

## Introduction

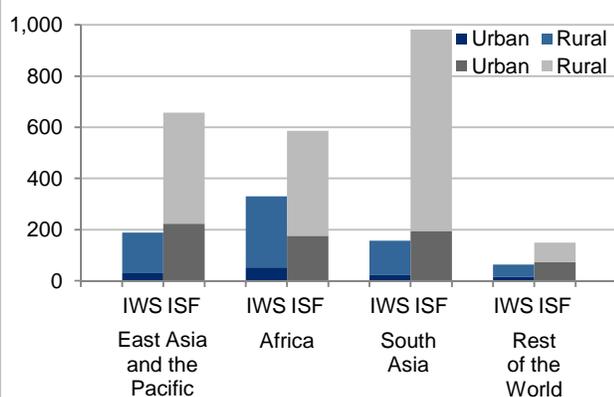
In May of this year, USAID published a five year Water and Development Strategy that aims to guide USAID investment and decision making regarding water programming. The strategy outlines two key objectives, the promotion of the effective usage of water resources for (1) public health and (2) food production. The goal of this snapshot is to highlight the data resources available on the Economic and Social Database (ESDB) that measure water issues by examining the state of the world in terms of the strategy's key objectives. This snapshot focuses on USAID-assisted countries, defined as non-high income countries that received at least \$2 million in obligations of USAID assistance in fiscal year 2011.

## Public Health

The strategy states that USAID will continue its effort to expand access to improved water sources (IWS) and improved sanitation facilities (ISF) along with improving the quality of already existing sources and facilities. Besides funding programs that directly expand or improve IWS and ISF, the strategy states that USAID will promote delegating to local governments, the responsibility of providing these resources, because they can more effectively fulfill the needs of local populaces. Additionally, USAID will offer assistance to private providers of both IWS and ISF in an effort to encourage income earning opportunities in addition to expanding these resources into places not readily reached by government services.

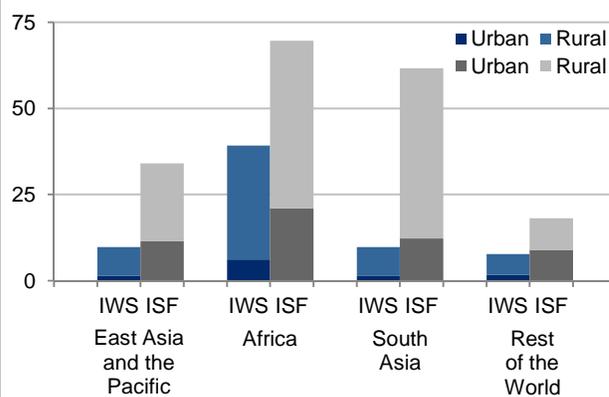
The graphs report the most recent national level data from the United Nations Millennium Development Goals (MDG) concerning access to IWS and ISF. The graphs make evident where these resources are still lacking among USAID-assisted countries categorized by region. The vast majority of people currently living without access to either IWS or ISF or both live in sub-Saharan Africa and South and East Asia.<sup>1</sup> Yet, in all of these regions, far more people live without access to ISF than access to IWS. This is especially true in South Asia where six times the number of people lives without ISF than without IWS. On the other hand, 40 percent of the sub-Saharan population lives without IWS, a far higher percentage than in any other region where the figures are all less than 10 percent. Finally, the graphs clearly show that it is the rural populations in these regions that are primarily the ones still lacking both IWS and ISF.

**Number of People Living Without Improved Water Sources or Sanitation Facilities, 2010 (millions)**



SOURCE: United Nations, Millennium Development Goals.

**Percentage of Population Living Without Improved Water Sources or Sanitation Facilities, 2010**



SOURCE: United Nations, Millennium Development Goals.



## Food Production Systems

In order to improve food production systems' water utilization, USAID plans to improve both rain fed and irrigated agricultural systems. As the strategy mentions, most cultivated land relies on rain and thus improving the productivity of this farmland will benefit large segments of the global population. Alternatively, irrigation allows farmers to improve yields, double crop, and farm in areas that would otherwise be too arid. Yet, irrigated farmland demands huge amounts of water that can strain water supplies and deplete aquifers. Furthermore, improper usage of irrigation can lead to soil degradation and render water sources unusable through pollution and salinization. USAID seeks to address the issues facing both agricultural systems by investing in canal maintenance; promoting the reuse of waste water; and introducing better water management systems, weather forecasting tools, and drought resistant crop varieties.

