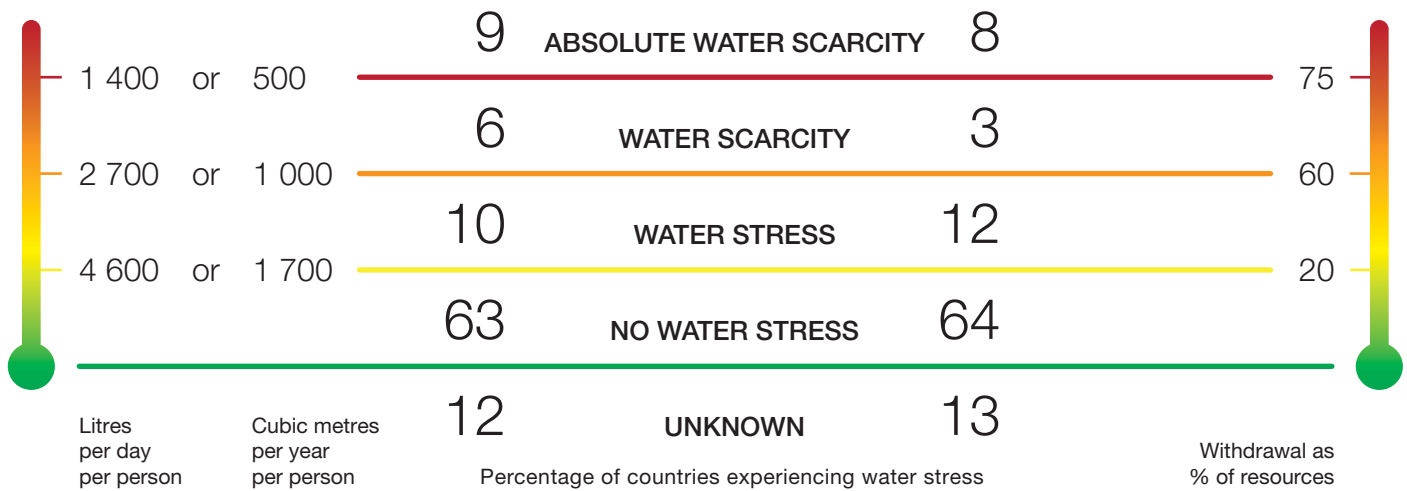
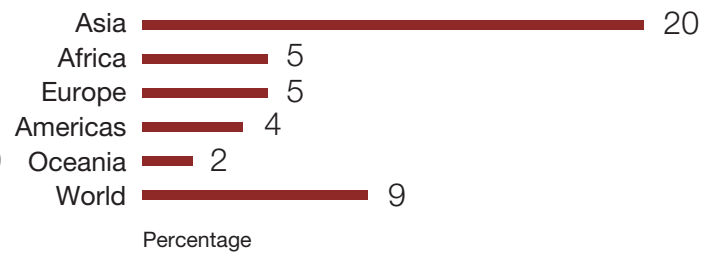
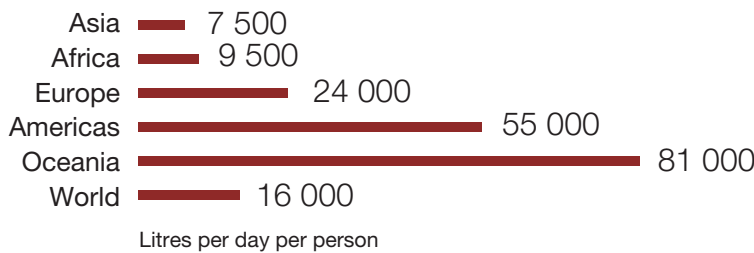


Water withdrawal

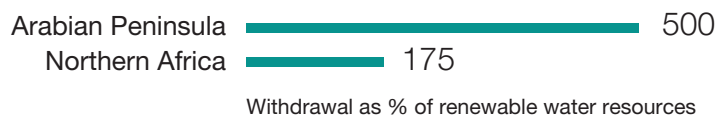
2 INDICATORS

Renewable freshwater resources per person

Part of renewable freshwater resources withdrawn



OVEREXPLOITATION OF FRESHWATER RESOURCES



Overexploitation occurs in some regions where withdrawal largely exceeds the renewable water resources

