



CHINA WATER
RISK

Water-nomics of the Yangtze River Economic Belt

XVI World Water Congress, Cancun, Mexico

2 June 2017

Feng Hu, China Water Risk

CHINA WATER RISK is a non-profit initiative dedicated to addressing business and environmental risk arising from the country's urgent water crisis.

We aim to foster efficient and responsible use of China's water resources by engaging the global investment and business communities, civil society and individuals in understanding and managing China's water risk.

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BIG PICTURE →

95.6%

of China's **electric power** requires **water** to generate.

47%

of **electricity** is consumed by **water** scarce provinces.

DISCOVER THE WATER ENERGY NEXUS IN THE BIG PICTURE

ANALYSIS →

Alleviating Water Scarcity in Cuba
UNESCO-IHE's Dr. Vazquez on how Cuba is alleviating its water scarcity issues through wastewater reuse, use of seawater and pilots in Cuba's growing tourism sector to ensure "Mas Agua Para Todos" ... [more](#)

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MEP says the 'overall environmental quality was average' but a closer look reveals mixed news, such as groundwater continues to worsen... [more](#)

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consumption and recharge. **China's** northern region has long suffered from **water** shortages, leading...

May 23 2014, The Chinese Academy of Sciences China's Hybrid Rice Set for World Record Yield The yield of China's new hybrid rice breed has topped 1,000 kg per mu (0.067 hectare), with the country set to break the world record in rice output through large-scale planting, according to a report released on Thursday. **a yield of 16 tonnes per hectare is achievable,"** Yuan said. **China**, the world's most heavily farmed country, faces problems including limited...

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With rising urbanisation and the need for more water & power in Chinese cities, water & sustainability expert, Robert Brears shares some price & non-price management tools to better manage urban demands ... [more](#)

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Biotech, new materials & trade could be the way forward to alleviate water stress in China's agriculture sector and ensure future supply. Check them out... [more](#)

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Coal's environmental costs in 2010 reaches RMB555.54 billion related with public health, deforestation, groundwater pollution ...

2014 World Water Week – Energy & Water
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Cloud computing consumes 623 TWh of electricity annually – more than all electricity generated in India. This means a lot of energy production, which means a lot of water ... [more](#)

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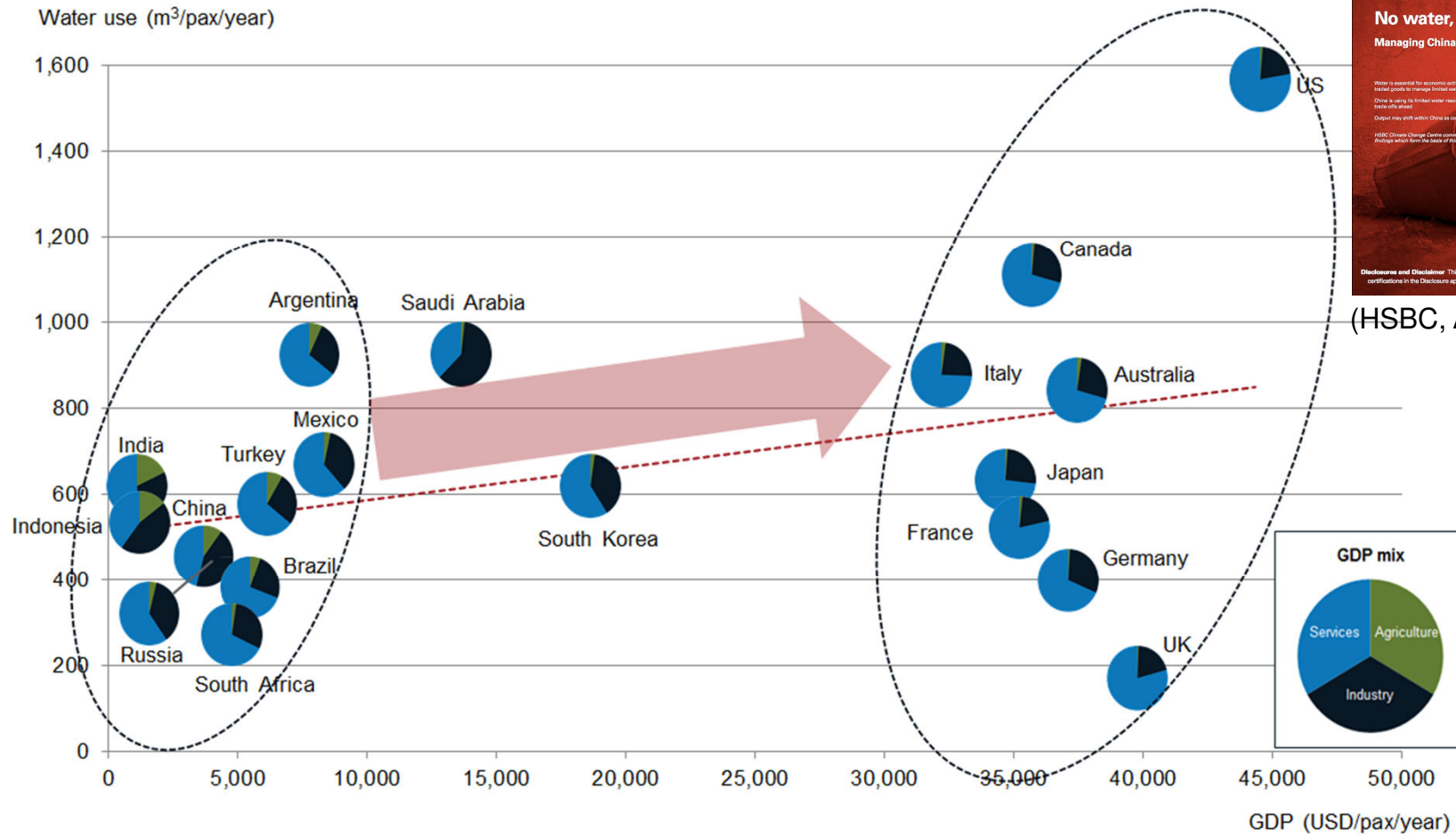
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G20 Water-nomics ...

Water is needed for development - changing GDP mix matters (G20 Per Capita Water Use vs. GDP)



(HSBC, August 2015)