**Lowest Average Cereal Yields Among Arid Countries with Significant Agricultural Sectors, 2011**

| Country    | Cereal yield (kg/hectare) | Agricultural land area (percent of total land) | Average annual precipitation (mm) | Employment in ag sector (percent of population) * | Irrigated land (percent of agricultural land area) * |
|------------|---------------------------|--|-----------------------------------|---|--|
| Namibia    | 354.1                     | 47.1   | 285                               | 16.3  |  |
| Niger      | 378.2                     | 34.6   | 151                               | 56.9  | 0.2  |
| Botswana   | 393.3                     | 45.6   | 416                               | 29.9  | 0.0  |
| Somalia    | 466.2                     | 70.3   | 282                               |   |  |
| Eritrea    | 591.6                     | 75.2   | 384                               |   |  |
| Zimbabwe   | 820.0                     | 42.2   | 657                               | 64.8  |  |
| Chad       | 888.1                     | 39.7   | 322                               |   |  |
| Mali       | 996.2                     | 34.1   | 282                               | 66.0  |  |
| Yemen      | 1126.8                    | 44.4   | 167                               |   | 3.3  |
| Mauritania | 1394.6                    | 38.5   | 92                                |   |  |

SOURCE: World Bank, World Development Indicators.

NOTE: Countries with a significant agricultural sector are those with more than 20 percent of their land area devoted to agriculture.

\* Data are from 2011 or most recent year.

Unfortunately, the nature of agricultural data gathered on a national scale does not lend itself to measuring the productivity of solely rain fed agricultural systems. However, data from the World Bank's World Development Indicators (WDI) can be used to examine which countries would benefit the most from improvements to their rain fed agricultural systems by examining the average cereal yields of countries that dedicate at least 20 percent of land area to agriculture, yet receive no more than 700mm of annual precipitation. The table displays the USAID-assisted countries with the lowest yields among these arid or semi-arid, agricultural dependent countries. Not surprisingly, the countries with the lowest yields are found almost exclusively in sub-Saharan Africa, Yemen being the only exception. WDI data also show a significant portion of the populations of these countries are employed in agriculture, while little of their agricultural land is irrigated. Accordingly, improvements to how their agricultural systems utilize precipitation would go a long way towards improving the food security and economic outcomes for many in these countries.

Turning to irrigated agricultural systems, it is vital to understand the huge amount of water irrigation systems demand. Among USAID-assisted countries, nearly one fourth have agricultural sectors that demand 90 percent or more of their total water usage. By using MGD data on the percentage of water a country uses from its own internal resources, the percentage of the total internal water resources that goes to agriculture can be calculated. The table displays which countries' agricultural sectors demand the most water from their internal resources. All but one of the top countries, Sudan, are in Eurasia or the MENA region. Notably, the agricultural sectors of the three top countries, Libya, Yemen, and Uzbekistan, actually use more water than is naturally provided by their internal resources. This should be reason for concern, because it means that they are drawing upon aquifers and other non-renewable sources at an unsustainable rate.

**Agricultural Sectors that Use the Most from Internal Resources, 2011**

| Country      | Internal water resources used by agriculture (percent) | Internal water resources used (percent) * | Agriculture withdraws out of total (percent) |
|--------------|--|---|--|
| Libya        | 589.3  | 711.3                                     | 82.9   |
| Yemen        | 153.0  | 168.6                                     | 90.7   |
| Uzbekistan   | 106.5  | 118.3                                     | 90.0   |
| Egypt        | 98.3   | 113.8                                     | 86.4   |
| Turkmenistan | 95.1   | 100.8                                     | 94.3   |
| Pakistan     | 69.9   | 74.4                                      | 94.0   |
| Iraq         | 68.8   | 87.3                                      | 78.8   |
| Tajikistan   | 68.0   | 74.8                                      | 90.9   |
| Jordan       | 58.8   | 90.5                                      | 65.0   |
| Sudan        | 55.9   | 57.6                                      | 97.1   |

