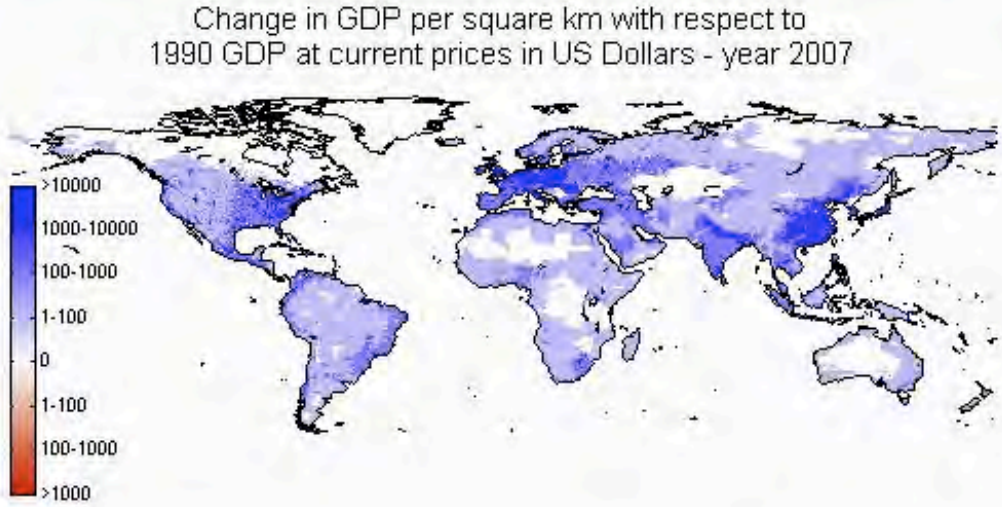
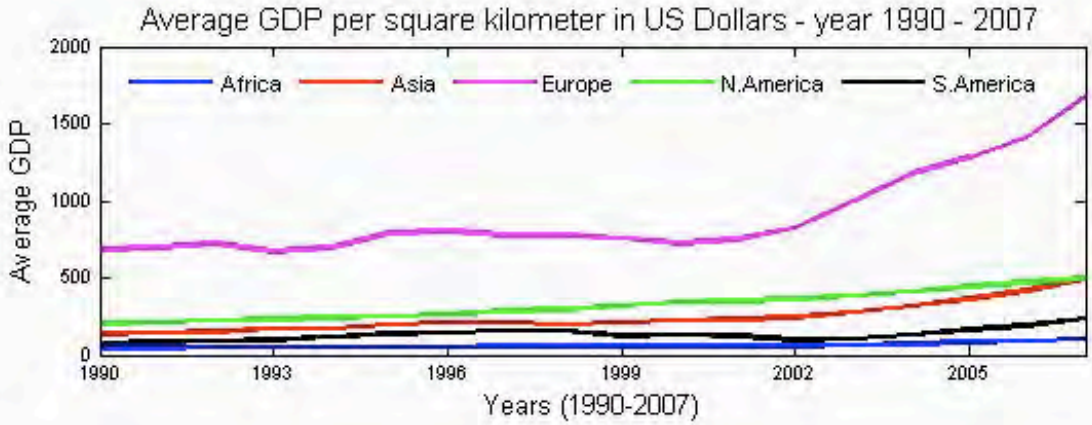
Pilot Study on Indicators (PSI)

Welcome | Overview | Hydromet Data | Socio-Economic Data | Indicators





Gross domestic Product:

The annual Gross-Domestic Product (GDP) per square kilometer in US dollars was calculated using data from the United Nations Economic Statistics Division. Two data sets, originally based on a country level scale, constituted the starting point for the mapping exercise from GDP/capita and the total population. The yearly data was scaled to 0.5 degree resolution using a data set provided by Mr. Gregory Yetman, Drs. Stuart Gaffin, and Deborah Balk from the Center for International Earth Science Information Network (CIESIN) at Columbia University.