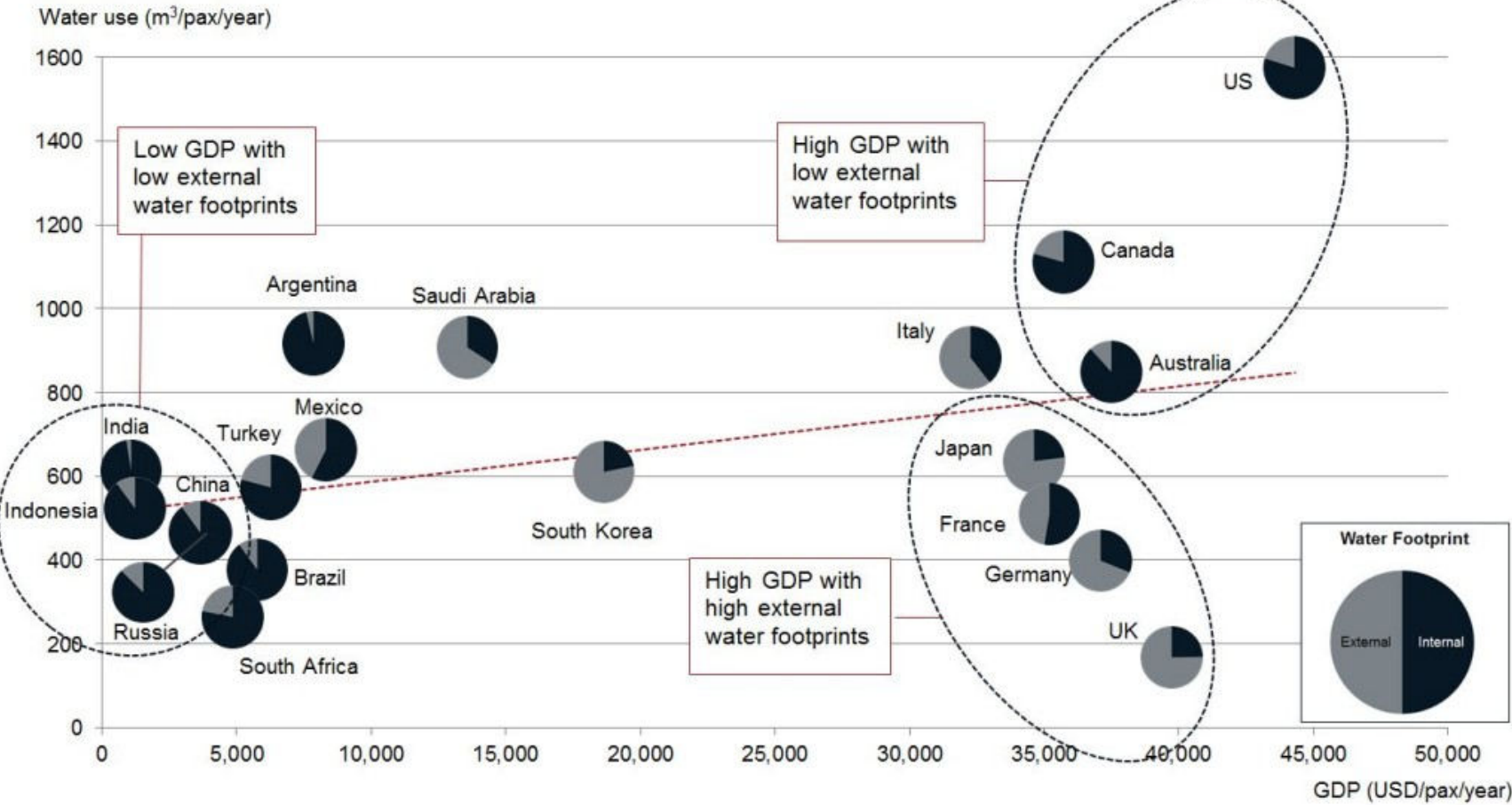


Source: China Water Risk based on FAO Aquastat, World Bank, NBSC

Note: For each country, the latest available data for water use is considered (ranging from 2000 to 2014). GDP at that year is expressed in Constant 2005\$

Use other people's water ...


Outsourcing water - imports can help reduce domestic water use (G20 Per Capita Water Use vs. GDP)



Source: China Water Risk based on FAO Aquastat, World Bank, NBSC, Water Footprint Network
 Note: For each country, the latest available data for water use is considered (ranging from 2000 to 2014). GDP at that year is expressed in Constant 2005\$

China's real liquidity constraint ...


Annual Renewable Water Resources

 = 2,015m³
(2003-2013)



\$\$\$

U.S. Annual Water Withdrawal

 1,583m³
(2005)



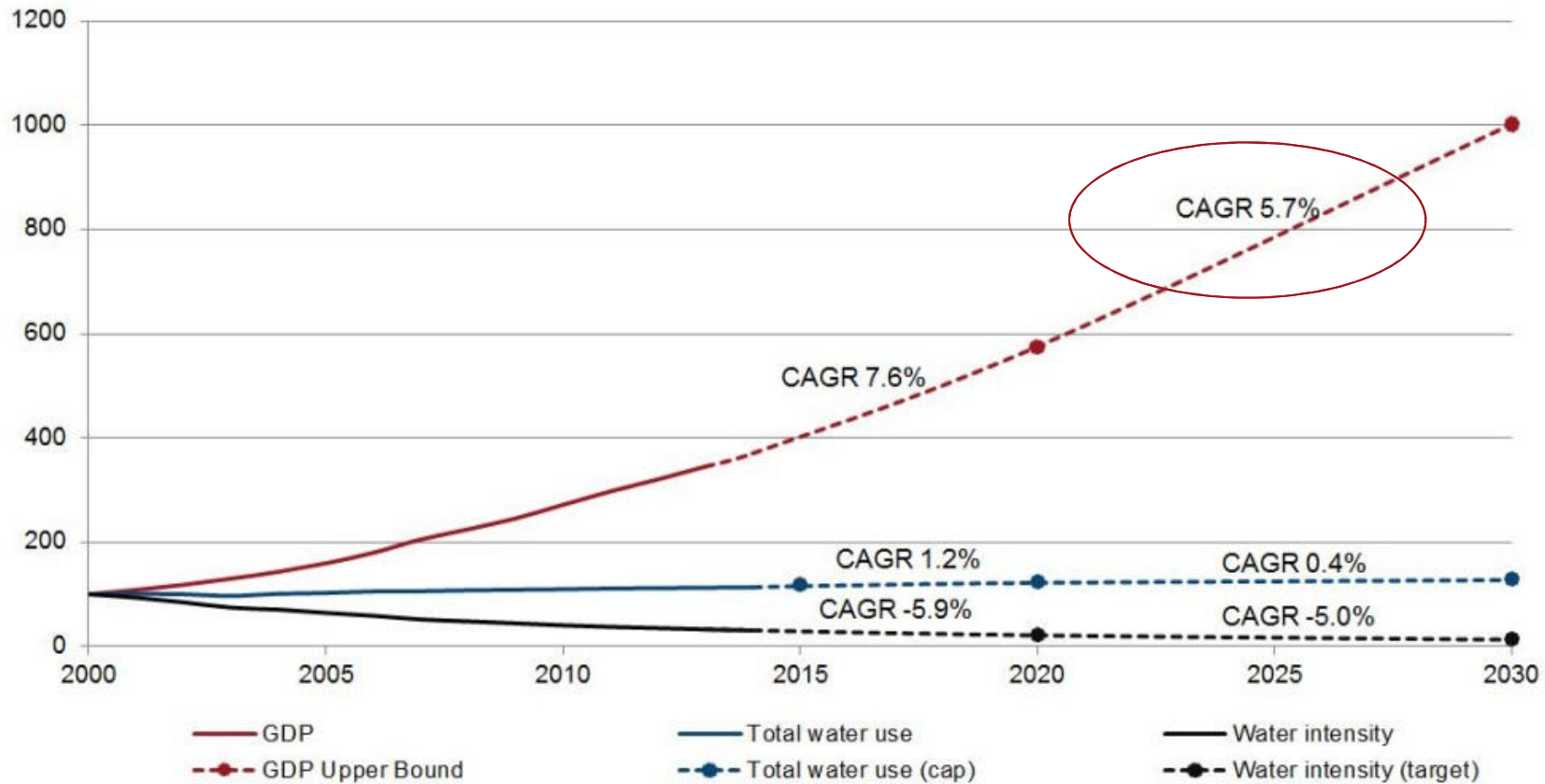
There is no choice but to do "business unusual"

