



Bundesministerium
für Bildung
und Forschung

Promoting International Wastewater Activities

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Sino-German Dialogue Forum on Sustainable Urban Development
Infrastructure Solutions in Key Urban Sectors

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www.bmbf.de

§ **Water - Challenges of a Changing World**

§ **Germany's Programmatic Frame**

§ **Developing Solutions for the Future:
BMBF's Water Research Program**

§ **Sino-German Cooperation in the Field of Water:
Research and Innovation Programme "Clean Water"**

§ **Conclusions**



Water: Challenges of a Changing World

Climate Change



Demographic Change



Water, Land, and Resource Management

Urbanization

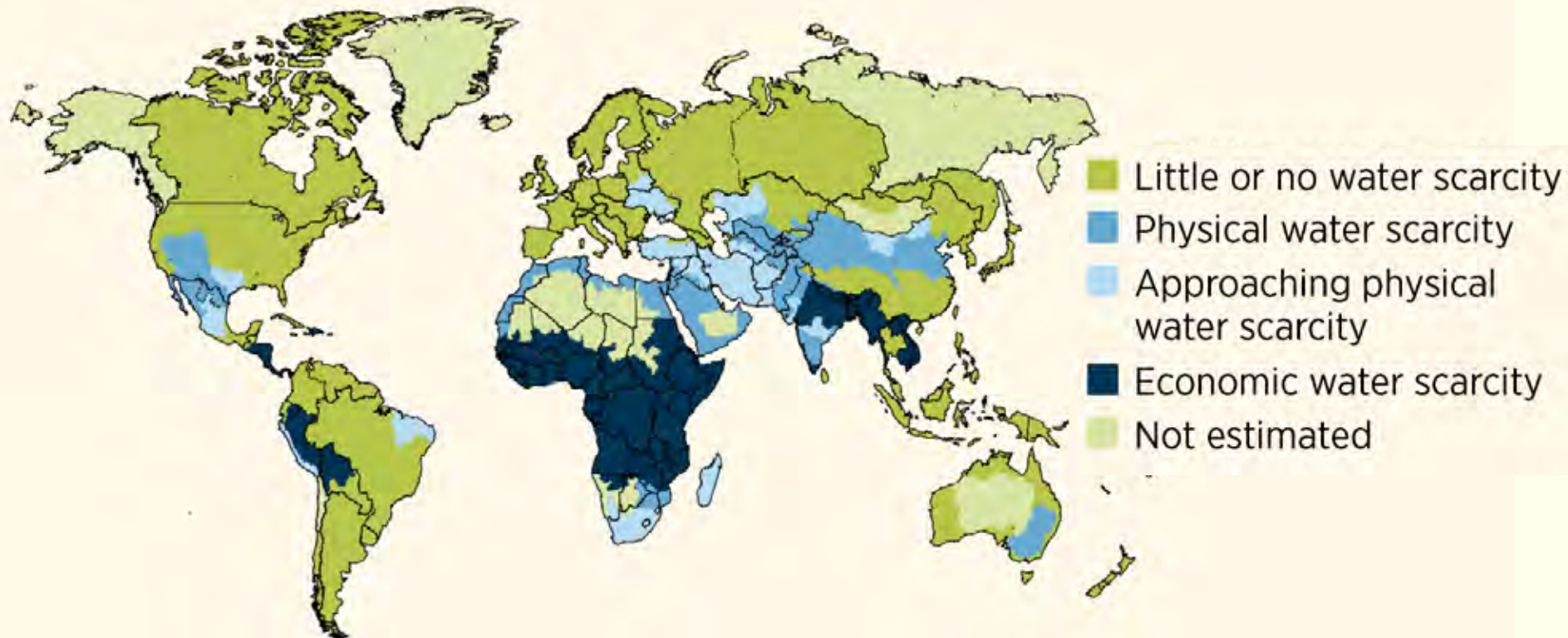


Changes of Ecosystems





Global physical and economic water scarcity



UNESCO 2012

- § **No access to basic sanitation**
(~ 2.5 billion people)
- § **Sewage discharged untreated**
(about 80 - 90%)
- § **Waterborne diseases**
(cholera, typhoid...)
- § **More than 14,000 deaths daily**



