

Support to the Government of China in Groundwater Monitoring for Safe Drinking Water Supply

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Water Concerns People

Declaration of the UN Conference on the Human Environment, Stockholm (1972)

- 'A point has been reached in history when we must shape our actions throughout the world with a more prudent care for their environmental consequences.'

UN Millennium Declaration (2000):

to halve (from 1990) the proportion of people who are unable to reach or to afford safe drinking water by 2015.

UNICEF began its first water project in 1987 in China

1996-2000 – 9th Five-Year

Provision of safe drinking water

2001-2005 – 10th Five-Year

Groundwater monitoring for arsenic mitigation + strengthening regular water quality monitoring; advocacy for increased government investment in community water supply and user's participation in planning, implementation and O&M

2006-2010 – 11th Five-Year

Above + monitoring the implementation of Government's 11th Five-Year water supply works + climate change impact on groundwater



Project on Arsenic Mitigation and Management (2001-2010)

- Developed arsenic testing kit
- Trained health workers from central to local level for the water arsenic testing and examination of arsenicosis patients
- Screened water wells for high level of arsenic and made clear of affected areas and affected population
- Facilitated in the information exchange between sectors and planning for providing safe water to affected people.
- Supported in building the capacity in information management by establishing a GIS system and train staff for data entry and analysis
- Educated local people to shift to safe drinking water sources through health communication activities.
- Supported the inter-regional capacity building on arsenic monitoring and patient examination etc