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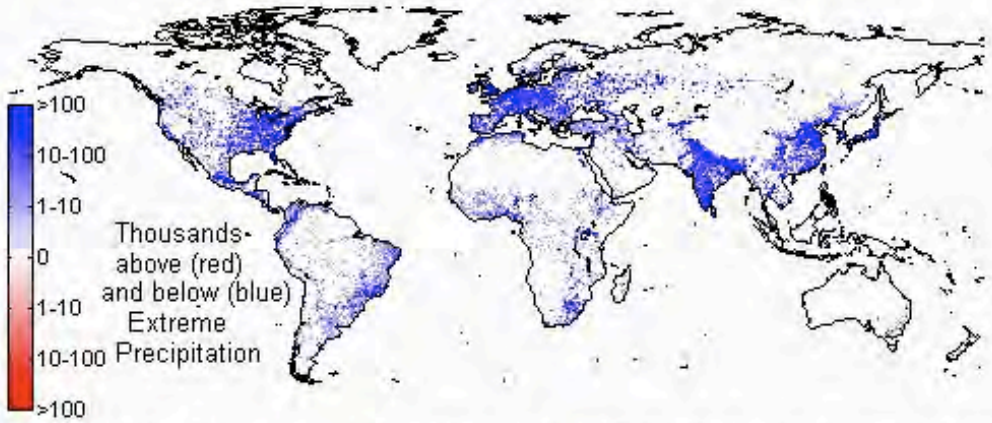
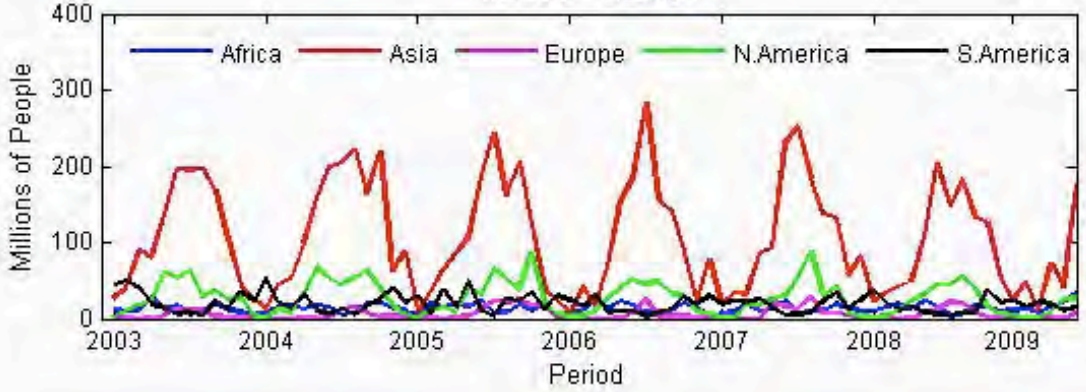
Contemporary Urban Population Under Extreme Precipitation
Extreme Precipitation (> 50 mm/day) - 12/2009



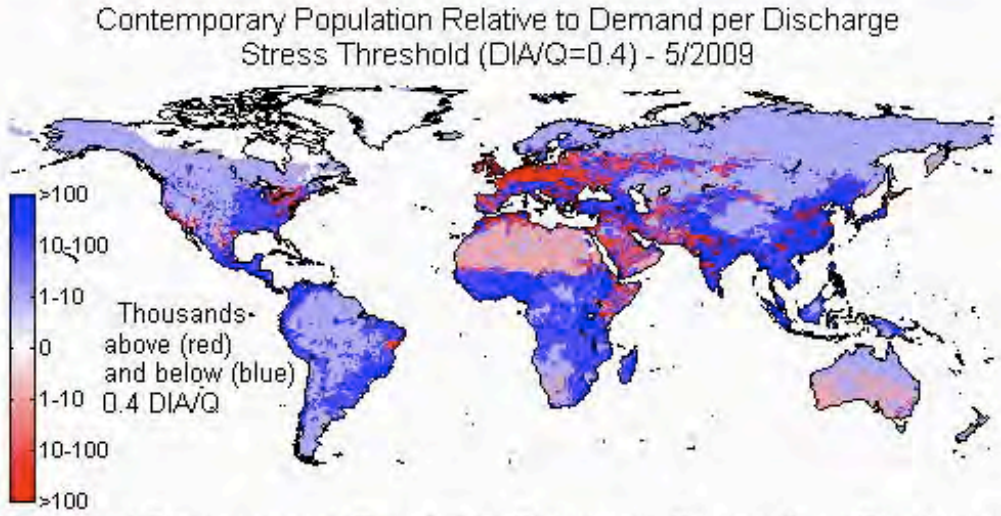
Millions of Contemporary Urban Population Under Extreme Precipitation
1/2003 - 5/2009

