AMU DARYA RIVER

Does Asia have enough water to develop?

KEY COUNTRY EXPOSURE

<table>
<thead>
<tr>
<th>Country</th>
<th>Surface Water Resources</th>
<th>Population</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>33%</td>
<td>31%</td>
<td>25%</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>100%</td>
<td>80%</td>
<td>75%</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>5%</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>20%</td>
<td>32%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Note: the share of surface water resources refers to the ratio of surface water produced internally by the river in the respective country and the country’s total renewable surface water.

RIVER FLOW

Annual flow estimation

109bn m³


DEFINITIONS (FAO AQUASTAT):
- River flow/runoffs: the amount of river water that flows in a given time
- Surface water produced internally: long-term average annual volume of surface water generated by direct runoff from endogenous precipitation (surface runoff) and groundwater contributions
- Total renewable surface water: the sum of the internal renewable surface water resources and the total external renewable surface water resources

It is estimated that 77-80% of the Amu Darya’s annual runoff falls during April and September, while only 10-13% during December and February


CLIMATE CHANGE: PAST & FUTURE TREND

Temperature Change (°C)

<table>
<thead>
<tr>
<th>Year</th>
<th>1.44</th>
<th>1.31</th>
<th>0.85</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956-2005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006-2055</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: China Water Risk based on data from Center for Water Resources Research, Chinese Academy of Sciences. Rainfall, snowfall and runoff change are expressed in equivalent water height. All data are calculated from five ensemble models (BCC-CSM1.1, CanESM2, CCSM4, MIROC5, MPI-ESM-LR) in IPCC AR5.

Hydrological Changes (mm/year)

<table>
<thead>
<tr>
<th>Year</th>
<th>Snowfall</th>
<th>Rainfall</th>
<th>Runoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956-2005</td>
<td>-0.45</td>
<td>0.17</td>
<td>-0.21</td>
</tr>
<tr>
<td>2006-2055</td>
<td>-0.55</td>
<td>0.09</td>
<td>-0.28</td>
</tr>
</tbody>
</table>

Source: IPCC AR5.

ICE RESERVES & GLACIER MELT

Glaciers in the Amu Darya:
Number: 3,277

AMU DARYA RIVER BASIN

Length 2,550 km
Basin Area 0.52-0.65 million km²
Annual flow 47-109 billion m³
Flow through Afghanistan, Tajikistan, Turkmenistan, Uzbekistan
Share of ice & snow melt in upper reach N/A
Average surface water resources 52 billion m³
Basin GDP in 2015 US$37 billion (constant 2010 price)
Transboundary Yes

In 1993, Kazakhstan, Kyrgyz, Tajikistan and Turkmenistan signed an agreement for restoring the balance of the destroyed ecosystems in the Aral Sea Basin which includes the Amu Darya.

THE AMU DARYA MATTERS FOR COUNTRIES, PEOPLE & THE ECONOMY

Total surface water resources = 52 billion m³
Total population = 28 million
Total 2016 GDP (constant 2010 price) = US$37 billion

Uzbekistan 17%
Afghanistan 35%
Turkmenistan 2%
Tajikistan 36%
Afganistan 38%

GDP mix

Services 33%
Agriculture 26%
Industry 39%

Water Use Per Unit GDP (m³/USD)

Tajikistan 46%
Turkmenistan 25%
Uzbekistan 7%

Water use mix

Industry 26%
Agriculture 69%
Municipal 4%

Water use per capita: 4,185m³/pax
This map uses UN urban population data. However, if we add rural population and other temporary residents living within the municipal boundary of cities, the total population can be larger.

© China Water Risk. Data Source: ICIMOD; Randolph Glacier Inventory; FAO AQUAmaps; Data Center for Resources and Environmental Sciences, Chinese Academy of Sciences