



## Converting water-intensive paddy to dryland crops, China

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**Short title:** Converting water-intensive paddy to dryland crops, China

**Key Message:** The «Paddy to Dryland» programme helped peasants to develop water-saving agricultural production schemes as well as implemented controls on agricultural water use.

**Reviewer:** Prof. Lan Fang

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### What was the problem?

The Beijing Municipality has endured 25 years of below-average rainfalls since the 1980s. Nine consecutive very dry years since 1999 even worsened the situation. Less rainfall led to less surface runoff feeding Beijing's rivers and reservoirs. These droughts also affected the groundwater table, or more precisely hindered its recharge. Thus, Beijing's groundwater table dropped dramatically due to the amount of water which was pumped out of the groundwater table at a rate much faster than it could be replenished. The demand for water was even increasing because of Beijing's growing population and industrial developments. Over and above the groundwater has more and more been polluted. The guarantee of the municipality of Beijing to supply the capital with all the water demanded for consumption has put an even bigger burden on decision makers. This guarantee was given independently of the supply side, i.e. the water regime. The guarantee showed two effects: On the one hand it encouraged industry and urban consumers to use water in a wasteful manner which put an even higher pressure on water resources and reservoirs (Qing, D. 2008). On the other hand, drying up of reservoirs and rivers had severe effects on agricultural production and rural households.

### What was done to solve it?

Due to concerns about ensuring the quality and quantity of Beijing's water supply a policy shift was introduced. A framework for cooperation was developed between province of Beijing and Hebei regarding the maintenance of water quality and quantity. For Beijing, two reservoirs play a central role for the provision of drinking water. Miyun reservoir alone is estimated to supply 80 per cent of the drinking water for Beijing (Zheng, H. and Zhang, L. 2006).

The new policy focused on the Miyun and, eventually, the Guanting reservoir and consisted of various programmes. One programme of this cooperation between Beijing and Hebei was the 'Paddy to Dryland' (*dao gai han*) programme, initiated in 2005. The two parties agreed to

convert 183,000 mu<sup>1</sup> (i.e. 12,200 ha) of rice paddies to corn and other dryland crops (i.e. crops with less water consumption) in the Chengde and Zhangjiakou Municipalities within a timeframe of 5 years (more precise: two periods [2005-2008] and [2008-2010]). The municipalities of Chengde and Zhangjiakou are located in the upper watersheds of the Miyun and Guanting water reservoirs (Bennett, M.T. 2009).

### **Which ecosystem services were examined? And how?**

The primary ecosystem service considered here is the provisioning service of consumable fresh water through saving measures of water consumption and measures to augment the groundwater table as well as the quantity of surface water in neighbouring regions of Beijing. For, about 90 per cent of the surface water flowing through Beijing comes from rivers and streams originating in neighbouring Hebei, Shanxi, and Inner Mongolia province.

### **What policy uptake resulted from examining the ecosystem services?**

The 'Paddy to Dryland' programme envisions Hebei to convert 103,000 mu (i.e. 6867 ha) of paddy rice fields in the upper watershed of the Miyun reservoir before the year 2008 into less water consuming crop fields (i.e. corn), and after the year 2008 additional 80,000 mu (i.e. 5,333 ha) of paddy fields in the upper watershed of the Guanting reservoir. According to Bennett, by the end of 2007 the area of as much as 71,000 mu (i.e. 4,733 ha) of paddy fields in the upper watershed of the Miyun reservoir had been converted – lagging somewhat behind the schedule –, while in the upper watershed of the Guanting Reservoir 14,400 mu (i.e. 960 ha) of paddy fields had been converted (i.e. ahead of schedule) (Bennett, M.T. 2009).

As part of this arrangement, Beijing Municipality provided annual 'income loss' subsidies to peasants for this at the rate of RMB 450/mu (approx. \$US 870/ha). This has since been increased in 2008 to RMB 550/mu (approx. \$US 1.150/ha). The responsible departments of both parties have promised to improve verification of the area converted from rice paddies to dryland crops in the upper watershed of the two reservoirs and to establish a concrete plan. The department of water resources is also helping farmers to improve production conditions, develop water-saving agriculture, and implement controls on agricultural water use (Bennett, M.T. 2009).

The 'Paddy to Dryland' programme is a policy response by the municipality. Beijing Municipality has earmarked RMB 100 million (around \$US 13.6 mio.) in water resource environmental management funds for the period 2005–2010 to support water pollution management and water-saving industries in the upper watersheds of the Miyun and Guanting reservoirs (Bennett, M.T. 2009).

The programme was criticised for shortcomings:

- The subsidy agreements are signed once a year. This is difficult for farmers who are expected to shift their traditional way of food production and technology to a new one. A long-term mechanism and perspective is missing.
- The amount of subsidies seems not to fully compensate for the economic losses of paddy farmers, leaving some farmers behind poorer than before thanks to the new policy.
- The mechanisms and regulations of subsidy distribution are not transparent leaving room for doubts and critique if the money really gets to where it belongs. This affects threatens the acceptance of the program by farmers and threatens its legitimacy.

### **Lessons learnt**

Changes in agricultural production and technology can improve the provision of water for consumption. This implies major social and economic shifts. In order to sustain these

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<sup>1</sup> Mu is a Chinese unit of measurement. 1 mu = 1/15 ha

changes, it is important to gain the acceptance of the farmers concerned. One important issue here is the amount of subsidies. The subsidies have to meet the needs of farmers and fully compensate for their economic losses due to the shifts. This is all the more important since without the commitment of the local population and farmers concerned policies based on the recognition of ecosystem services will not be sustainable. It is in this sense also important that the distribution mechanisms are transparent.

#### **References:**

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