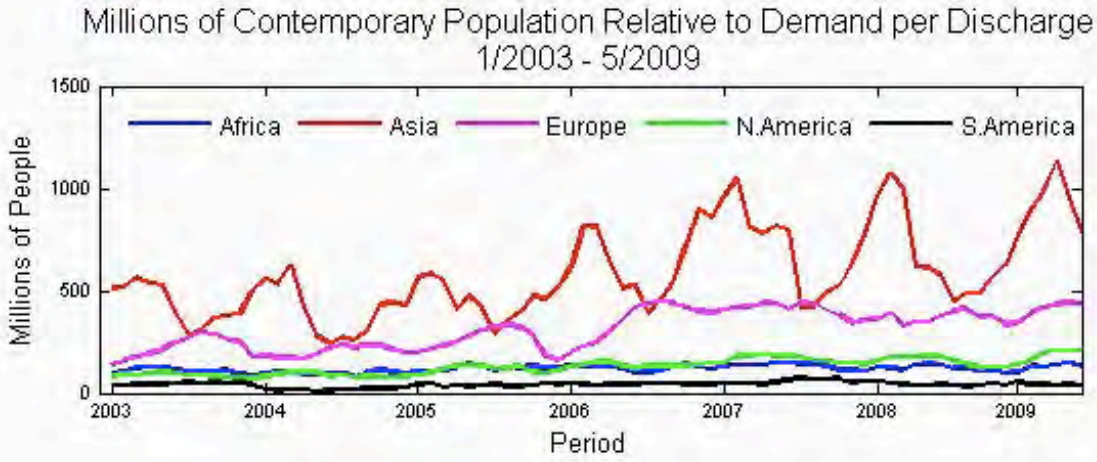


Urban people under extreme precipitation:

This indicator estimate the number of urban people that are affected by extreme precipitation. The threshold for the indicator is 50 mm/ day. The capacity to identify those areas that have been experienced extreme precipitation is critical in order to avoid human or economic losses associated with floods or mudslides. The global precipitation data comes from the Global Precipitation Climatology Project / CPC Morphing Technique (GPCP/ CMORPH) (Joyce, 2004).

Pilot Study on Indicators (PSI)





Water Use Index (DIA/Q):

The water Use Index is based on a scarcity threshold of > 0.4 (ratio of mean annual demand to supply, Falkenmark (1998)). The annual demand refers to the agriculture, domestic and industrial water demand on a monthly basis. The Water Balance/ Water Transport Model (WBM/ WTM) provides the monthly discharge corresponding to the period January 2003 to December 2008 used here. The input data for the WBM/WTM model includes air temperature from the National Center for Environmental Prediction (NCEP) and combined precipitation products from the GPCP /CMORPH project.

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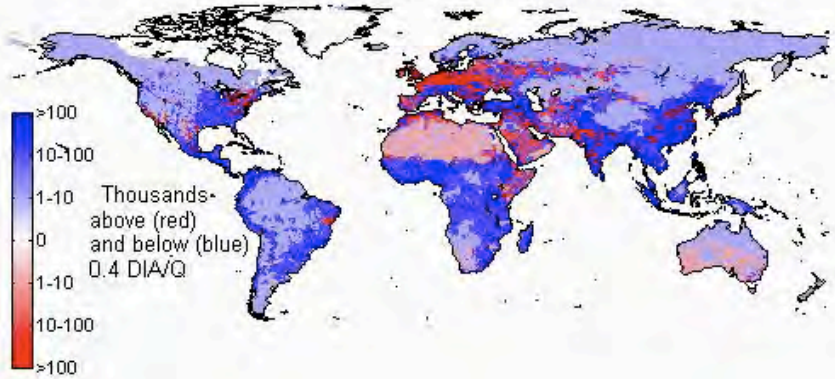
Pilot Study on Indicators (PSI)

Contemporary Population Relative to Demand per Discharge
Stress Threshold (DIA/Q=0.4) - 5/2009



