

Case Study 7.1-2 Adapting nitrogen management for potato to irrigation regime in China. China's northwest belongs to an arid and semiarid region with an annual rainfall of 200 to 400 mm or less. Lack of moisture in the soil makes it a challenge to support adequate seedling growth in most spring seasons, and generally restricts agricultural production. To improve crop yield farmers try to irrigate with limited water resources. Potato is the main crop and is often planted in level fields for flood irrigation. Recently, more and more farmers have shifted to planting potatoes on ridges and using drip irrigation. However, nutrient management, especially N application, has been both a challenge and an opportunity under these conditions.

Experiments were conducted on N management under flood and drip irrigation methods in irrigated potatoes grown on Chestnut soils in Wuchuan county, Inner Mongolia. The results in **Table 1** below show that when all of the recommended N was applied before planting under drip irrigation, it produced higher tuber yield, N recovery efficiency (RE_N), and water use efficiency (WUE) than under flood irrigation. Applying only 50% of the recommended N under drip irrigation produced potato tuber yield similar to the yield obtained with 100% recommended N under flood irrigation. The reduced rate also led to higher N recovery efficiency when compared with the flood irrigation method, but lower WUE relative to the full rate of N with drip irrigation. Drip irrigation saved water (630 m³/ha) and N fertilizer (105 to 120 kg/ha) compared to flood irrigation, while maintaining crop yields. Under flood irrigation, split N application and 100% basal N application produced similar potato tuber yields, but higher N efficiency was obtained with split N application. Thus, great potential exists to use both limited water supplies and fertilizer nutrients to optimize crop production and nutrient use efficiency, under both irrigated regimes. **Source:** Li, S., et al. 2011, Better Crops with Plant Food, Vol. 95, No. 3, 20-23.

Table 1. Potato responses to N management and irrigation regime in Inner Mongolia. Mean of two years, 2009-2010.

N management		Irrigation	Average tuber yield, t/ha	Mean RE_N , %	Mean WUE, kg/ha/mm
Basal	At flowering				
100%		Drip	37.3 a	34	431 a
50%			33.1 b	46	383 b
30%	70%	Flood	34.2 b	27	228 c
100%			33.0 b	22	220 c

Note: N-P₂O₅-K₂O=210-90-165 kg/ha in 2009, N-P₂O₅-K₂O=240-90-165 kg/ha in 2010. Numbers followed by the same letter within a column are not significantly different at P<0.05.

Submitted by S. Li, IPNI, China, December 2011.