

Achieving Mexico's Maize Potential

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Executive Summary

Rising agricultural prices, combined with growing import dependence, have driven Mexico's food import bill over \$20 billion per year and increased its agricultural trade deficit. The current drought in the United States is making this situation worse, with maize prices setting new record highs. Mexico now runs an annual production deficit of roughly 10 million tons and an import bill for maize of more than \$2.5 billion/year. Mexico imports one-third of its maize, overwhelmingly from the United States, but three million producers grow most of the country's white maize, which is used primarily for tortillas, and more than 59 native maize landraces that are basic ingredients of nearly 600 food preparations. Yield gaps are estimated at 43% on rain-fed land, compared to just 10% on the country's larger irrigated farms. Most of the country's small to medium-scale maize farmers are operating at less than 50% of potential.

To what extent could Mexico close this yield gap, using proven technologies widely employed in the country, to regain its lost self-sufficiency in maize? This comprehensive review of the literature highlights the potential for achieving that goal as well as the policies most likely to be effective. Based on a close examination of productivity gains and potential in Mexico's diverse maize-producing sectors – irrigated and rain-fed, industrial scale and small scale, using hybrid seeds and native varieties, with strong and weak access to natural resources – we find that Mexico has the potential to regain self-sufficiency in maize relatively quickly based on existing technologies and without relying on controversial transgenic maize varieties.

Evidence suggests that within 10-15 years Mexico could increase annual production on current lands from 23 to 33 million tons, meeting the current deficit of 10 million tons. Irrigation and infrastructure projects in the southern part of the country could add another 24 million mt/year. This would be more than enough to meet Mexico's growing demand for maize, estimated to reach 39 million mt/year by 2025.

With climate change likely to constrain input-intensive agricultural productivity growth, policies must build on the resilience offered by Mexico's rich diversity of native maize varieties while promoting more sustainable agricultural practices. Since reduced water availability is projected to be one of the primary agriculture-related effects of climate change in Mexico, improved water management will be essential. In both irrigated and rain-fed farmland, as will expanded irrigation in the southern part of the country better endowed with water resources.

We review four current government programs that have the goal of increasing maize productivity. We find that:

- Mexico's current push to expand the use of transgenic maize is unnecessary and ill-considered. Its yield potential is limited, particularly for smaller scale

- producers, and its risks are high for a country with Mexico's rich diversity of native maize varieties and wild relatives.
- The state aims of Mexico's recently introduced MasAgro Program, with its focus on smallholders and resource conservation, are laudable. But the program is unlikely to meet its goals with its small budget and its overreliance on improved seeds and the promotion of conservation practices poorly suited to small-scale farms and marginal lands. "Conservation" and "no-till" practices should, however, be encouraged where appropriate, particularly on Mexico's larger farms, where such methods have shown excellent environmental impacts.
 - A pilot program in farmer-led extension services, the Strategic Project for High-Yield Maize (PROEMAR, by its Spanish acronym), has proven the most promising, raising yields 55-70% in one project carried out in several states by a farmer organization. The project provided basic soil analysis and improved input use and other sustainable management practices among small and medium-scale farmers on rain-fed land. The project did not rely on the introduction of new hybrid seeds nor transgenic seeds. Positive results were achieved within one year with producers on both high-quality and more marginal lands and with those using hybrid seeds and those using native maize varieties.
 - An innovative program to introduce fruit trees into traditional intercropped farms has shown promise for increasing family income, decreasing runoff water, reducing soil erosion in hillside farming, and increasing fixation of atmospheric carbon.

Such findings are consistent with the prevailing international consensus around the "sustainable intensification" of small-scale production. Public investment should go where the yield gaps are the greatest, among small-to-medium-scale farmers. This is also where private investment is scarce and where market failures are prevalent.

Public investment is also desperately needed in water systems, since climate change is expected to reduce water availability. Existing irrigation systems, mostly in the semi-arid northern part of Mexico, are poorly maintained and inefficient. Mexico would also benefit greatly from investment in new irrigation in southern Mexico. This would represent a wise long-term investment in both maize productivity and resource management in the region of the country that most needs economic development and sustainable livelihoods.

Mexico's current transition to a new government offers an opportunity to address the country's maize dependence. High international prices provide a strong incentive. The import savings are substantial and the market is providing strong incentives for farmers to adopt productivity-enhancing improvements. Ambition is needed, backed by public investment.

The full paper can be downloaded at:

English: <http://www.ase.tufts.edu/gdae/Pubs/wp/12-03TurrentMexMaize.pdf>

Spanish: <http://www.wilsoncenter.org/desarrolloruralemexicano>