Arsenicosis-affected provinces, 2008

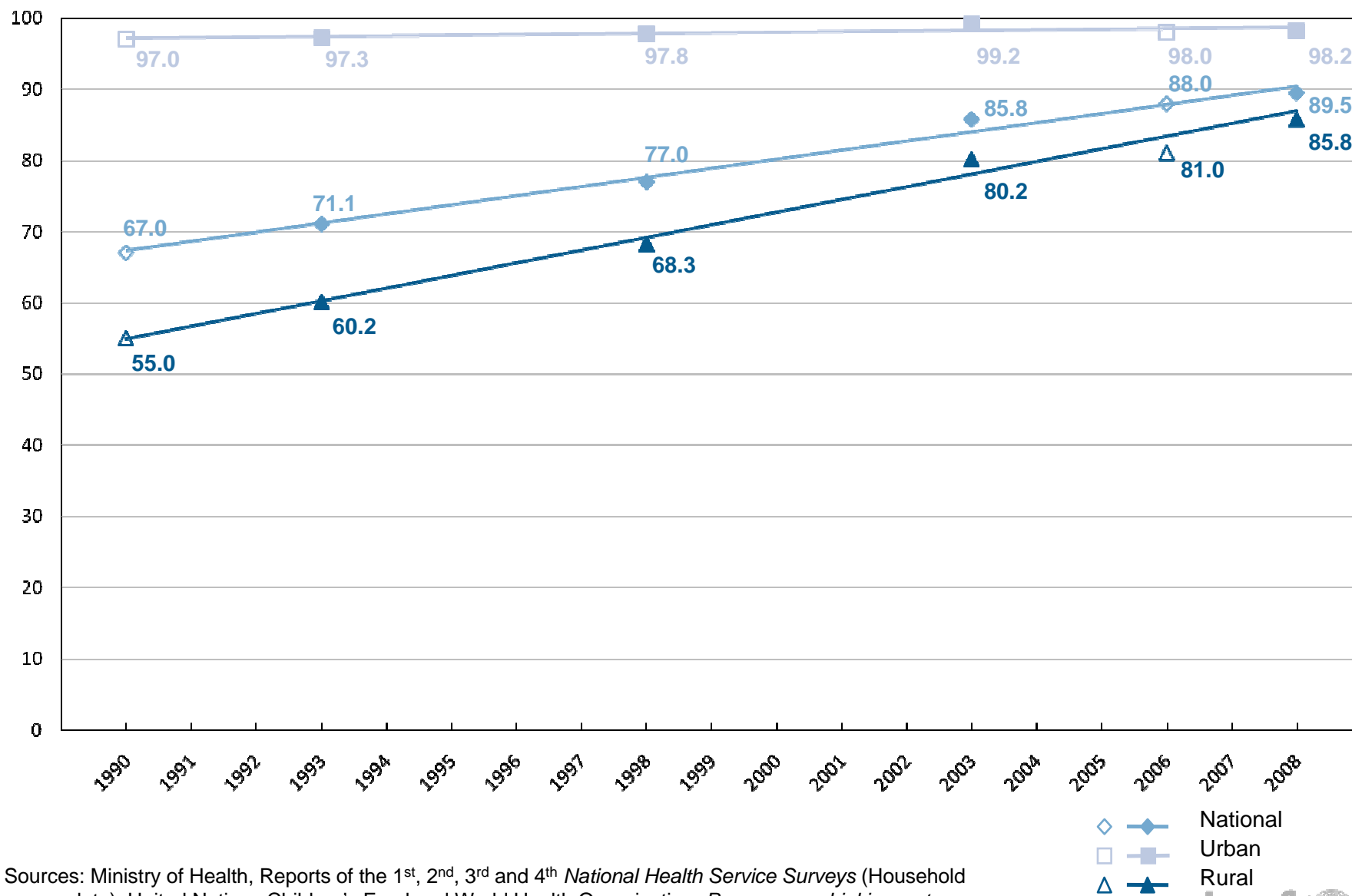


Project on Strengthening Rural Drinking Water Quality Monitoring Network (2003-2010)

- Supported to revitalize the rural drinking water quality monitoring program started in 1993
- Integrated arsenic monitoring into the regular monitoring program
- Built local capacity for more provinces and counties to join the program including training sub-national CDC staff in designing the local program, sampling, testing, data analysis, reporting and quality control.
- Supported the development of a program for the monitoring of newly built rural water supply works planned for the 11th-Five-Year period.
- Integrated the monitoring of newly constructed water works into the regular rural water quality monitoring program.
- More than 20 water quality parameters are now monitored at 50,000 sites each year.

Percentage of households using improved water sources, 1990–2008

Percentage of households/population

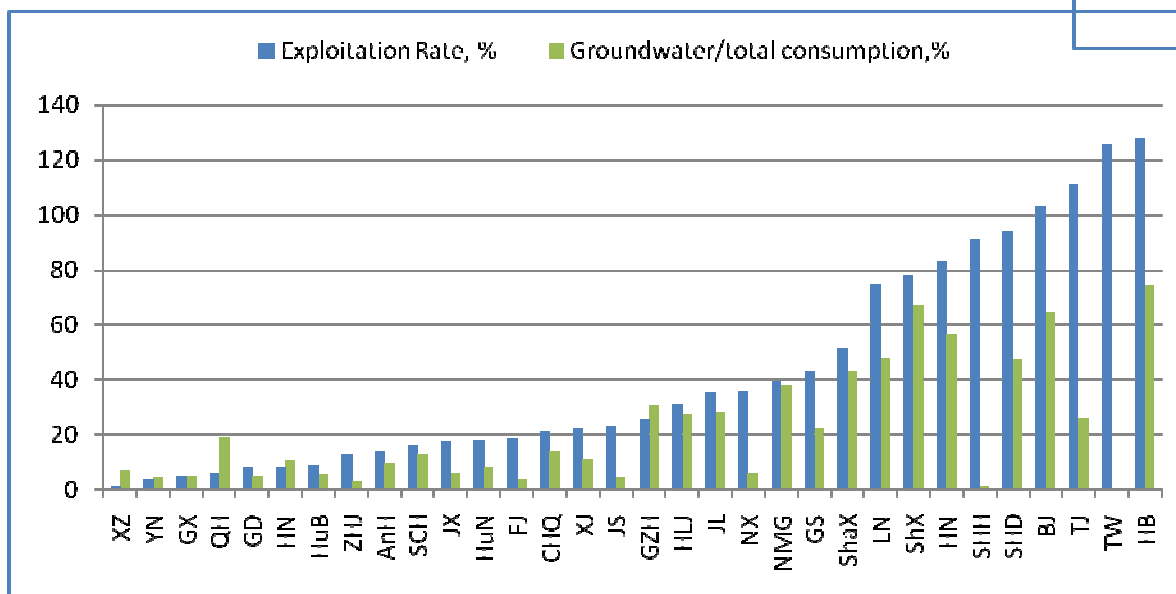
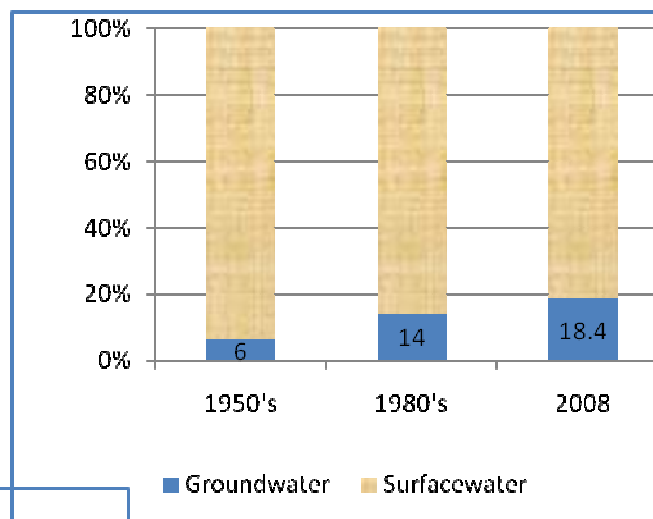