Water Red Lines will affect China's GDP



2000-2030F Maximum GDP Growth Given Water Use Caps & Intensity Targets

Indexed to 100



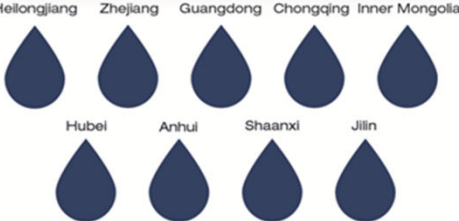
Source: China Water Risk based on NBSC, MWR, MEP
 Note: CAGR values correspond to the periods 2014-2020 and 2020-2030

Provincial difference in water pressure

Safe 11

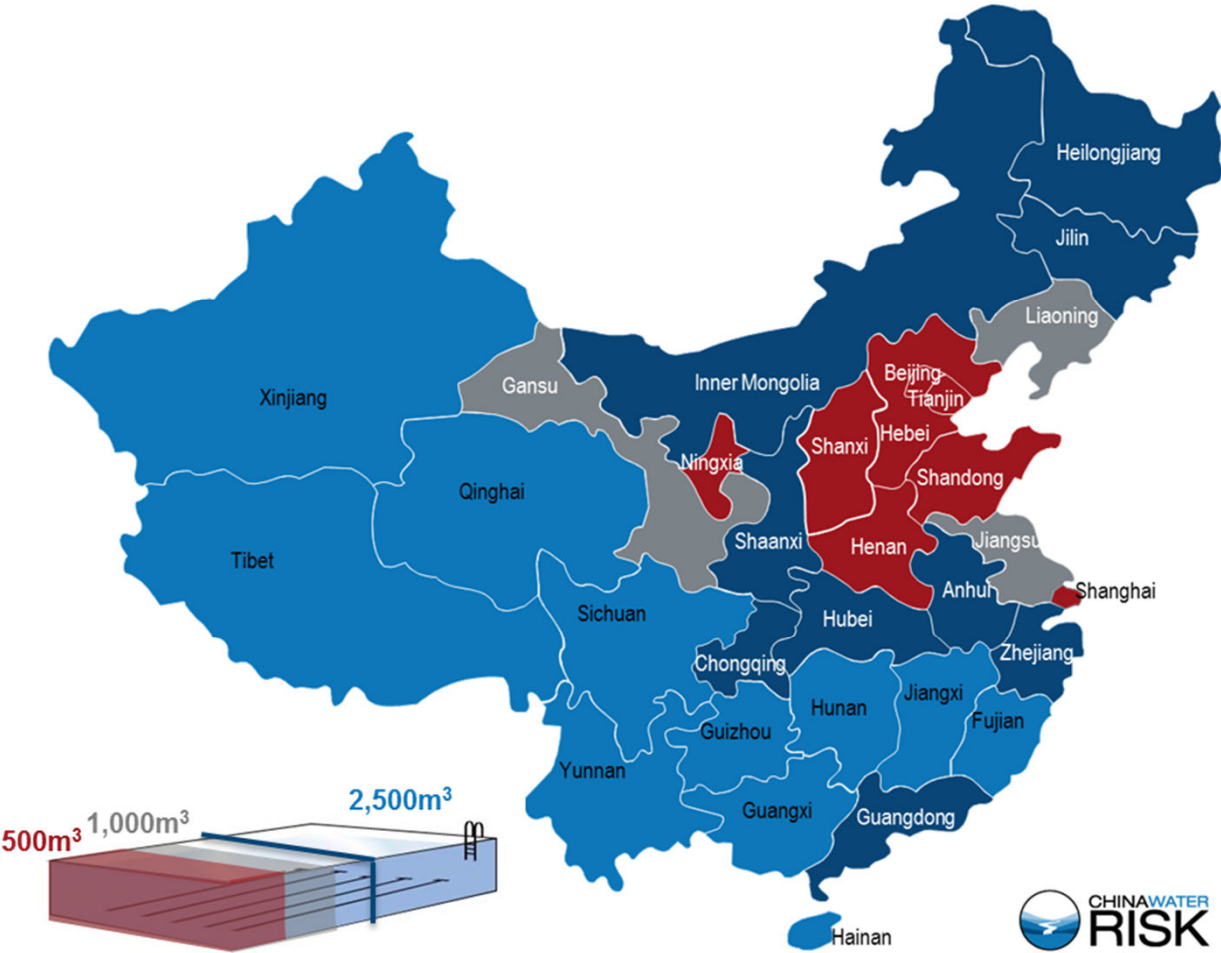
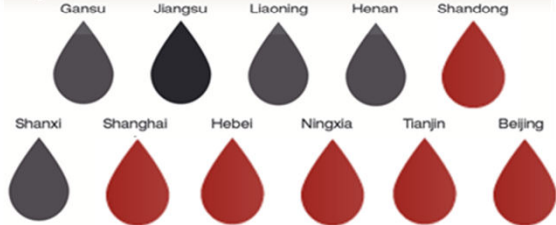


At Risk 9



1,000m³ Renewable Water Resource per capita per annum

Dry 11



45% of China's GDP from the Dry 11

Case Study: Yangtze River



WATER-NOMICS OF THE YANGTZE RIVER ECONOMIC BELT

Strategies & recommendations for green development along the river

Foreign Economic Cooperation Office,
the Ministry of Environmental Protection of the People's Republic of China
China Water Risk

June 2016



36 | 政策 | 共抓大保护 永葆长江丰沛活力

基于水经济学理论的长江经济带绿色发展策略与建议

Green Development Strategy and Advices for Yangtze River Economic Belt Based on Water-nomics Theory

摘要 长江经济带是中国人口最多、经济最活跃的区域之一，在当下不被人开发，并无人保护的指导思想下，具有引领中国走向绿色发展的重任。本文基于水经济学和长江经济带的水经济学，通过分析长江经济带中“水”的产业结构对经济发展与水资源与水环境的影响，结合用水量和水资源与水环境的关系，提出在长江经济带中实现绿色发展的策略与建议。优化产业结构和产业结构以绿色经济表现，通过优化产业结构实现绿色发展的策略与建议。

关键词 长江经济带；水经济学；绿色发展；水管理；水环境

长江经济带 绿色发展 策略与建议

2015年11月21日，习近平总书记在北京会见中外记者，就长江经济带发展提出明确要求。长江是中华民族的母亲河，也是中华文明的重要发祥地。长江经济带发展必须从中华民族长远利益考虑，保持长江经济带良好生态。3月25日，《长江经济带发展规划纲要》审议通过，强调长江经济带发展的战略定位必须坚持生态优先、绿色发展的原则，不搞大开发，要着力推进创新发展动能上移“加法”，在淘汰落后产能上做“减法”。长江经济带，作为人口最多、经济最活跃的地区之一，对国家经济、环境、水安全、粮食安全和国防安全都具有重大意义。要实现生态优先、绿色发展，需要探索和推进水管理策略。