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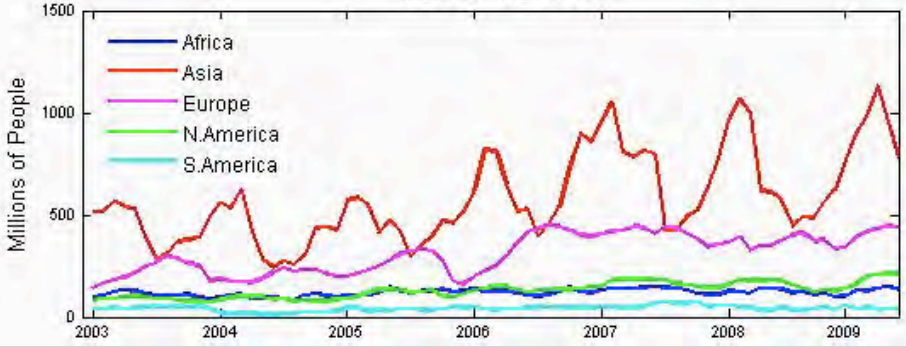
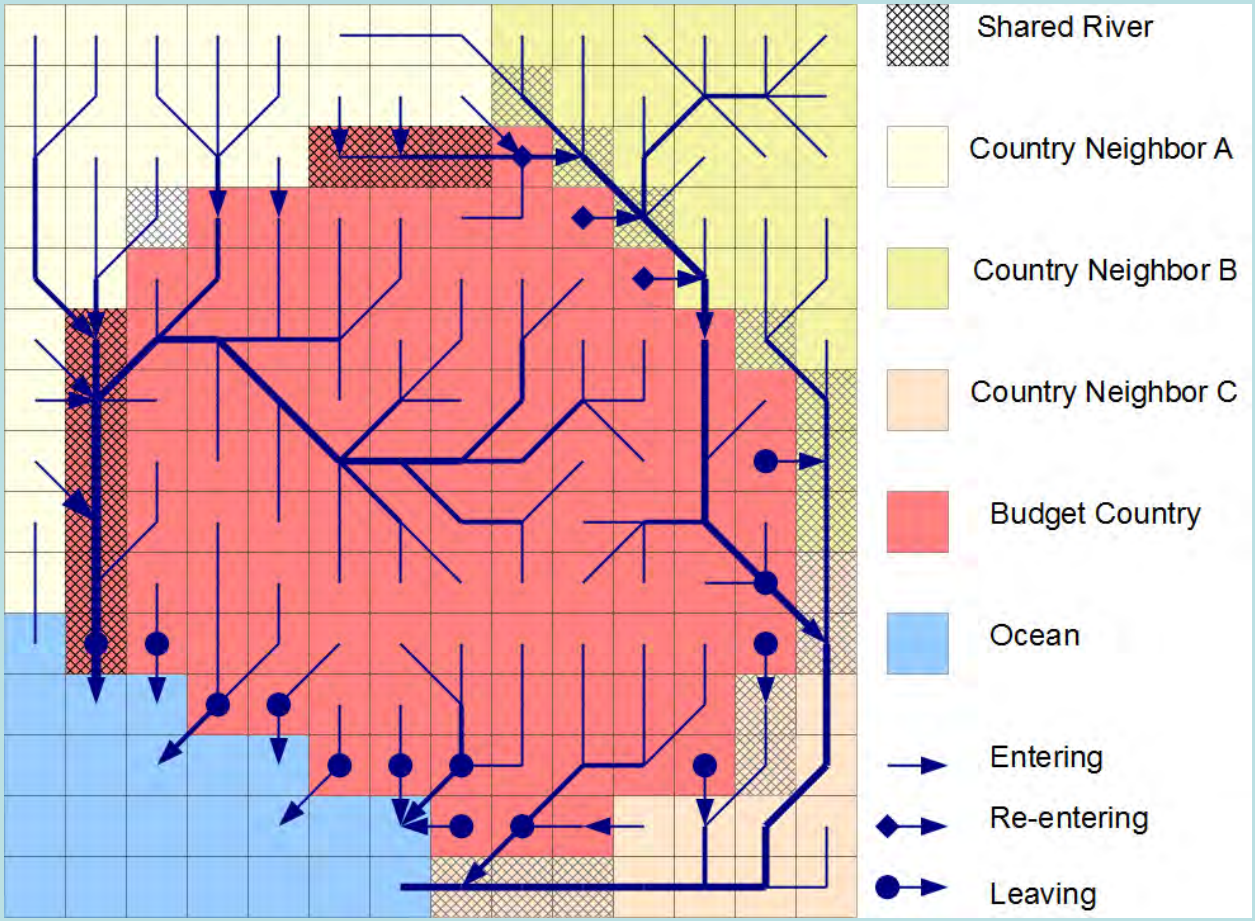
Millions of Contemporary Population Relative to Demand per Discharge
1/2003 - 5/2009



