

LI HUI



China's water crisis needs more than words

A new water strategy from the Chinese government is a step in the right direction, says **Chaoqing Yu**. But it will be difficult to put into practice.

Late last month, the Chinese government announced that it will invest four trillion renminbi (US\$600 billion) over the next ten years to protect and improve access to water. The policy was spelt out in this year's No 1 Document — the central government's first policy document of the year, setting the top priorities — released on 29 January, and comes as a severe and continuing drought in northern China threatens crops of winter wheat.

The Chinese government is right to highlight sustainable use of water resources as critical for China's food, economic, ecological and even national security. Among the measures it proposes are control of total water consumption, improved irrigation efficiency, restricted groundwater pumping, reduced water pollution and guaranteed funds for water-conservancy projects. Such a national policy could go a long way to help secure and protect China's water. How to put the policy into practice, however, remains challenging.

Since the 1950s, China has constructed 86,000 reservoirs, drilled more than four million wells, and developed 58 million hectares of irrigated land, which generates 70% of the country's total grain production. Efforts to conserve water have lagged far behind. The largest threat to sustainable water supplies in China is a growing geographical mismatch between agricultural development and water resources. The centre of grain production in China has moved from the humid south to the water-scarce north over the past 30 years, as southern cropland is built on and more land is irrigated further north. As the north has become drier, increased food production there has largely relied on unsustainable overuse of local water resources, especially groundwater. Wasteful irrigation infrastructure, poorly managed water use, as well as fast industrialization and urbanization, have led to serious depletion of groundwater aquifers, loss of natural habitats and water pollution.

To tackle water issues in China, one problem that must be addressed is the scattering of authority across different agencies. At present, major rivers are managed by the Ministry of Water Resources, whereas local governments control smaller water courses. Water supply, farmland irrigation, groundwater, water pollution and weather forecasting are separately administrated by, respectively, the Ministry of Housing and Urban-Rural Development, the Ministry of Agriculture, the Ministry of Land and Resources, the Ministry of Environmental Protection, and the State Meteorological Administration.

Data on precipitation, river runoff, groundwater, land use, pollution and water use are not shared between governmental agencies, or made accessible to the public. It will be difficult to implement the holistic policy laid out in the No 1 Document without breaking down these bureaucratic barriers.

As a starting point, China needs to build an integrated network to monitor surface and groundwater, and use it to assess and set water policies through an integrated water-resource management system. And for this to happen, China needs a law that sets out clear policies on data sharing, and penalties for those who do not comply.

Other legislation is needed too. A water law introduced in 1988, and amended in 2002, is too vague to apply in practice, and there remains confusion over water rights of individuals, such as whether to grant them based on land ownership or use.

As political attention to water increases, a new, fair water law, based on transparent decisions, is essential to protect citizens' rights and prevent corruption. Low-income farmers will suffer greatly if water prices rise. To protect them, and so food supplies, China must keep irrigation costs low. Clear measures will also be needed to better match food production with water availability. Without regulation to increase food production in the south, it will be difficult to maintain food security, even if water-use efficiency is improved in the north.

Some of the areas identified in the document need more attention. Despite increasing concern about the effects of climate change on the availability and suitability of water resources, the document does not specifically define adaption to climate impacts. It is also vague on how the departments of water resources and environment protection should cooperate on planned new limits on water pollutants. Ecological water use is mentioned, but the document does not outline the specific measures that will be needed to protect the water supply of ecosystems against conflicting demands of economic activity. The role of ecosystems in water availability must be explicitly accounted for.

How will the money be raised to deliver the government's promises on water? The document demands that local governments reserve 10% of the annual income (currently 70 billion renminbi) from land sales for real-estate development to be used for water projects. However, it is not clear whether this money would be better held by local governments or allocated by Beijing.

The current drought shows how urgent the problem of sustainable water use and supply is for China. Although many of the policies and measures in the No 1 Document are not new and still need more work, the high priority the government has placed on sustainable water use is extremely welcome. ■

**CHINA NEEDS
TO BUILD AN
INTEGRATED
NETWORK
TO MONITOR SURFACE
AND GROUNDWATER.**

➔ **NATURE.COM**
Discuss this article
online at:
go.nature.com/wxqs3y

Chaoqing Yu is associate professor in the Center for Earth System Science and the Institute for Global Change Studies, Tsinghua University, Beijing, China. Colleagues **Peng Gong** and **Yongyuan Yin** also contributed.
e-mail: chaoqingyu@gmail.com.