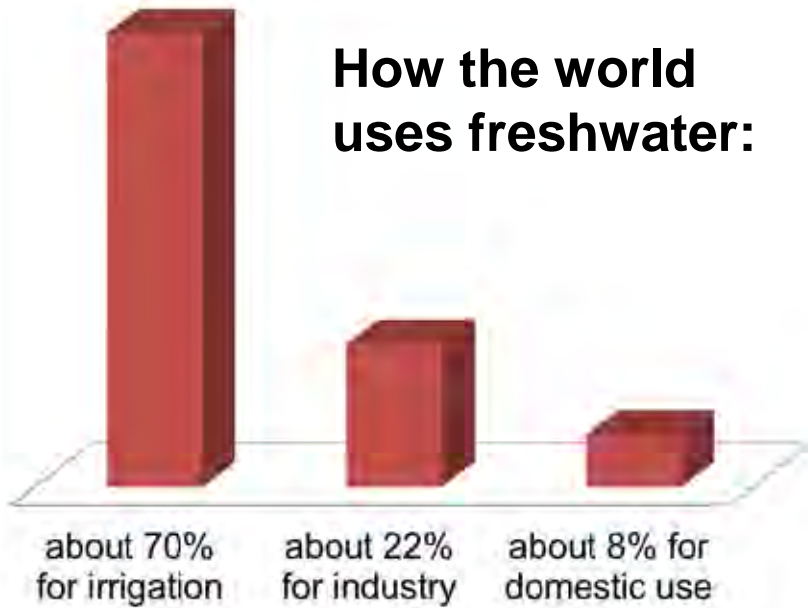
REUTERS/China Daily, 2014



India, 2015

Water Wastage: Agriculture and Water Losses

How the world uses freshwater:



**Excessive water use for
agriculture:**

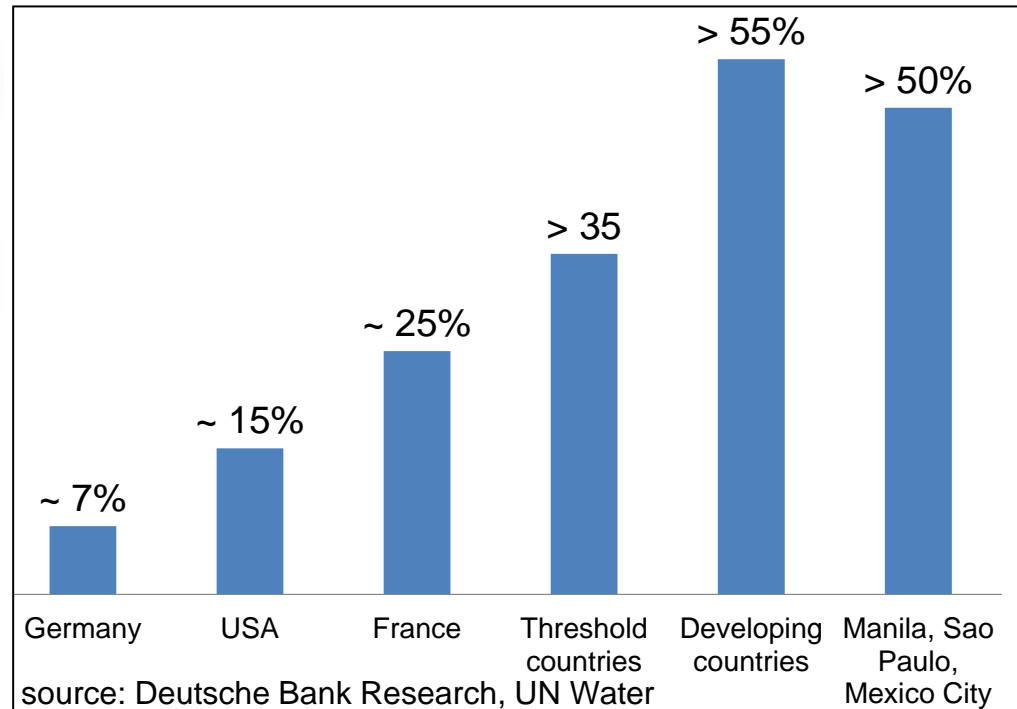
**Dry rivers, lakes, and
underground water sources
in many irrigated areas**

Drinking water losses worldwide

~ 45 million m³/day

~ 18 billion US \$/day

~ Water for 200 million people



Water Wastage – Water footprint

- § Water footprint: the amount of water used to produce each of the goods and services we use
- § Tap water consumption of Germany, USA, Japan:
125 – 300 liters per inhabitant and day
- § Water footprint of Germany, USA, Japan:
~ 5000 liters per inhabitant and day



source: WWF



Water Wastage – Water footprint

One possible solution?