Country Statistics



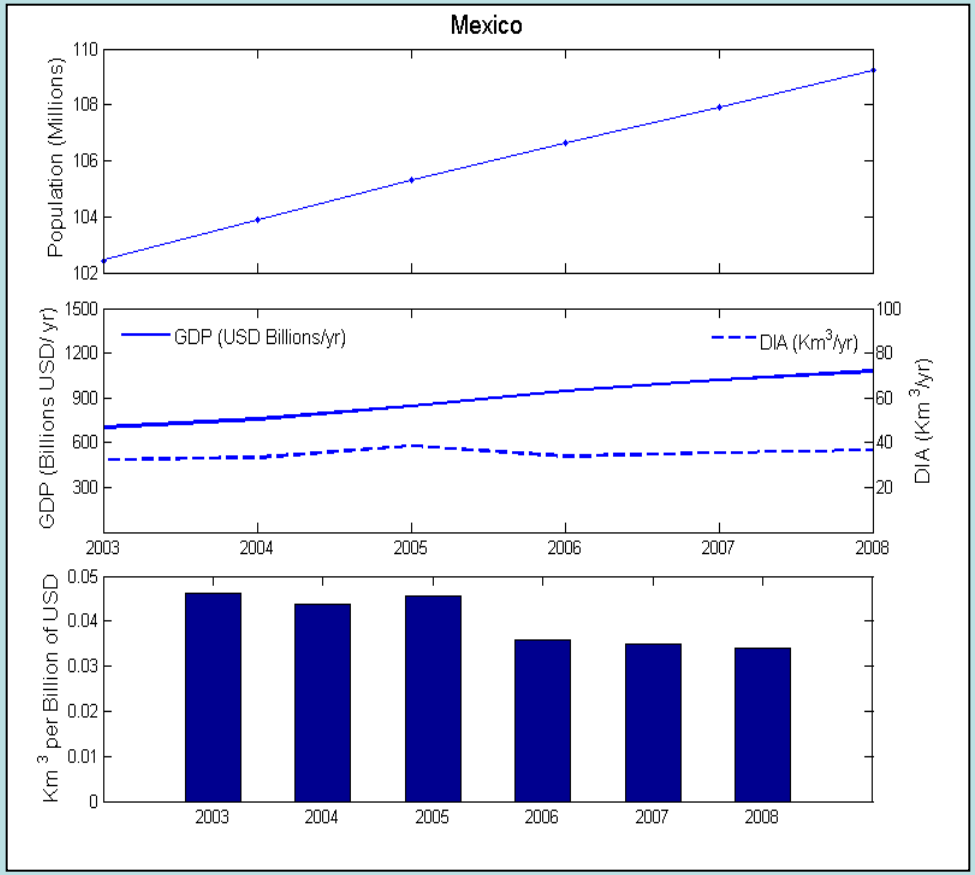
Country: **MEXICO**

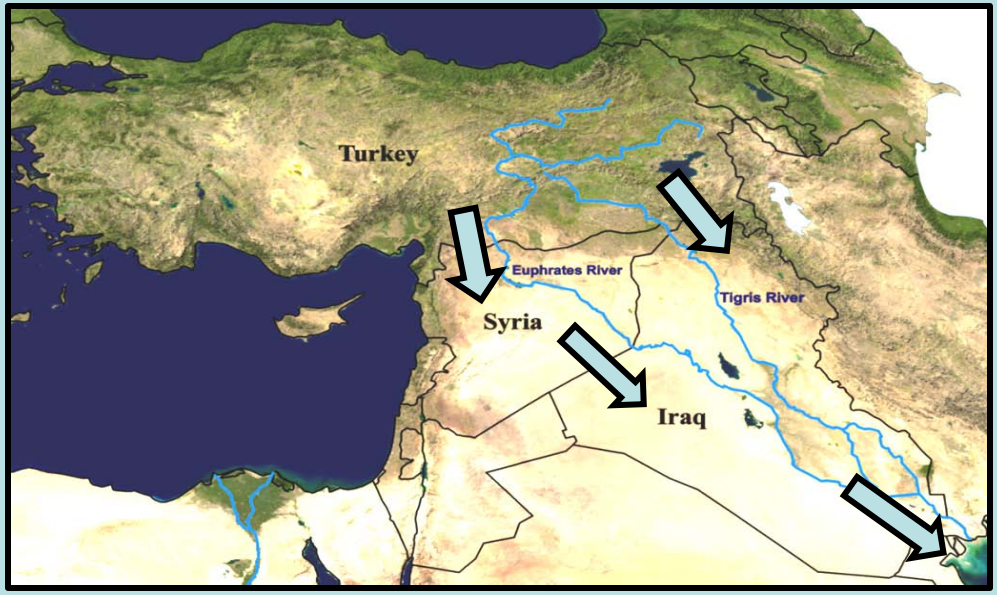
Socio-economic Statistics *Year: 2008*

- *Total area*: 1,972,550 km^2
- *Total Population*: 109M
- *Population growth rate*: 1.14 %/yr
- *GDP/year*: 1,080B USD
  - *Agricultural*: 33B
  - *Industrial*: 1,047B
- *Per Capita GDP/yr*: 9,908 USD