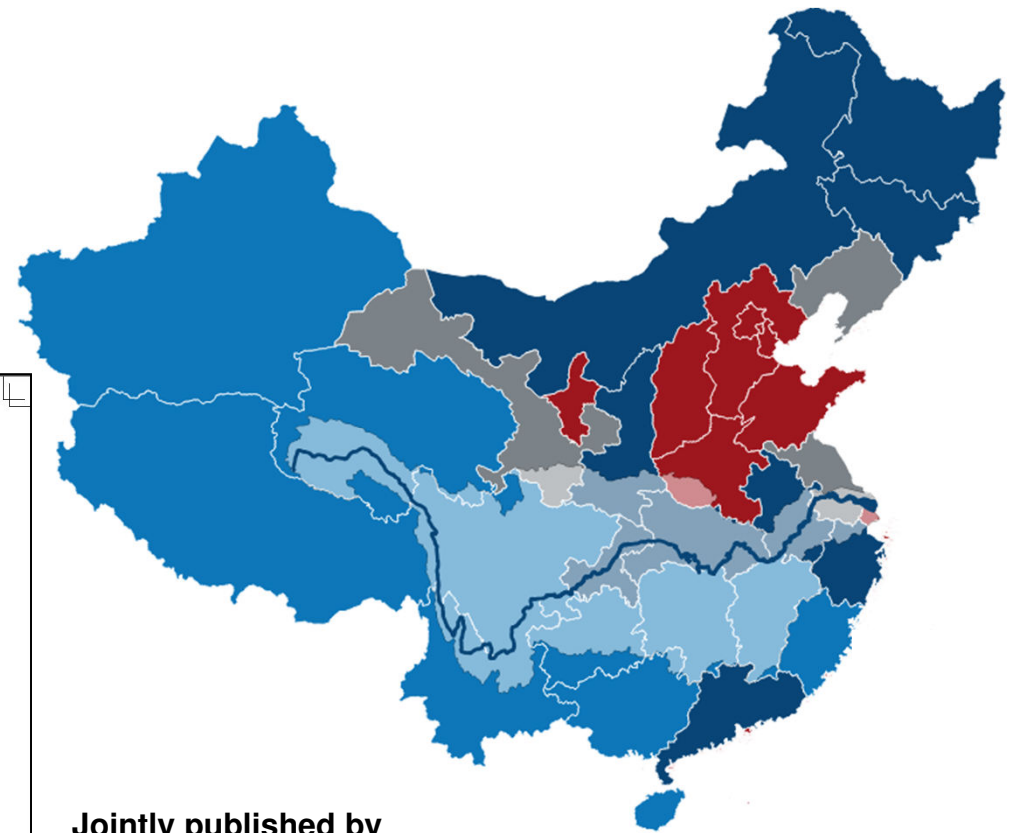
水经济学概述：以G20国家为例

水发展的基本要素，合理的产业结构和有利于水资源有效利用的国家政策。本文分析了G20国家的水资源利用情况，从水资源利用和产业结构、产业结构、农业占比较低的国家处于下游，用水较少且不再，服务业占比较高国家用水更多。G20国家在保障粮食安全的的同时，利用较少的水资源实现经济增长的经验，值得借鉴。

结论：减少用水量

一些发达国家主要是通过较高的水资源效率（也就是进口水资源密集型，取得更多的产品），“外化”一部分国内用水需求，从而利用有限的水资源实现了经济发展。从图3可知，高收入、高水资源效率的国家如日本、美国、德国和英国，通过提高的水资源效率，实现了了较高的GDP和较低的水资源消耗。高GDP、低外部水足

图3 G20国家的人均GDP、人均用水和人均GDP



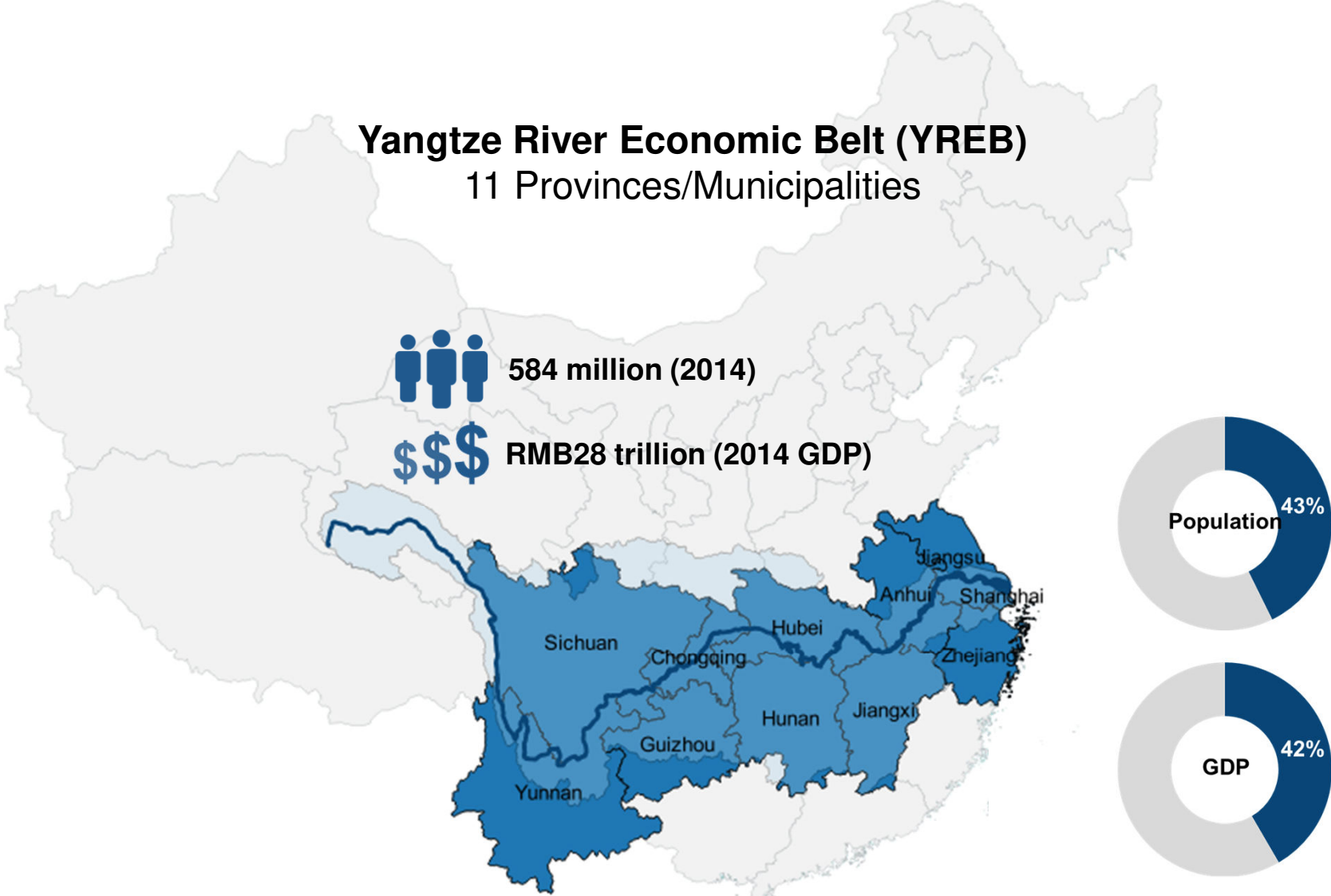
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China Water Risk

