Summary

The large and ever growing population of China is the most important driving force behind China's agricultural sector. In fact, agriculture in China has been production-oriented in the past decades. Nowadays, more and more people pay greater attention to the sustainability of China's agriculture. They want to know whether if with a severely limited land area and non-abundant water resource, China's agriculture could feed its people. If it could, could that be achieved sustainably, and what expense should Chinese economy and the farmers pay to increase the production by a great percentage? To Chinese agricultural scientists, a critical question is whether it is possible to develop intensive sustainable agricultural systems, i.e. if sustainability and intensification could be simultaneously achieved. Substantial research has been conducted on this topic, namely, to increase crop productivity with decreased resource consumption. There is a great potential for crop productivity in the North China Plain. Many reports have been produced on wheat-maize cropping system's productivity of 15 tons per hectare. This raises the question: is the high-yielding system sustainable, and how to achieve the high productivity with reduced use of water and nitrogen.

Given this background, this case study entitled “To increase the use efficiency of scarce resources and profitability in high-yielding wheat-maize cropping systems with stimulating effect”, financially supported by the provincial and county government, was conducted by agronomists from Hebei Agricultural University, in collaboration with the local government. After a successful field plot study, several model fields were set up to demonstrate the technique to the local farmers. A video program and printed materials were produced for extension purposes. Today, the technique has been demonstrated in, and expanding to a large area, and is being practised by more and more farmers.

Objectives

The initial purpose of this case was to:

- increase crop yield with increased use efficiency of scarce resources (water and fertilisers);
- reduce the amount of irrigation and nitrogen application; and
- increase the profitability and sustainability of the cropping system.

The goal was achieved with an integrative overall design. Agronomy, economics, soil sciences, ecology, and systems theory and approaches were all employed in the research and the system design.

Most Significant Contributions

There are a number of significant contributions made to sustainable agriculture and land use management. Among these are increased land and labour productivity, profitability, and efficient use of water and fertilizer. Water is a severely limited resource in North China, especially in Hebei Province. Groundwater is being depleted at a dramatic speed. Water use efficiency has greatly increased in this case, hence it is greatly helpful to stop groundwater depletion, and to increase the area of irrigated
crop land. Land productivity and profitability in this case have also increased with a reduction of nitrogen application, hence it is possible to increase soil and groundwater quality, and the carrying capacity of the land is increased.

**Most Outstanding Results Achieved**

The most outstanding results achieved include:

- Increase in annual crops yield: 10 %
- Increase in water use efficiency: 40%
- Increase in profit per hectare: 30%
- Decrease in irrigation water: 30%
- Decrease in nitrogen application: 20%.