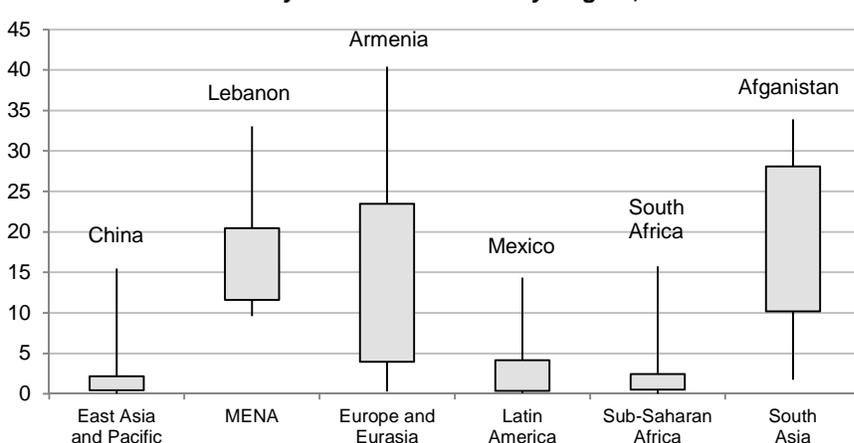
SOURCE: World Bank, World Development Indicators, United National, Millennium Development Goals, and author's calculations.

\* Data are from 2010 or most recent year.

## Sustainability

The strategy emphasizes environmental sustainability in guiding its programming goals. Therefore, it is important to consider the impact that a country's water usage has upon the environment. One measure of water stress comes from the Environmental Performance Index jointly published by CIESIN and Yale. Among other water related indicators, the index contains an indicator of the change in water quantity in a country from its natural state due to human usage. The box and whisker graph displays percent decreases in the natural water flow of USAID-assisted countries grouped

**Decline in Water Quantity from Natural State by Region, 2011**



SOURCE: CIESIN and Yale, Environmental Performance Index.

The boxes indicate the range of the middle two quartiles and the whiskers indicate the lowest and highest national extremes in each region with the highest extreme labeled.

by region. As expected, the regions that see the highest extremes and averages are mostly arid and heavily populated regions like South Asia, MENA, and Eurasia. This adds a caveat to the fact that these regions that have done well to provide water to much of the population have done so at the cost of straining their water supply. Also of note, sub-Saharan African countries, as a whole, do not suffer from large decreases in water quantity. This is most likely due to a lack of usage rather than the efficient usage of water resources. Overall, nearly one third of all USAID-assisted countries have a five percent decrease or greater in their water quantity.

## Additional Sources

---

Along with the sources mentioned above, there are numerous other sources on the ESDB (<http://esdb.eads.usaidallnet.gov/>) that measure different aspects of water related issues. The Population Reference Bureau, the United Nation's Environmental Program, and UNICEF all report data on IWS, ISF, and water usage and agricultural measures. Additionally, there are region-specific sources such as the African Development Indicators and the Economic Commission for Latin America and the Caribbean that contain the same type of measures. Other sources that focus on environmental issues, such as CEISIN and Yale's various Environmental Indexes and the World Resource Institute, have measures of water supplies and water pollution levels and emissions. The World Bank's Enterprise Survey has several series that measure the availability of water for business and industry use. Finally, the Economic Intelligence Unit and DuPont's Global Food Security Index have several water related measures used as indicators in their quarterly reported index.

## Endnotes

---

- I. Because individuals could be living without access to both improved water sources and sanitation facilities, the population and percentage totals cannot be summed across the two measures.

### Additional Information

For questions or more information, please contact the author, Darren Enterline, at [denterline@devtechsys.com](mailto:denterline@devtechsys.com).

To access the full USAID Water and Development Strategy, please visit <http://www.usaid.gov/documents/1865/usaid-water-and-development-strategy-2013-2018>. To access any of the data sources mentioned in this snapshot, please visit the Economic and Social Database (ESDB) at <http://esdb.eads.usaidallnet.gov/>. At the ESDB you can also access standard country profiles, utilize analytical tools such as the population pyramids, and generate customized tables and graphs. Plus, you can contact the EADS team at [statsunit@devtechsys.com](mailto:statsunit@devtechsys.com) for assistance with data queries and analysis.