

Evidences

Study #3322

Contributing Projects:

- P1456 - MasAgro Productor
- P1461 - MasAgro Maiz
- P1458 - MasAgro Biodiversidad

Part I: Public communications

Type: OICR: Outcome Impact Case Report

Status: On-going

Year: 2019

Title: MasAgro project in Mexico: 500,000 farmers improve yields, incomes and food security by growing improved maize varieties and practicing conservation agriculture on 1.3 million hectares.

Short outcome/impact statement:

Masagro has worked since 2012 to improve food security and incomes for smallholder farmers in Mexico through the development of improved maize varieties for specific regions coupled with conservation agriculture techniques promoted by the project. On average, smallholder farmers working with the project have achieved yields and revenue 20.5 percent and 23 percent higher respectively, compared to other regions of Mexico. For participating farmers practicing rainfed agriculture, yield and revenue gains and 92 percent and 105 percent higher respectively.

Outcome story for communications use:

The Sustainable Modernization of Traditional Agriculture (MasAgro) project, a joint initiative between CIMMYT and Mexico's Secretary of Agriculture and Rural Development (SADER), has worked since 2012 to help address maize production, biodiversity conservation, food security and rural development challenges. Since 9 years, improved maize varieties and conservation agriculture techniques reach farmers across Mexico. MasAgro is a collaborative effort with 150+ partners, including Mexico's agricultural research system (INIFAP and universities), local seed companies, multinational agri-food companies, farmer associations, local machinery workshops and several non-governmental organizations (NGOs). MasAgro has developed 58 new maize hybrids specifically adapted for smallholder farmers in Mexico so far, which are distributed in partnership with local seed companies. These companies sold over 1 million bags of improved seed in 2018, contributing to improved yields and income for farmers.

While maize is a main staple food in Mexico, key to local food security, nutrition and tradition, productivity remains low, with an average of 3.1 tons per hectare. On average, farmers participating in the MasAgro project in Mexico had 20.5 percent higher maize yields than the average yields achieved in the region where they live, and 23 percent higher average net income. In rain-fed conditions alone, MasAgro helped participant farmers achieve yields and income gains that were 92 percent and 105 percent higher, respectively. On average, rain-fed plots managed with MasAgro's sustainable intensification practices yielded 25 percent more grain and revenue to maize farmers than plots managed with conventional practices, on the same farm. Similarly, Mexican seed companies increased their sales of improved seed by 55 percent from 2011 to 2018, as a direct result of the project's efforts. MasAgro has had a positive impact in the lives of more than 500,000 farmers who have adopted conservation agriculture and sustainable farming technologies on more than 1.3 million hectares across Mexico.

Links to any communications materials relating to this outcome: <Not Defined>

Part II: CGIAR system level reporting

Link to Common Results Reporting Indicator of Policies : No

Stage of maturity of change reported: Stage 3

Links to the Strategic Results Framework:

Sub-IDs:

- Adoption of CGIAR materials with enhanced genetic gains
- Agricultural systems diversified and intensified in ways that protect soils and water
- Increase capacity of beneficiaries to adopt research outputs

Is this OICR linked to some SRF 2022/2030 target?: Yes

SRF 2022/2030 targets:

- # of more people, of which 50% are women, meeting minimum dietary energy requirements
- # of more farm households have adopted improved varieties, breeds or trees

Description of activity / study: <Not Defined>

Geographic scope:

- National

Country(ies):

- Mexico

Comments: <Not Defined>

Key Contributors:

Contributing CRPs/Platforms:

- Maize - Maize

Contributing Flagships:

- FP4: Sustainable intensification of maize-based systems for improved smallholder livelihoods
- FP1: Enhancing Maize's R4D Strategy for Impact
- FP3: Stress Tolerant and Nutritious Maize

Contributing Regional programs: <Not Defined>

Contributing external partners:

- SADER - Secretaria de Agricultura y Desarrollo Rural (México)

CGIAR innovation(s) or findings that have resulted in this outcome or impact:

MasAgro has had a positive impact in the lives of more than 500,000 farmers who have adopted conservation agriculture and sustainable farming technologies on more than 1.3 million hectares across Mexico.