OVEREXPLOITATION MEANS:



Depletion of renewable groundwater



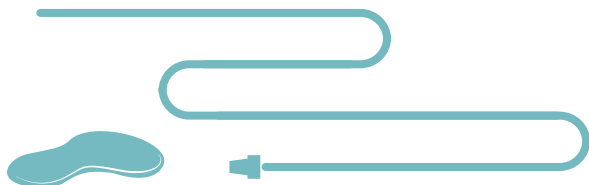
Over-reliance on fossil non-renewable groundwater






Mandatory use of non-conventional water





AREA EQUIPPED FOR IRRIGATION





FULL CONTROL IRRIGATION

-  Surface irrigation
-  Sprinkler irrigation
-  Localized irrigation

PARTIAL CONTROL IRRIGATION

-  Equipped lowlands irrigation
-  Spate irrigation

OTHER WATER MANAGEMENT

-  Flood recession
-  Cultivated wetlands

Over **324** million hectares are equipped for irrigation worldwide (2012)



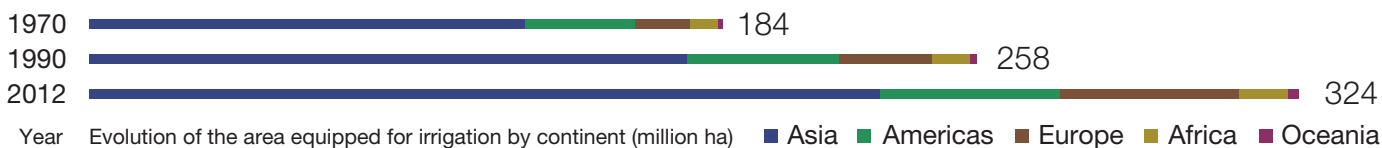
Part of area equipped for irrigation actually irrigated



Total cultivated land under irrigation



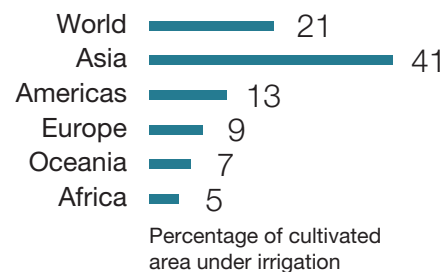
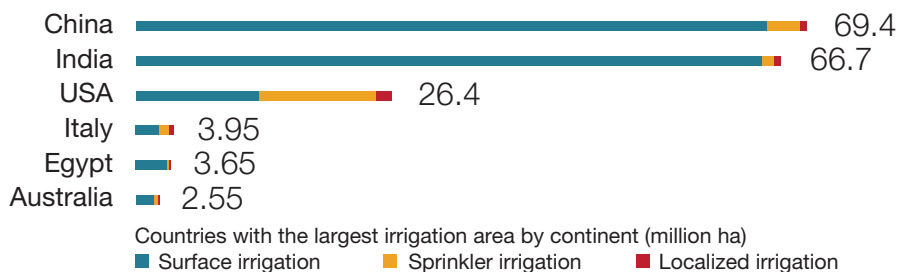
Part of area equipped for irrigation located in Asia



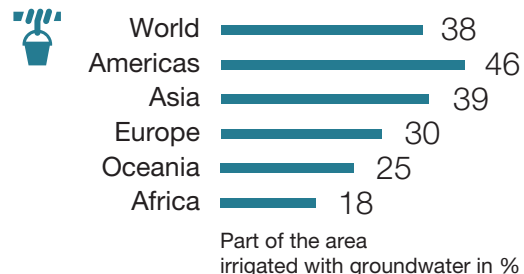
Irrigation is thought to have started more than **7500** years ago in Mesopotamia

42% of the world irrigation is located in only **2** countries: China and India

In **2010** China became the country with the largest irrigation area



	 Surface irrigation	 Sprinkler irrigation	 Localized irrigation
Area in 2012	280 million ha	35 million ha	9 million ha
% of total	86	11	3
Price	\$	\$\$	\$\$\$
Efficiency	+	++	+++
Mobility	-	+/-	+



