TO: Members of the Subcommittees on Agricultural Appropriations, U.S. House of Representatives and U.S. Senate
FROM: GEM (Germplasm Enhancement of Maize) Technical Steering Group and Stakeholders
DATE: March 14, 2011
SUBJECT: **CRITICAL CORN GENETIC RESOURCE CURATION AND MAINTENANCE**

SUMMARY: Low cost, high efficiency corn production is one of the fundamental pillars of US food security and economic strength. The demand by researchers for corn genetic resources held at the North Central Regional Plant Introduction Station (NCRPIS) in Ames, Iowa, is among the highest for any germplasm bank in the world, with 25%-40% of its holdings distributed annually. Financial support for the corn collection, with only 62% of its over 20,000 accessions at NCRPIS currently available, is inadequate for providing needed capacity for regeneration, maintenance, and distribution.

1. Most of the important genetic resources of corn are of tropical origin. Because of lack of adaptation of tropical corn in temperate growing environments, providing these genetic resources is costly, labor intensive, and must typically be done in tropical, off-season environments and greenhouses.

2. The finest seed storage facilities become morgues without testing viability regularly and regenerating materials when needed. Viability testing should be conducted every 10 years, at a minimum, to ensure the quality of the germplasm. Resources to conduct these tests have not kept up with collection growth.

3. Genomic and molecular technologies have developed rapidly over the last decade. Without information about the valuable agricultural traits in these collections, scientists cannot readily apply new genetic advances and deploy such traits. Phenotypic and genetic analyses are needed to identify those valuable traits and properties and enable researchers to select materials to meet research objectives. All information associated with the collection must be collected and stored in the Germplasm Resources Information Network (GRIN) database, or its pending successor, GRIN-Global.

4. Current ARS funding supports one corn curator, one technician, and several part-time student employees and is insufficient to support routine germplasm bank activities - viability testing, regeneration, storage, and seed distribution. Trait and genotypic analyses require cultivating corn in winter nurseries to increase unadapted accessions and improve the information content of GRIN so that researchers can more readily identify accessions that meet their objectives. Winter nurseries are not possible with current resources.

5. Seed storage rooms at the station are near maximum capacity and soon will be a severe resource limitation. In 1997, the US GAO/RCED-98-20 report entitled 'Information on the Condition of the National Plant Germplasm System' described a situation where funding could not provide for collection maintenance, while collection size was actually increasing. Although the NCRPIS's annual budget increased during 2001-2004, those budget increases were not sufficient to meet the ever-increasing demand for corn genetic resources.

IMMEDIATE, URGENT NEEDS AND RECOMMENDATIONS

1. An additional $650,000+ is required for the NCRPIS's annual budget for (a) a second corn curator/geneticist to manage this extensive collection and provide adequate technical support, (b) increase germplasm, ensure quality, and enable genetic characterization, and (c) additional information management to improve database content and function.

2. A one-time, additional $700,000 is needed to construct a two-acre field facility at the NCRPIS to control corn plants' exposure to light. This would enable tropical, daylength-sensitive materials (common in horticultural and ornamental production) to be grown in Iowa. This would be more cost-effective than growing these materials in winter nurseries in tropical regions because staff can continue to conduct germplasm activities instead of being absent for long periods of time to care for nurseries.

ESSENTIAL, NEAR-TERM INVESTMENTS

1. $1 million per year is required to safeguard and manage the NCRPIS's corn genetic resources.

2. Capital investment for critical facilities needed for conservation and distribution of corn germplasm at NCRPIS.