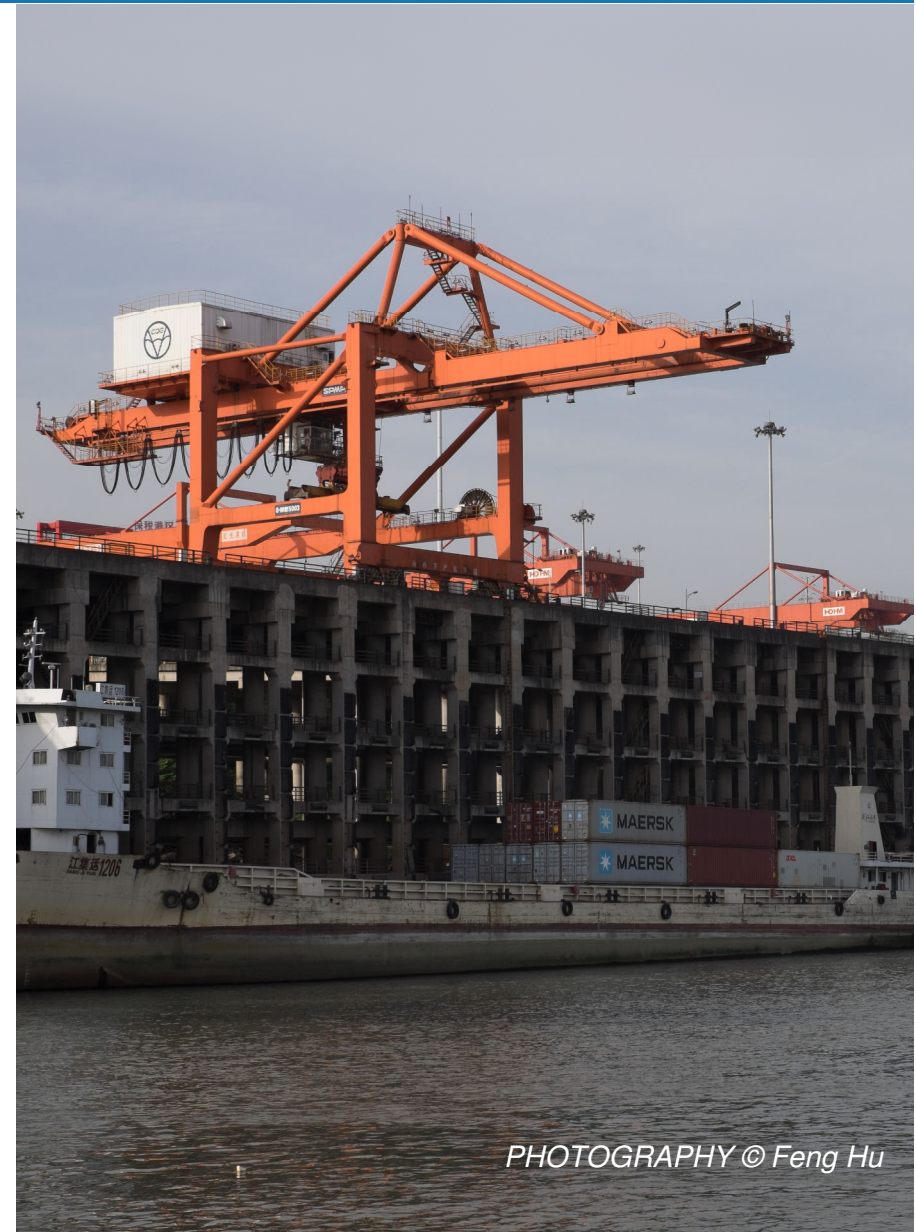
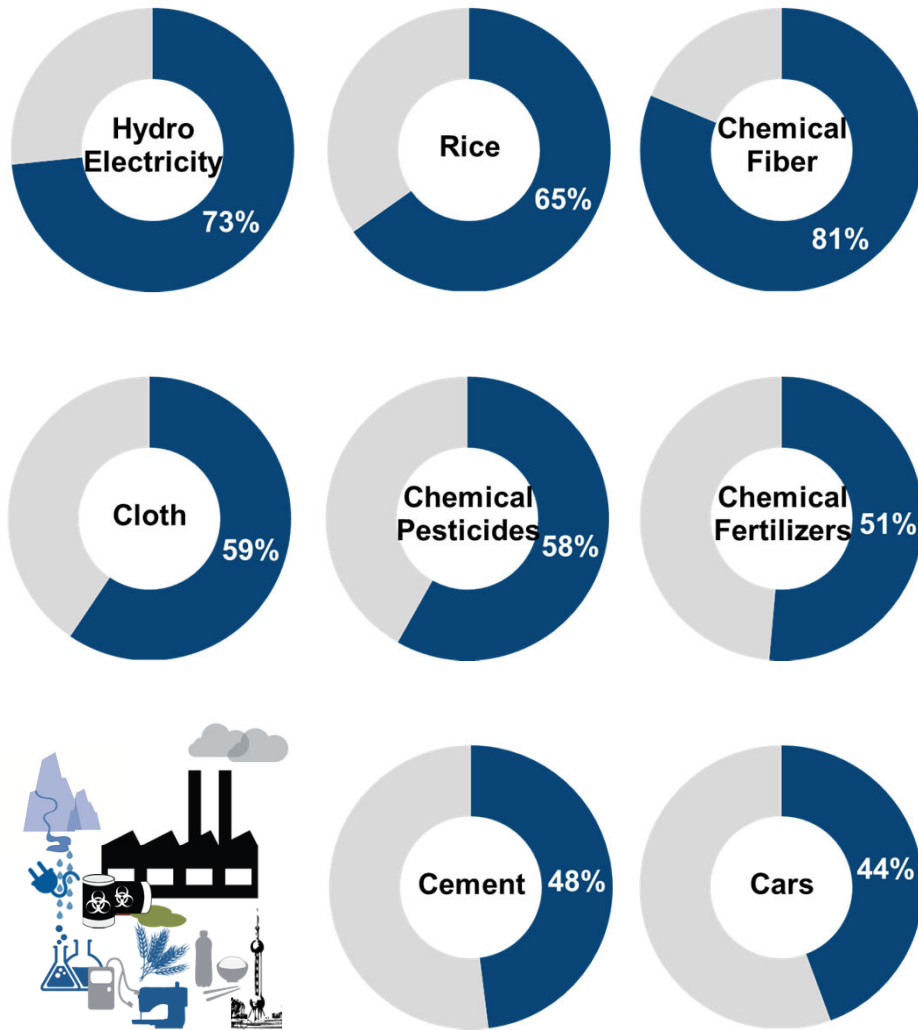
Base map data are from Data Center for Resources and Environmental Sciences, Chinese Academy of Sciences

Case Study: Water-nomics in YREB



Source: China Water Risk based on National Statistical Bureau of China
Base map data are from Data Center for Resources and Environmental Sciences, Chinese Academy of Sciences

Case Study: Water-nomics in YREB



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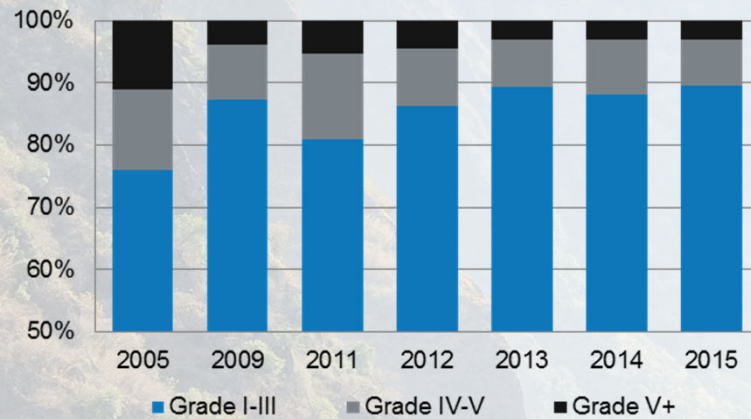
Source: China Water Risk based on National Statistical Bureau of China