Preliminary Water Account (Year 2008)

- *Total available supply*: 655 (km^3/year)
- *Withdrawals*:
  - *--Agriculture (A)*: 27 (km^3/year)
  - *--Domestic and Industrial (DI)*: 10 (km^3/year)
- *DIA/GDP*: 0.034 (km^3 per Billion USD)
- *Per capita water availability: 6,000* (m^3/person-yr)

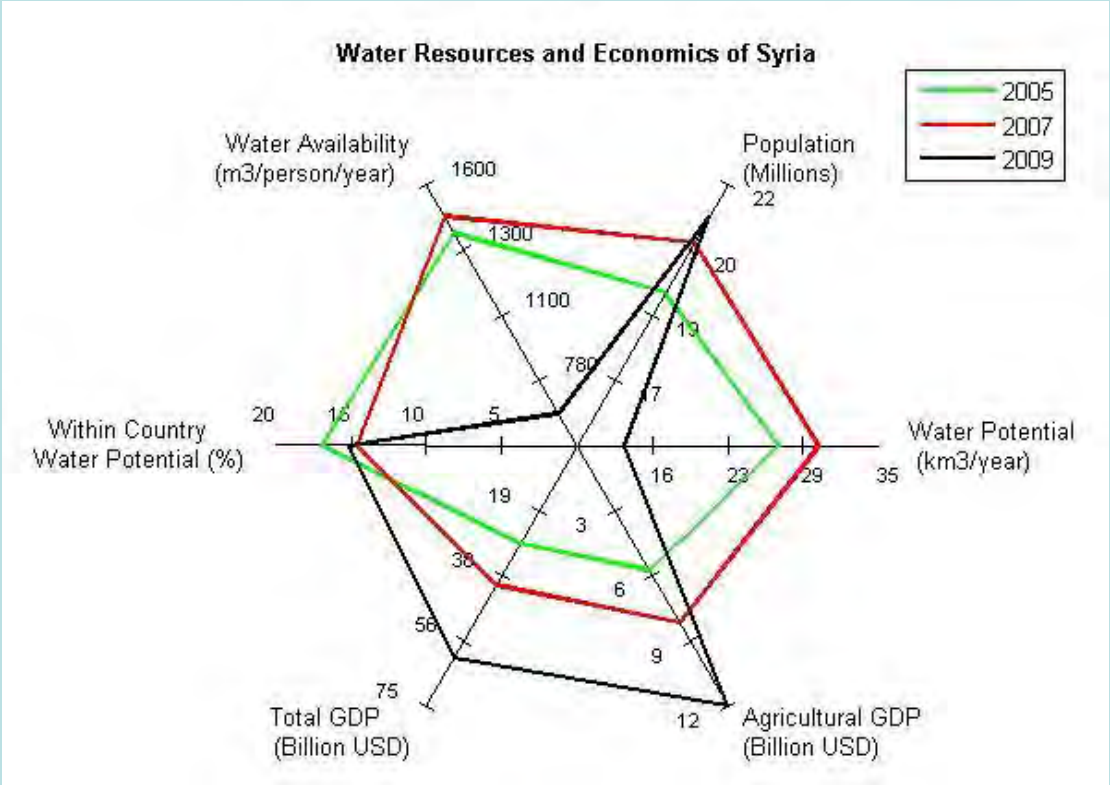


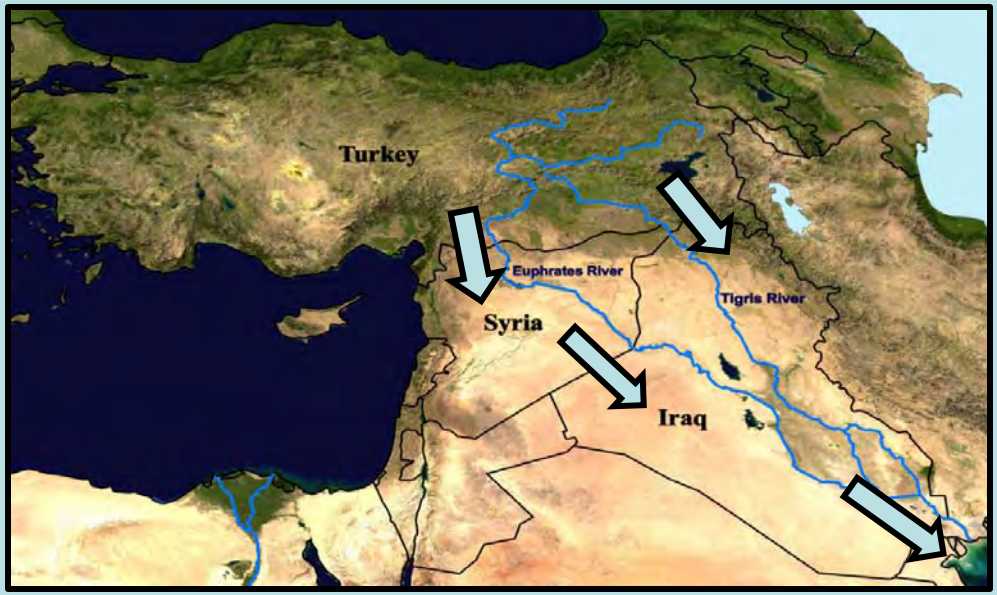


Multi-national water resource accounts:

--Turkey, Iraq and Syria

Severe drought conditions in Iraq and Syria in 2009, detected by PSI.





Multi-national water resource accounts:

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Severe drought conditions in Iraq and Syria in 2008, detected by PSI.

Country	Parameters	2003	2004	2005	2006	2007	2008
Turkey	Water Potential (lm3/year)	186.79	170.19	145.70	139.11	105.65	**78.60**
	Population (millions)	69.29	70.23	71.17	72.08	72.98	**73.89**
	Water Stress (m3/p/yr)	2696	2423	2047	1930	1448	**1064**
	Within Country Water Potential (%)	87.3	88.4	84.9	86.1	87.5	**84.8**
	Transboundary Water Potential (%)	12.7	11.6	15.1	13.9	12.5	**15.2**