Innovations:

- 253 - Four new hybrids with high yield potential incorporated to the Mexican seed market. (<https://tinyurl.com/2fv3q2wy>)
- 1404 - 60 hybrids selected to be evaluated in the 2019 collaborative evaluation network of MasAgro. (<https://tinyurl.com/2dvvephb>)
- 1405 - CIM17MMT04: A new maize hybrid with high yield potential released in Mexico. (<https://tinyurl.com/2ly5djg3>)
- 251 - 47 hybrids (with high yield potential) selected for the three agricultural environments of Mexico: lowlands, mid-altitudes and highlands. (<https://tinyurl.com/2fx86rz4>)
- 1403 - Maize hybrids with high yield potential for lowlands, mid-altitudes, and highlands. (<https://tinyurl.com/2pngasjl>)
- 252 - Five hybrids with high yield potential selected for the seed sector of Mexico (<https://tinyurl.com/2keelfxq>)

Elaboration of Outcome/Impact Statement:

Mexico is the center of origin of maize, and the crop plays a crucial role in the country's nutrition and food security. However, maize yields in Mexico lag behind other nations, at 3.1 tons per hectare on average (3), not nearly enough for self-sufficiency. Since 2012, the MasAgro project has worked to support Mexican farmers to increase their yields and income through improved maize varieties and conservation agriculture techniques.

A 2019 study (1) found that conservation agriculture can improve both long term yield and soil quality in maize systems in Mexico. Using data from an experiment conducted from 1997-2018, researchers compared the use of conventional tillage, reduced tillage and raised beds in maize-oat rotation systems and found that both maize and oats had significantly higher yield when planted in permanent raised beds, a conservation agriculture technique promoted by the MasAgro project. The study found that maize yielded an additional 3.9 tons per hectare when planted in permanent raised beds compared to traditional tillage (1). On average, permanent raised beds generated an extra profit of \$18,424 MXN per hectare (\$776 USD at time of reporting) than tilled treatments (1), a huge benefit to farmers. This conservation agriculture technique also increased soil organic carbon by an average of 63%. Overall, the results of this study show that the conservation agriculture techniques and improved varieties promoted by the project can help Mexican farmers improve their food security and income through increased yields and improved soil quality.

Most farmers in Mexico grow maize in rain-fed conditions, on approximately 6 million hectares. A recent study examined how MasAgro promoted practices and technologies influence productivity in seven different rain-fed regions (2). By measuring the technical efficiency – the difference between the average farmer output and the highest possible output, given available technology in a certain region, and the technology gap – the distance between the highest possible output in a region and the highest actual output by all farmers – the study found that on average the range of technical efficiency among MasAgro farmers was 70-100% and the technology gap is between 32 and 82% (2). This shows that farmers participating in the MasAgro project have benefited from the tillage, hybrid seed and market integration practices promoted by the project, and suggests that further scaling-out would contribute to increasing production and food self-sufficiency in Mexico (2).

References cited:

- 1.) Fonteyne, S., Martinez Gamiño, M.A., Saldivia Tejeda, A., Verhulst, N., 2019. Conservation agriculture improves long-term yield and soil quality in irrigated maize-oats rotation. *Agronomy*, 9, 845. <https://doi.org/10.3390/agronomy9120845>
- 2.) Donnet, M.L., López Becerril, I.D., Black, J.R., Hellin, J, 2017. Productivity differences and food security: a metafrontier analysis of rain-fed maize farmers in MasAgro in Mexico. *AIMS Agriculture and Food*, 2(2): 129-148. <http://dx.doi.org/10.3934/agrfood.2017.2.129>
- 3.) MasAgro Case Study, 2018

Quantification: <Not Defined>

Gender, Youth, Capacity Development and Climate Change:

Gender relevance: 0 - Not Targeted

Youth relevance: 0 - Not Targeted

CapDev relevance: 0 - Not Targeted

Climate Change relevance: 1 - Significant

Describe main achievements with specific **Climate Change** relevance: Conservation agriculture techniques can make agricultural systems more resilient to climate change effects.

Other cross-cutting dimensions: NA

Other cross-cutting dimensions description: <Not Defined>

Outcome Impact Case Report link: [Study #3322](#)

Contact person:

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