

## Native Races of Maize and Food Security for All in Mexico

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Mexico

Mexico is the center of origin of maize and of teosinte, its direct ancestor. Sixty-two ethnic groups share credit for the domestication of maize, having been stewards and further developers of 59 native races of maize. They accomplished this technological breakthrough as they were developing a consensual “autochthonous maize breeding system” that emphasized seed interchange among neighbors, introduction of allopatric (evolutionarily distinct) parental materials, and a high seed selection pressure. At present, maize is the basic staple of Mexico. It provides 65 percent of caloric input and 40 percent of protein input to the national diet. The maize agroecosystem of Mexico extends over nine million hectares, 1.5 million of which are irrigated and the remainder rain fed.

There are two practical reasons why Mexico must protect and further develop its native races of maize: 1) food security for all, and 2) specialty maize needs for the pluricultural Mexican cuisine.

**Food security for all.** Only three million hectares of the maize agroecosystem have optimal or nearly optimal field conditions. A significant fraction of this farmland is managed under a modern, competitive system that has Industrial Agriculture as its model. Maize yield of this farmland is approaching its potential, but it will not be sufficient to reach food security for all. The remaining six million hectares have suboptimal edaphoclimatic conditions and include highly variable agroniches. These are characterized by drought, frost, Sierra conditions (fog, high humidity, hyperacidic soils, above and below ground endemic diseases of maize), hyperalkaline soils, elevation over sea level, and others. There are always one or more native races of maize that could be adapted to any of the agroniches. Notwithstanding 60 or more years of public and private research efforts to substitute hybrids and open pollinated varieties for native races of maize these continue to go unmatched in most of those agroniches.

**Specialty maize needs for a pluricultural Mexican cuisine.** Only the 59 native races of maize can provide the highly specialized maize grain required for more than 600 food preparations (including 300 types of tamales) and beverages from nixtamalized maize. Any standard maize hybrid or open pollinated variety would fail most tests of kernel quality for the pluricultural Mexican cuisine.

Neglect of the small farming sector and overemphasis on the modern farming sector are widely recognized as causal factors for the growing maize deficit which has reached 30 percent of national apparent consumption and which is getting worse. Yet, the government strategy continues to further privilege modernization of the already modern sector, by considering the adoption of transgenic maize. Permission was granted for twenty-five field experiments on transgenic maize in northern Mexico in the 2009/2010 growing cycle. Furthermore, multinationals are lobbying intensely for a faster process to commercial liberation of their technology.

This is a double threat to native races of maize by 1) decreasing farmland planted which in turn will decrease the genetic diversity *in vivo* and 2) risking the progressive and irreversible accumulation of transgenic DNA. Transgenic maize and native races cannot coexist in Mexico without the progressive and nonreversible accumulation of transgenic DNA. There is no way that DNA flow through seed-pollen will take place in

the presence of the “Autochthonous Maize Breeding” practiced in several million farming units. It is well known that seed banks do not cover the genetic diversity of Native Races of Mexican Maize.

It has been shown that Mexico has the public and private knowledge and the resources to reach maize self-sufficiency without transgenic technology. Abundant water and land resources have been identified which could increase national potential production from 33 to 57 million tons per year.

### **Conclusions**

1. Transgenic maize technology is not necessary for reaching food security for the Mexican population.
2. Native Races of Maize are necessary for reaching food security for all and for providing the specialty grains required by the pluricultural Mexican Cuisine.
3. Mexico has the necessary resources to reach maize self-sufficiency in the near future.