	Total GDP (Billion USD)	303.01	392.16	482.99	530.92	657.28	**741.45**
	Agricultural GDP (Billion USD)	33.78	42.00	51.29	49.77	57.24	**65.39**
Iraq	Water Potential (Km3/yr)	58.31	50.73	38.49	37.54	53.20	**19.74**
	Population (millions)	26.80	27.52	28.24	28.88	29.53	**30.18**
	Water Stress (m3/p/yr)	2176	1843	1363	1300	1802	**654**
	Within Country Water Potential (%)	23.5	26.0	29.7	26.7	22.9	**24.1**
	Transboundary Water Potential (%)	76.5	74.0	70.3	73.3	77.1	**75.9**
	Total GDP (Billion USD)	10.62	16.84	18.16	20.65	21.29	**23.71**
	Agricultural GDP (Billion USD)	0.88	1.16	1.24	1.20	1.07	**1.42**
Syria	Water Potential (Km3/year)	46.67	35.81	17.65	24.46	26.07	**14.21**
	Population (millions)	18.08	18.60	19.12	19.80	20.47	**21.15**
	Water Stress (m3/p/yr)	2582	1925	923	1236	1273	**672**
	Within Country Water Potential (%)	29.6	22.6	13.6	10.7	10.1	**19.2**
	Transboundary Water Potential (%)	70.4	77.4	86.4	89.3	89.9	**80.8**
	Total GDP (Billion USD)	20.72	24.47	28.16	32.57	40.20	**54.60**
	Agricultural GDP (Billion USD)	5.14	5.51	5.76	6.69	8.19	**11.17**