Case Study: Water-nomics in YREB



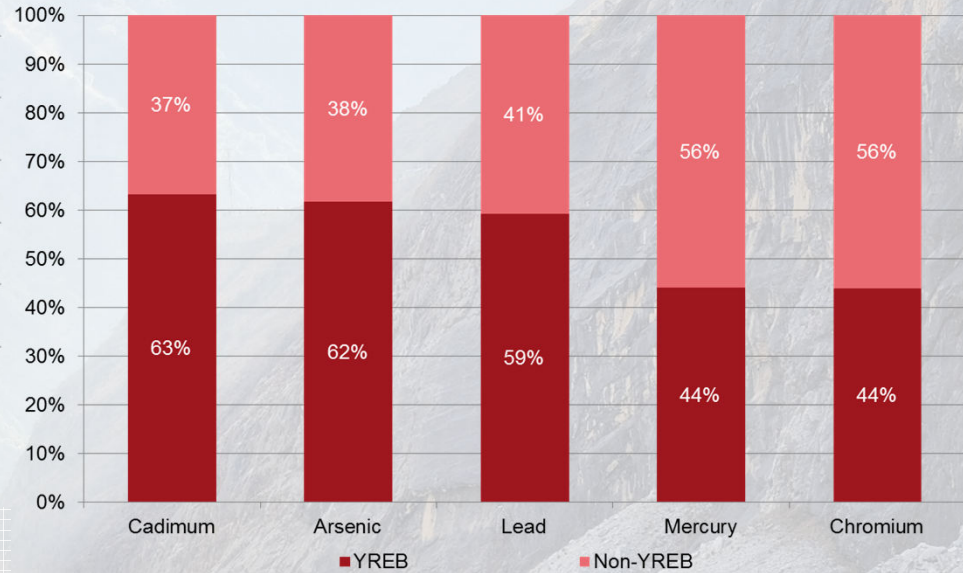
Water quality of Yangtze is improving

% of monitored points



Source: China Water Risk based on MEP's State of Environment annual reports (various years)

**YREB Heavy Metal Emissions in Wastewater - Disproportionately High
2014 YREB vs Non-YREB**



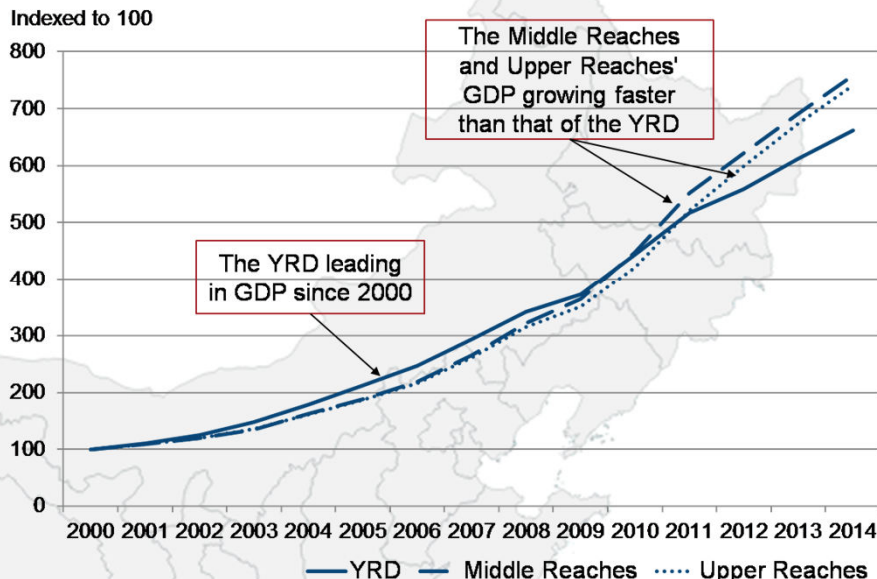
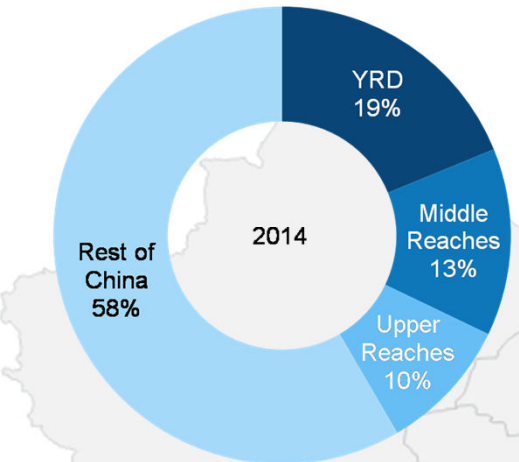
Source: China Water Risk based on National Statistical Bureau of China

Overall water quality improving but risk from heavy metal pollution still high

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Case Study: Water-nomics in YREB

The YRD leads the YREB in GDP but upstream growth is rising faster than the YRD
 YREB regions' GDP share and historical trends



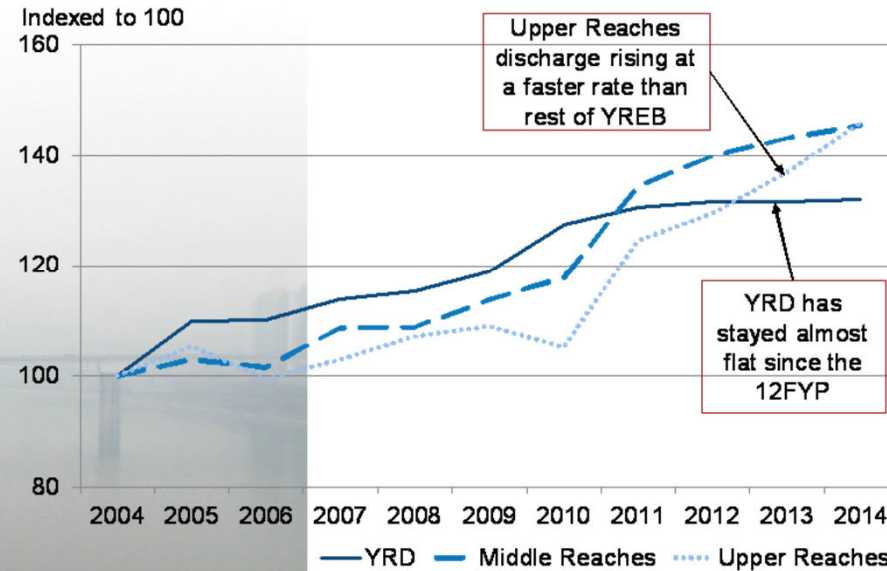
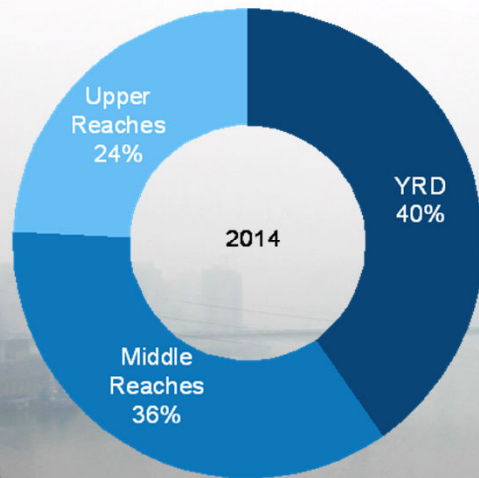
Source: China Water Risk based on National Statistical Bureau of China