Water Wastage – Water footprint



probably not because

~ 75 l to make a glass of beer (250 ml)

~ 200 l to make a glass of wine (250 ml)

Germany's Action Programmes

§ General Governmental Policies

- The New High-Tech Strategy
- The National Sustainability Strategy



§ BMBF - National Programmes:

- Research for Sustainable Development (FONA)
- Sustainable Water Management (NaWaM)



§ BMBF - International Programmes:

- The Internationalization Strategy
- International Partnerships for Sustainable Technologies / Services for Climate Protection & the Environment (CLIENT)
- Integrated Water Resources Management (IWRM)





Innovative Management of Urban Water

- Rainwater collection and treatment for use as service water
- Separate collection and treatment of grey water, black water and yellow water for different reuse purposes
- Anaerobic wastewater treatment (possibly together with bio waste) and production of biogas
- Vacuum / pressure sewer systems
- Modular concept to adapt to urban growth and reduce the size of the supply and disposal network
- ...
- Reduction of water losses



Implementation of Innovative Urban Water Systems Demonstration Scale Projects KREIS & SEMIZENTRAL

„KREIS“, Hamburg, Germany

§ ~ 2,000 residents

§ Construction project of Hamburg city



„SEMIZENTRAL“, Qingdao, China

§ ~ 15,000 residents

§ Construction project of Qingdao World Horticultural Development company



Implementation of Innovative Urban Water Systems Demonstration Scale Projects KREIS & SEMIZENTRAL

„KREIS“, Hamburg, Germany

„SEMIZENTRAL“, Qingdao, China

Separate collection and treatment of grey and black water,
anaerobic black water treatment, generation of power and heat