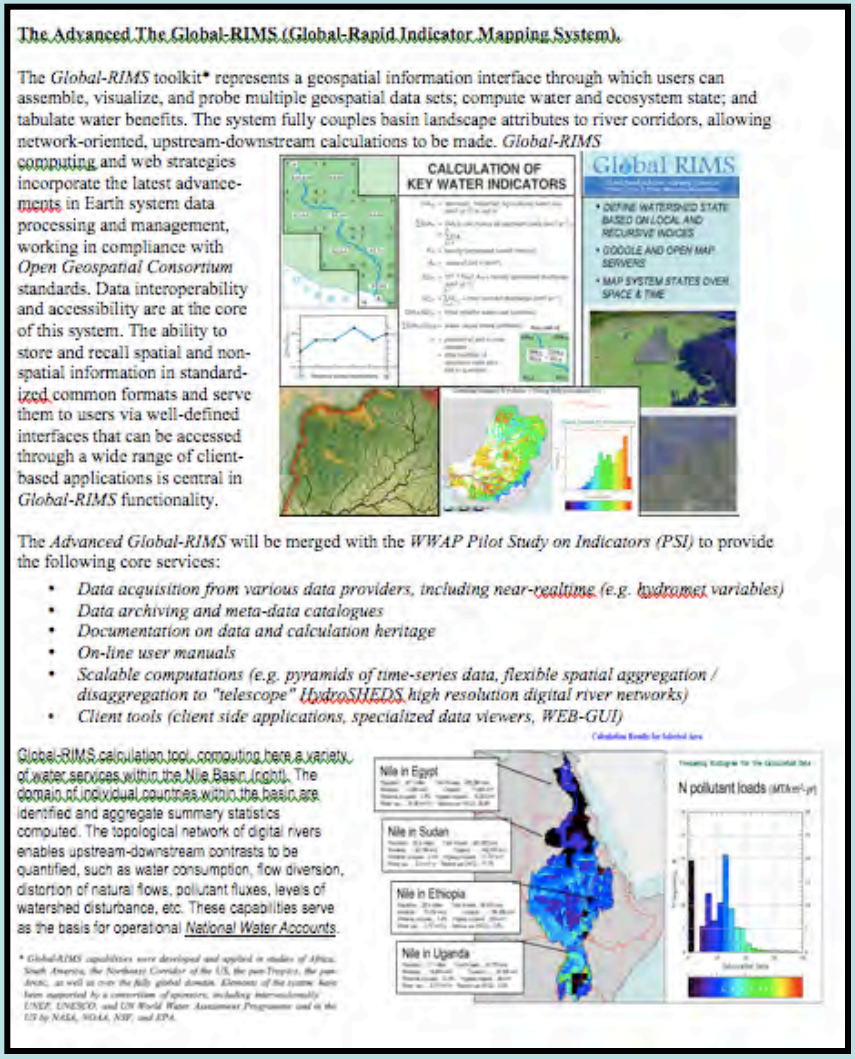
- Water potential estimates include in-country runoff plus transboundary inputs, based on GPCC (Global Precipitation Climatology Center) monitoring PPT product
- Other global precipitation products currently being tested

Next steps

- What key indicators to focus on: *robust, understandable to target audience of policy-makers, trackable over time*
- Move to a next stage: More rigorous testing, “error-bars”, higher resolution / enhanced functionality anticipated, outreach to UN partners

An Advanced Global-Rapid Indicator Mapping System (Global-RIMS)
Extending the WWAP Pilot Study on Indicators

- Part of package of proposals to WWAP for donor funding *(post-Copenhagen; June 2009)*
- Current status?
- Move PSI into a more coherent working relationship with UN partners *(thru WWAP-EG on Indicators, Monitoring, Databases; GTN-H; UN-DESA)*



The Advanced The Global-RIMS (Global-Rapid Indicator Mapping System).

The *Global-RIMS* toolkit* represents a geospatial information interface through which users can assemble, visualize, and probe multiple geospatial data sets; compute water and ecosystem state; and tabulate water benefits. The system fully couples basin landscape attributes to river corridors, allowing network-oriented, upstream-downstream calculations to be made. *Global-RIMS* computing and web strategies incorporate the latest advancements in Earth system data processing and management, working in compliance with *Open Geospatial Consortium* standards. Data interoperability and accessibility are at the core of this system. The ability to store and recall spatial and non-spatial information in standardized common formats and serve them to users via well-defined interfaces that can be accessed through a wide range of client-based applications is central in *Global-RIMS* functionality.

The *Advanced Global-RIMS* will be merged with the *WWAP Pilot Study on Indicators (PSI)* to provide the following core services:

- *Data acquisition from various data providers, including near-realtime (e.g. hydromet variables)*
- *Data archiving and meta-data catalogues*
- *Documentation on data and calculation heritage*
- *On-line user manuals*
- *Scalable computations (e.g. pyramids of time-series data, flexible spatial aggregation / disaggregation to "telescope" HydroSHEDS high resolution digital river networks)*
- *Client tools (client side applications, specialized data viewers, WEB-GUI)*

Global-RIMS calculation tool, computing here a variety of water services within the Nile Basin (right). The domain of individual countries within the basin are identified and aggregate summary statistics computed. The topological network of digital rivers enables upstream-downstream contrasts to be quantified, such as water consumption, flow diversion, distortion of natural flows, pollutant fluxes, levels of watershed disturbance, etc. These capabilities serve as the basis for operational National Water Accounts.

* *Global-RIMS capabilities were developed and applied in studies of Africa, South America, the Northeast Corridor of the US, the pan-Tropics, the pan-Arctic, as well as over the fully global domain. Elements of the system have been supported by a consortium of sponsors, including internationally UNEP, UNESCO, and UN World Water Assessment Programme; and in the US by NASA, NOAA, NSF, and EPA.*