Sources: Ministry of Health, Reports of the 1st, 2nd, 3rd and 4th *National Health Service Surveys* (Household survey data); United Nations Children's Fund and World Health Organization, *Progress on drinking water and sanitation, special focus on sanitation*, 2008 (1990 and 2006 data)

Groundwater Plays an Important Role

1. Groundwater reserve is around 760 billion M³/a, accounting for 26.8% of the total water reserve (2,841 billion M³/a);
2. Around 60% of groundwater is used for agriculture and industries and domestic activities each uses 20%.
3. Over exploitation of groundwater occurs in northern China, the safety is endangered.

Use of Water over time
Ground vs. surface

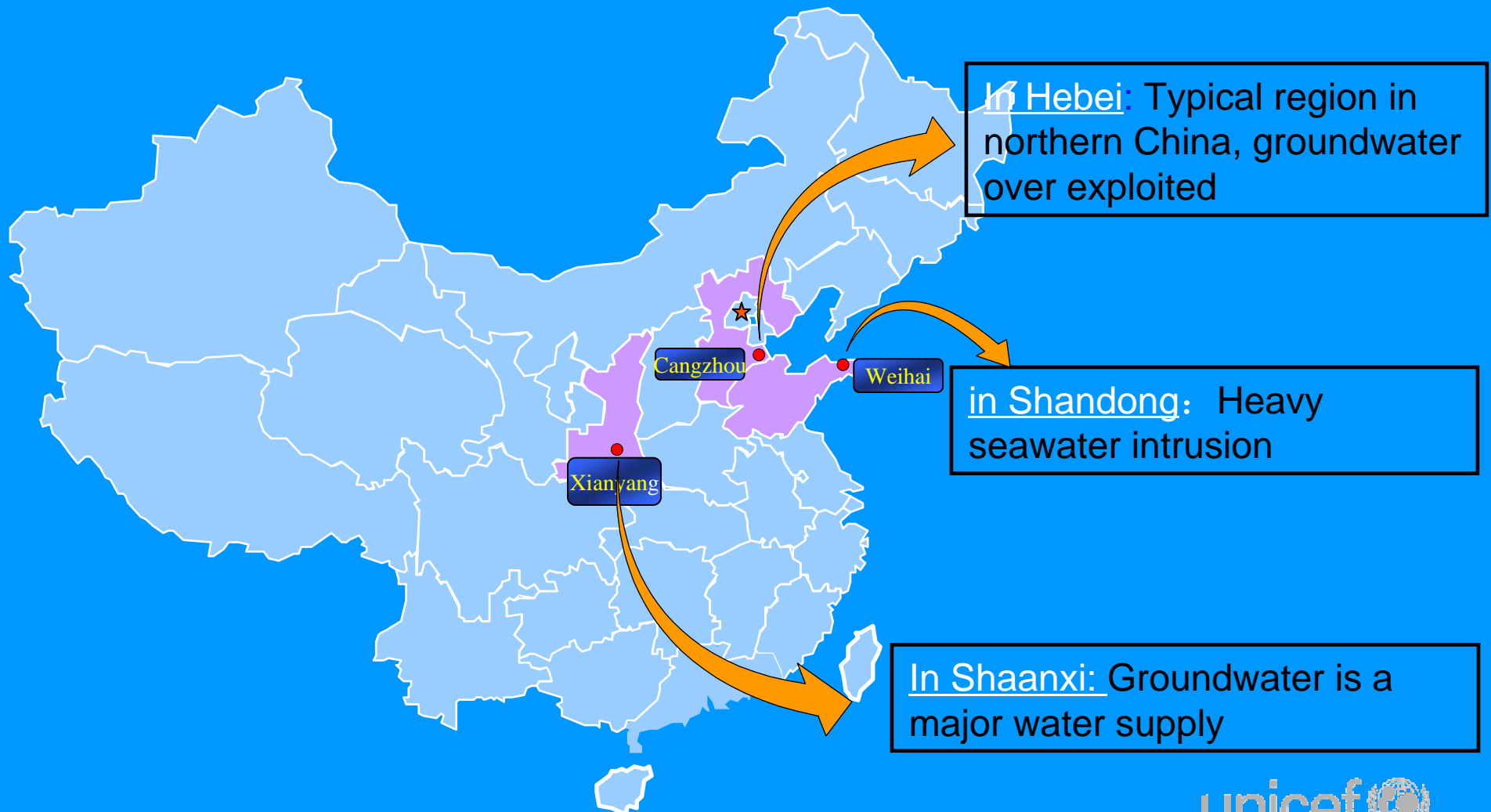


Project on Monitoring Climate Change Impact on Groundwater (2008-2011)



- To build the capacity to track the effects of climate change on groundwater
- To develop and test a model for monitoring and managing groundwater level and quality
- To establish a platform at national level for exchange of information and experiences.

Three Pilot Areas



Capacity Building

Courses of Action

1. Upgrading monitoring equipment
2. Conducting training
3. Overseas learning through visiting to experienced countries and institutions
4. Providing technical support by national and international expertise

Results and influences

1. Network distribution adjustment
2. Monitoring pattern diversification
3. Monitoring data & technology improvement; and
4. Amendment of the Regulations on Groundwater Monitoring



Study and Modeling Climate Change Impact on Groundwater

Methodology

1. Collect basic historical data from the three pilot areas
2. Analyze hydro-geological conditions in relation to climate parameters
3. Conceptualize hydro-geologic model and math model
4. Calibrate and validate model

Results and influence

1. Reports presented and some paper published having analyzed the impacts of climate change and human activities on groundwater level based on the historical data.
2. Groundwater simulation models were developed for the 3 pilot areas. And, training on the application of the models has further strengthened the capacity of the three pilot areas.
3. The models will be scaled-up and to be applied in other parts of China which have similar situations with those 3 pilot areas to predict groundwater variation for the future scenarios.

Establishment of a platform at national level for exchange of information and experiences

1. Cosponsored some key high level conferences e.g. the “High level roundtable meeting on global climate change and water security in China”, “International groundwater forum 2010---Securing groundwater in a changing world” etc. The results and progress of the project was presented; issues debated and called for coordinated effort in groundwater management for the best utilization.