At least 111 million ha equipped for irrigation use a pump

One single irrigation scheme can cover over 10 000 ha in India, Mexico, Pakistan and Sudan

Supplementary irrigation also takes place during rainy season to make up for rainfall deficit

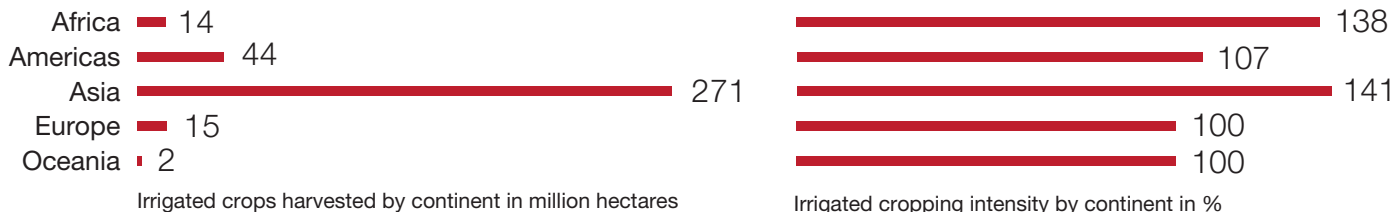


IRRIGATED CROPS

40% of crop production worldwide...
on 20% of the world's cultivated area only!



346 million ha of irrigated crops were harvested in 2011 on 261 million ha actually irrigated, resulting in a cropping intensity of 130%



Irrigated cropping intensity is the ratio of harvested irrigated crops area over actually irrigated area

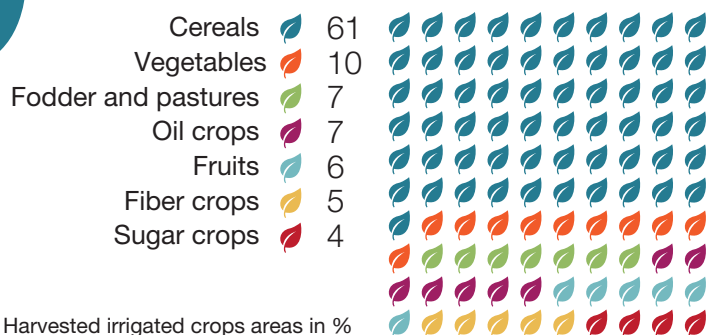
Asia harvests



of the world's irrigated crops area



Irrigation and a year-round favourable climate for crop growth make it possible to cultivate the same area more than once a year (i.e. cropping intensity > 100%)



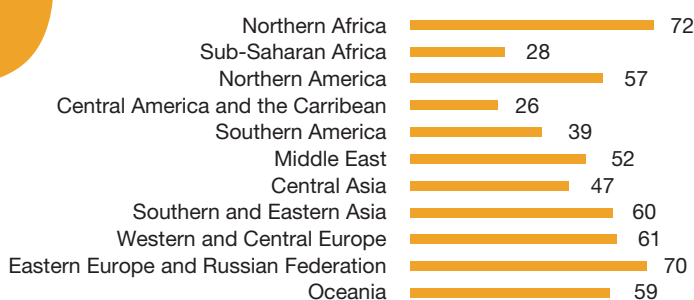
Harvested irrigated crops areas in %



Diversification of irrigated crops is higher in countries with higher income



Rice is the world's largest irrigated cereal, covering 29% of the total irrigated crop area and almost half of the irrigated cereals area



World 56

Irrigation scheme efficiency by region in %

In the year 2010, the global water requirement for irrigation was 1 500 km³.

The total amount of water withdrawn for irrigation being 2 700 km³

gave an irrigation scheme efficiency (or water requirement ratio) of 56%



7 700 m³/ha is withdrawn annually on average for irrigation



In the case of paddy rice cultivation, in addition to water for irrigation a layer of 10-20 cm of water is required for land preparation and plant protection

