

# RESEARCH WITH IMPACT

## THE CHALLENGE:

China is the world's leader in both rice and eggplant production. These crops are both economically important for Hubei province. Farmers in the region prefer to use commercial, soluble fertilizers such as urea and compound fertilizers; however, nitrogen (N) is frequently over used and phosphorus (P) and potassium (K) are commonly under applied. The excessive use of N fertilizer on cropland results in problems such as groundwater and surface water contamination, eutrophication, ammonia loss, and low N fertilizer use efficiency.

## THE SOLUTION:

To address the problem of fertilizer overuse and nutrient imbalance, the IPNI China Program, with the Wuhan Botanical Garden of the Chinese Academy of Agricultural Sciences, carried out a project to demonstrate the effects of polymer-coated controlled-release urea (CRU) on rice and eggplant production and profitability. This research tested N application that was 6% lower than current farmer practice for rice, and 17% lower than common practice for eggplant. Application rates for P and K were also adjusted according to soil test results.

## THE RESULTS:

### Rice

The field research in Honghu county showed that replacing current farmer practices with proper rates of regular urea (RU) or CRU increased grain yield, farm profitability, and nutrient recovery (**Figure 1**). Agronomic efficiency (grain yield increase from each kg of added N fertilizer) increased from 18 kg rice/kg fertilizer (current farmer practice) to 29 kg grain/kg N fertilizer when CRU

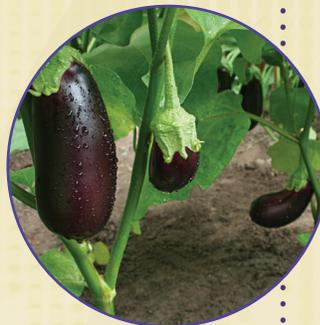


## Improving Yields and Profit with Controlled-Release Urea on Rice and Eggplant in Hubei

was used. The best combination of yield, efficiency, and net profit resulted with a combination of 60% CRU and 40% RU.

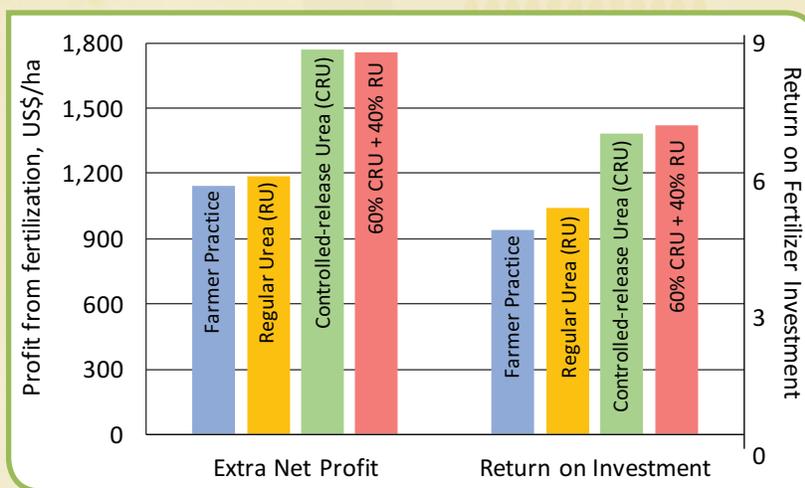
### Eggplant

In the eggplant experiment in Wuhan, the use of balanced nutrition and RU increased yields by 8.2 t of fresh fruit/ha and profitability by US\$4,000/ha compared with current farmer practices. Using CRU as the N source further increased fruit yield (10.2 t/ha) and profitability (\$4,990/ha), compared with current farmer practices. Agronomic efficiency also increased with the use of



CRU fertilizer. The recommended combination of N fertilizer for eggplant in this county is 70% CRU and 30% RU.

The use of CRU consistently improved yield and farmer profitability for both rice and eggplant in Hubei. Greater agronomic efficiency from the use of CRU resulted in more nutrient recovery by the crop and larger nutrient removal in the harvested crop. This translates to less residual N remaining in the soil at the end of the season and less potential for nutrient loss to the environment. Additionally, using CRU fertilizer reduced labor costs for growing rice by about \$230/ha because it is applied only once before transplanting rice seedlings instead of requiring an additional midseason N fertilizer application.



The use of balanced nutrition and controlled-release urea (CRU), or a combination of regular urea (RU) and CRU resulted in the greatest rice yields, net profit, and return on investment compared with the unfertilized control.

