

Widespread use of improved QPM varieties by small-scale farmers in China will...

- Generate household income, because farm animals are more productive when fed QPM.
- Enhance human nutrition at the village level.
- Benefit the Chinese economy in the form of import savings.
- Contribute to enhanced food security region-wide, because China produces nearly 70% of maize in Asia.

The proposed 5-year, US\$2.24 million project will be executed by CIMMYT and CAAS, in concert with selected seed producing organizations, and provincial agricultural academies.

Activities will include the development, testing, and seed multiplication of high-yielding, locally acceptable QPM varieties and hybrids for use by farmers and consumers.

## *The Development and Dissemination of* **Quality Protein Maize (QPM) for China**

**Improving Nutrition, Enhancing Food Security, and Reducing Poverty**

### ***A project proposal submitted by***

The Chinese Academy of Agricultural Sciences (CAAS) and  
The International Maize and Wheat Improvement Center (CIMMYT)  
to The Nippon Foundation (Japan)

### **Introduction**

Maize is grown on some 24 million hectares in China, producing 115 million tons of grain annually. China will require 204 million tons of maize by 2020, mostly for animal feed. It will have to import approximately 18 million tons to meet this demand. Since China produces over 70% of the maize in Asia, maize production is closely linked to the food security issues not only in China, but throughout the region.

Scientists in Mexico have developed a type of maize with enhanced protein quality (quality protein maize, or QPM). New QPM varieties are high-yielding, have excellent grain type, and show outstanding agronomic traits.

Pigs fed on QPM gain weight twice as fast as with normal maize, representing a significantly savings for small farmers who cannot afford balanced feeds. The development and productivity of chickens and cows is also greatly enhanced when they are fed QPM. Thus, QPM will increase household incomes and nutrition through enhanced animal productivity (meat, eggs, milk, etc.).

It will also reduce national imports for feed production (China imports about 8 million tons of soybeans and significant amounts of fishmeal as feed supplements). Finally, if 40% of the national maize area were sown to QPM during the next 20 years, China could almost meet its growing demand for maize, as the increased quality of this maize will substitute for 20 million tons of normal maize.

(Over)



**CIMMYT**

International Maize and Wheat  
Improvement Center

### **Principal contacts:**

Timothy Reeves (Director General), Shivaji Pandey (Director,  
Maize Program), CIMMYT, Apartado Postal 6-641, 06600  
Mexico, D.F., Mexico; Tel: (52) 5804-2004; Fax: (52) 5804-7558;  
E-mail: t.reeves@cgiar.org, s.pandey@cgiar.org

## The Project

This project is submitted to the Nippon Foundation to accelerate the deployment, production, and utilization of QPM. The project will target farmers in Sichuan, Yunnan, Guizhou, and Guangxi provinces in the south and Shandong, Shanxi, Jilin, Shaanxi, and Xinjiang provinces in the north. Thus, approximately 45% of the maize area in the country will be targeted. The project will have the following main activities:

### 1. Development of QPM.

QPM open-pollinated varieties (OPVs) and hybrids for the southern provinces, and hybrids for the northern provinces, will be improved. The 11 most widely-used Chinese inbred lines will be converted to QPM. Lines, hybrids, and OPVs will be tested under optimum and stress environments through the existing QPM Network and the National Hybrid Evaluation Network. The Project will have complete access to germplasm and information developed through CIMMYT's global QPM project, supported by the Nippon Foundation.

### 2. Nutritional studies.

Strategically located feeding trials with pigs and chickens will be conducted throughout the target area to demonstrate to farmers the nutritional superiority of QPM. In addition, nutritional trials on humans will be conducted in collaboration with the National Food Nutritional Consultancy Committee of CAAS and with the Chinese Academy of Preventive Medicine to document nutritional benefits of QPM, both through direct consumption and through animal products. The results will be widely publicized.

**3. On-farm demonstration trials.** Extensive trials will be conducted in the farmers' fields in the target areas to demonstrate the superiority of QPM over normal maize. In such trials, currently grown non-QPM OPVs and hybrids will be compared with elite QPM OPVs and hybrids in large plots, under current and improved farmers' practices. Field days will be organized with farmers, seed producers, policy makers, and media at appropriate times during the crop season.

### 4. Strengthening the laboratory facilities.

A biochemical laboratory will be established at the Yunnan and Shanxi Academies of Agricultural Science to monitor the quantity and quality of protein in QPM. Molecular marker facilities will be strengthened at CAAS, Beijing, to support QPM research and development.

### 5. Enhancement of human resources.

Several community-level training courses will be organized in breeding, biochemical and molecular analyses, and seed production methodologies relevant to the Project. In addition, Chinese scientists will be trained at CIMMYT in Mexico.

### 6. Seed production and dissemination.

A vigorous seed production and dissemination effort will be launched to put the seed of QPM into the hands of the farmers at right time and in the right amounts.

**7. Baseline surveys and impact assessment.** Participants will collect nutritional status profiles and monitor changes that can be attributed to the broader dissemination of adapted QPM hybrids and varieties, as well as education about the product's advantages. Such studies will also document poverty alleviation effects from the adoption of QPM by farmers.

**Notional Budget for 2000-2004 (US\$)**

|                                | Total        |
|--------------------------------|--------------|
| <b>CAAS (China):</b>           | <b>980</b>   |
| Laboratory and field Equipment | 130          |
| QPM development (breeding)     | 350          |
| Nutritional studies            | 50           |
| On-Farm demonstration trials   | 105          |
| Seed multiplication            | 175          |
| Training                       | 120          |
| Travel                         | 50           |
| <b>CIMMYT (Mexico)</b>         | <b>791</b>   |
| Technical coordination         | 377          |
| In-country logistical support  | 144          |
| Impact assessment              | 170          |
| Travel                         | 100          |
| Contingency (10%)              | 177          |
| Overhead (15%)                 | 292          |
| <b>TOTAL</b>                   | <b>2,240</b> |