Source: China Water Risk based on National Statistical Bureau of China
 Base map data are from Data Center for Resources and Environmental Sciences, Chinese Academy of Sciences

Case Study: Water-nomics in YREB

YREB wastewater discharge – Upper Reaches' discharge rising faster than the rest
Regional share and historical trends of wastewater discharge

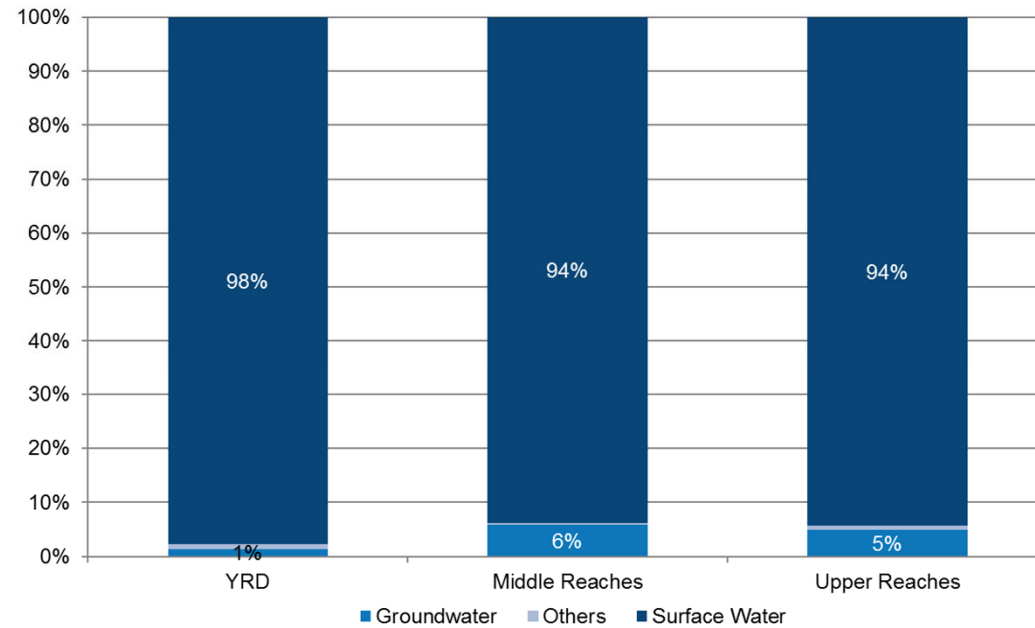


Source: China Water Risk based on National Statistical Bureau of China

Wastewater from Upper Reaches rising faster than rest of YREB in 12FYP

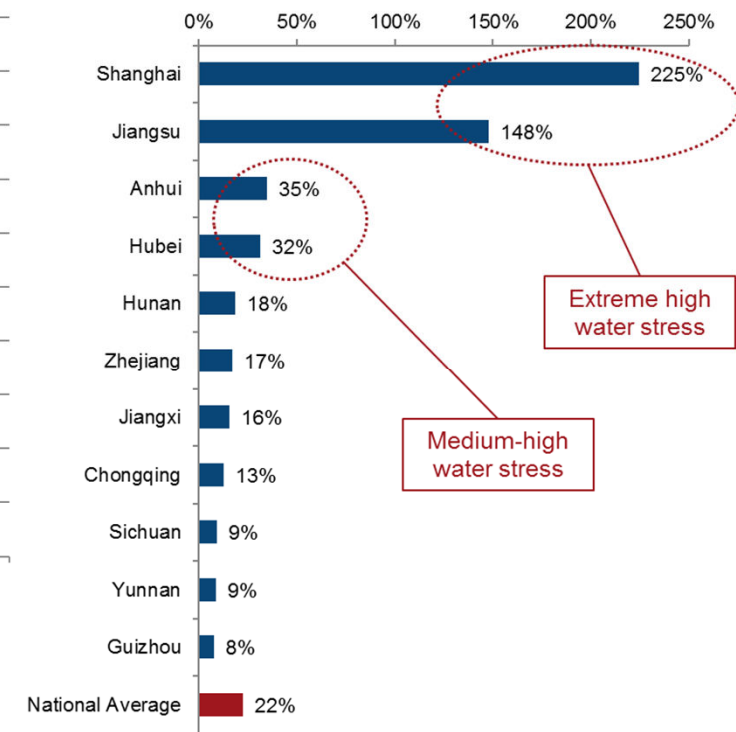
Case Study: Water-nomics in YREB

**YREB water supply- heavily reliant on surface water
2014 water supply by type (%)**



Source: China Water Risk based on National Statistical Bureau of China

**YREB Provinces: Water Use-to-Availability Ratio
2014 Water Use/Available Water Resources**