2. Children’s summer camp - Climate Change, Water and Future was held in Weihai City, Shandong Province in August 2010.



News from Nature

NEWS

NATURE | Vol 466 | 15 July 2010

China faces up to groundwater crisis

Researchers call for effective monitoring and management of water resources.

A crisis is developing beneath China's thirsty farms and cities, but no one knows its full extent. With about 20% of the world's population but only about 5–7% of global freshwater resources, China draws heavily on groundwater. Those reserves are being depleted at an alarming rate in some regions and are badly polluted in many others, warned experts last week at the International Groundwater Forum 2010 conference in Beijing.

The scientists also warned that confronting the crisis will require dealing with other shortages: of knowledge and regulation. They say that a nationwide network to monitor groundwater levels is urgently needed, and that the government should improve data sharing, cut water waste and help farming become more efficient. "The water crisis is not unique to China," says Frank Schwartz, a hydrologist at Ohio State University in Columbus, who was at the meeting. "But the problem here is orders of



Groundwater is an essential source of irrigation for much of China's arid land.

PHOTO LIBRARY.COM

The government hopes that a massive system of canals and pipes, to funnel 45 billion cubic metres of water a year from China's moist south

of Alabama in Tuscaloosa, who chaired the Beijing meeting. The central government has earmarked about 1.8 billion renminbi

Immediate follow up

1. Synergies with Ministry of Science and Technology funded project, “Study on the groundwater prediction in northern China groundwater over exploited areas”, in order to share the data and research results and by which to guide the groundwater utilization on northern China plain;
2. Seeking cooperation with IAEA: pilot project achievements could be applied to Yellow River Basin: research applications could be made to the IAEA for projects on the impact of climate change on interactions between groundwater and surface water.
3. Holding a high level forum with related stakeholders’ participation on issues and challenges in groundwater management to promote the policy improvement and enforcement in groundwater utilization, protection and adaptation to the impacts of climate change.
4. Documentation of project results and recommendations for regulations and policy improvement



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