§ Grey water discharge into a local
water body

§ Black water vacuum system

§ Grey water reuse for toilet flush

§ hydraulic water system

§ energy self-sufficient by addition
of bio waste from restaurants

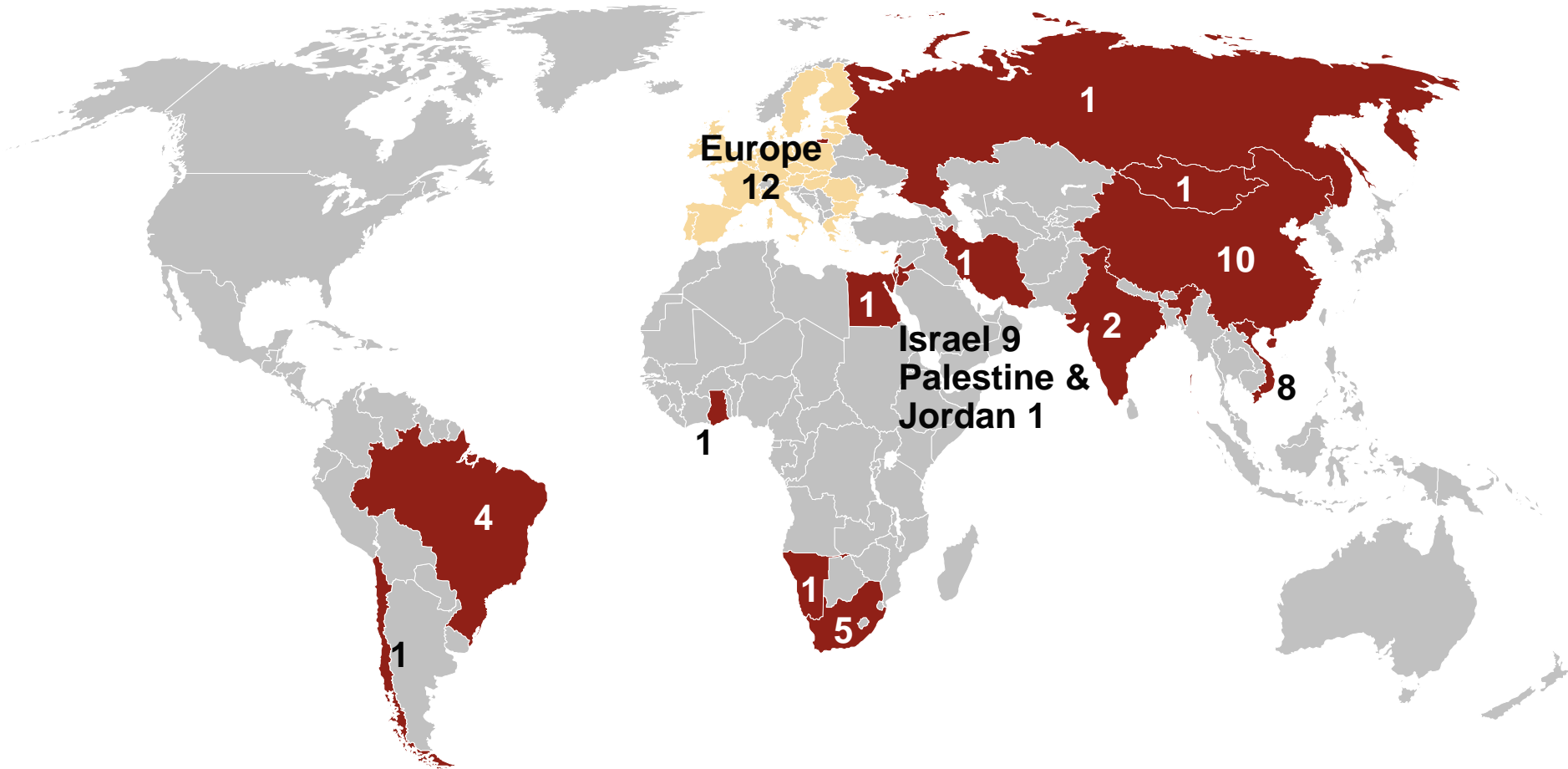
Rain water

§ local infiltration

§ no implementation



Promoting International Water Activities BMBF Division Resources and Sustainability



**Number of Project Networks in the Field of Water Management,
Land Management, and Resources**

Sino-German “Research and Innovation Programme Clean Water”

- § Sino-German research and innovation programme “Clean Water” signed by MoST and BMBF (Berlin, June 2011)
- § Sino-German “Cooperation within the China Major Water Programme” signed by MoST and BMBF (Beijing, May 2015)

Gemeinsame Absichtserklärung
zwischen
dem Bundesministerium für Bildung und Forschung
der Bundesrepublik Deutschland
und
dem Ministerium für Wissenschaft und Technologie
der Volksrepublik China
über die
Wissenschaftlich-Technologische Zusammenarbeit im Megawasser-Programm
zur Behandlung und Kontrolle der Wasserverschmutzung der VR China.

中华人民共和国科学技术部
与
德意志联邦共和国联邦教育与研究部
关于就中国水体污染控制与治理科技重大专项开展科技合作的
联合意向声明



Kick-off and Signing ceremony
“Cooperation within the Major Water Programme”
MoST, Dr. CAO Jianlin; BMBF, Dr. Georg SCHÜTTE

Sino-German Cooperation within the “Major Water Programme”

High-priority Major Water Projects in China

Lake Tai
(Suzhou city,
Wuxi city)

SIGN – Masterplan for Lake Tai; Focus: Water supply network (Monitoring and early warning, drinking water treatment and distribution) and urban catchment

Lead: Technologiezentrum Wasser, Karlsruhe

Liao River
(Shenyang city)
Lake Dian
(Kunming city)

SINOWATER – Masterplan for the Liao River and Lake Dian; Focus: Waste water and sludge treatment, monitoring concepts for quality control

Lead: RWTH Aachen / FIW

Lake Chao
(Hefei city,
Chaohu city)

URBAN CATCHMENTS – Masterplan for Lake Chao; Focus: Urban water management (urban water systems, surface water quality)

Lead: Helmholtz-Zentrum für Umweltforschung, Leipzig



Sino-German Innovation Cluster "Major Water"



Major Programme Office,
Division Major Water Programme
MoST

Major Water Programme
Management Office
MEP

Major Water Programme
Management Office
MoHURD

Division Resources
and Sustainability
BMBF



Innovation Cluster "Major Water"
Spokesmen: Prof. Dohmann & CHN-Spokesmen

Sino-German
SINOWATER
project

Sino-German
SIGN
project

Sino-German
URBAN CATCH-
MENTS project



Provincial and Local Governments
(Environmental Protection & Construction Bureaus)

→ Implementation (via credits given by donor banks, i.e. KfW, ADB..)

§ **Research & Innovation are the base for a sustainable future**

§ **More aspects are important for water management**

- **Boundary conditions** (structures, institutions, laws, ...)
- **People** (informed citizen, committed local authorities, qualified operational personal, ...)
- **Costs** (cost-covering water price, higher investment costs for innovative systems, long / medium-term advantages of energy & water recovery)

§ **Outlook:**
Future BMBF research projects intent to cover all relevant aspects



Thank you

谢谢