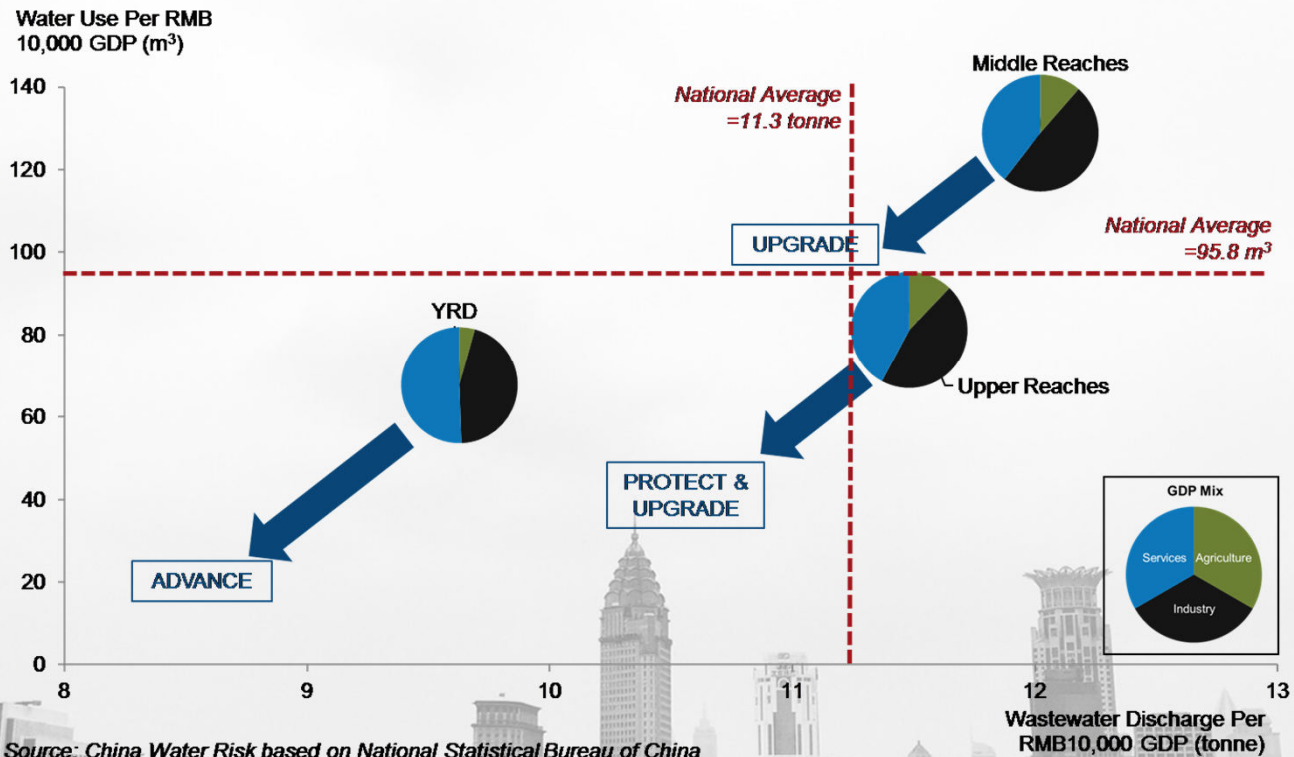


Source: China Water Risk based on National Statistical Bureau of China

Pollution exacerbates scarcity in already highly water stressed YRD

Case Study: Water-nomics in YREB

2014 YREB Regions: Per RMB10,000 GDP Water Use and Wastewater Discharge

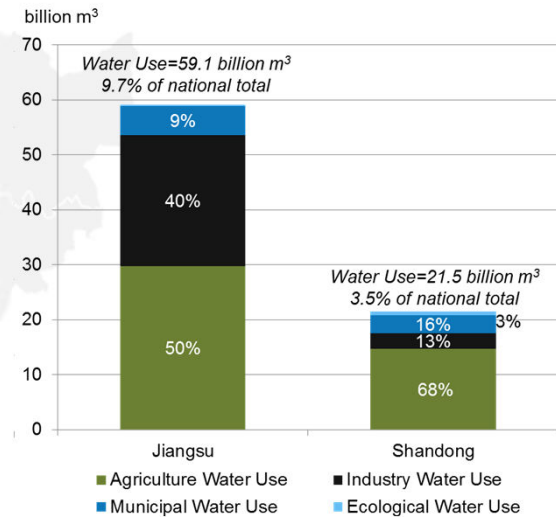


Embedding water & climate into economic planning & decision making

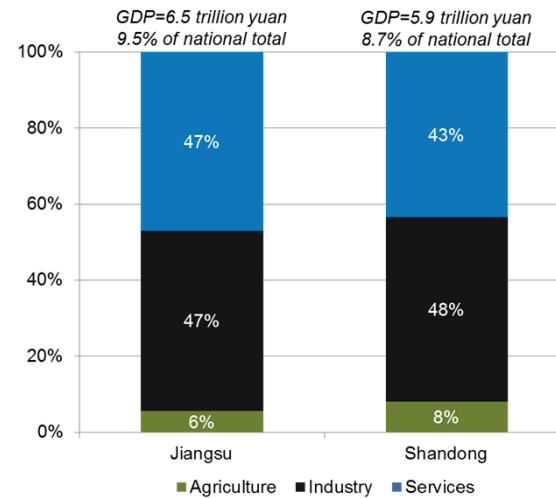
Case Study: Yangtze River Economic Belt



2014 Water use mix: Jiangsu vs Shandong

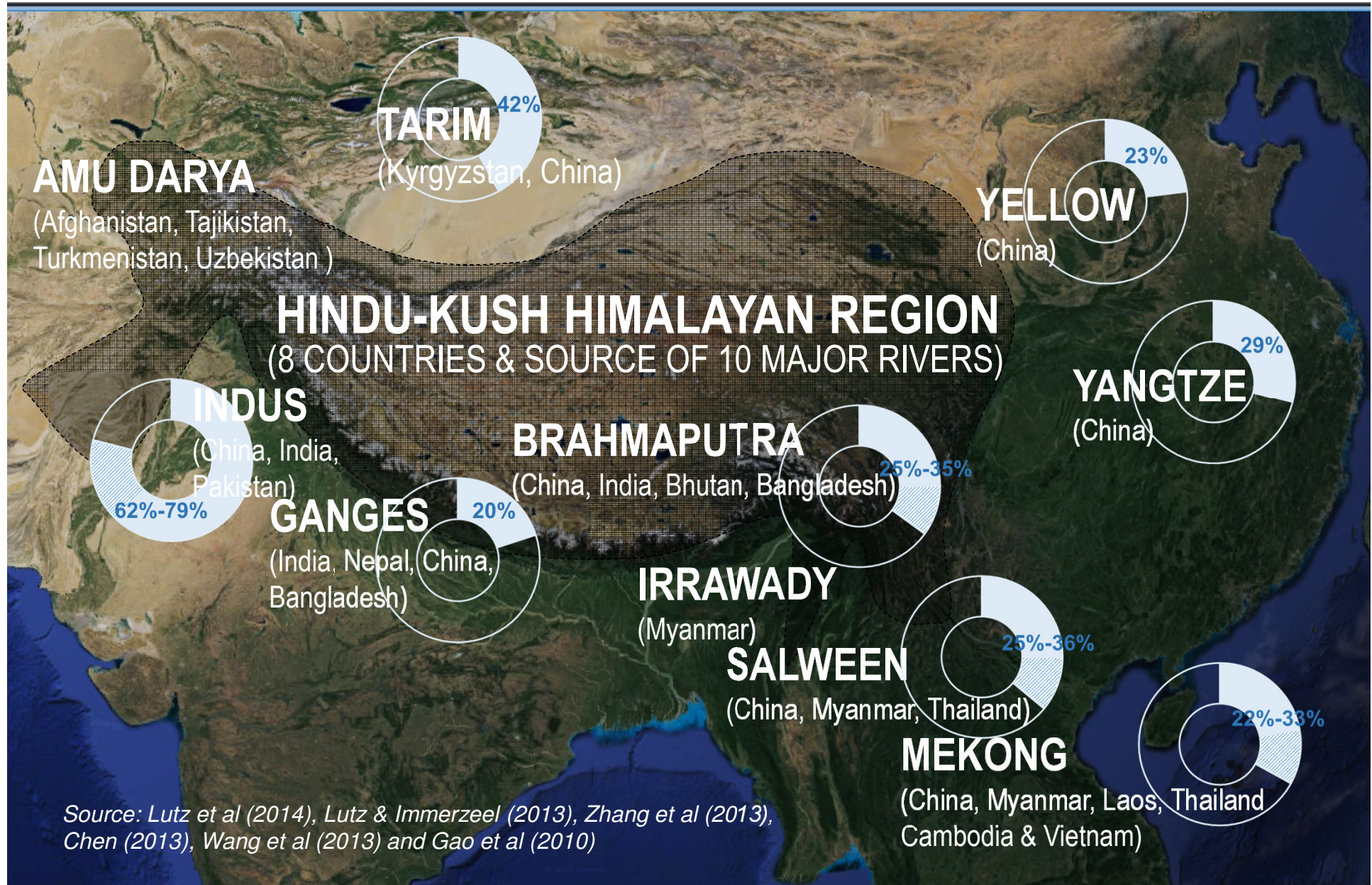


2014 GDP mix: Jiangsu vs Shandong



Source: China Water Risk based on National Statistical Bureau of C

Looking beyond: HKH Rivers for 16 countries ...





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