



Collaborative Modeling Efforts Between the U.S. and Mexican Governments

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The Value of Economic Modeling

- ❑ Economic models provide valuable insights into the possible impacts of contemplated policy changes and the actual effects of previous policy changes.

- ❑ Access to models and the quality of in-house modeling vary within and across national governments
 - Function of available resources and researchers' familiarity with subject matter
 - Often dependent on the skills and interests of a few

- ❑ Intergovernmental collaboration as a way to foster mutual capacity building



Two Examples of Intergovernmental Modeling Collaboration from the U.S.-Mexican Experience

- 1) Adaptation of Mexico Model Used in *USDA
Agricultural Projections*
- 2) Mexico-Focused Modeling Based on Global Trade
Analysis Project (GTAP)



Mexico Baseline Component

- ❑ Over the past 3 years, agricultural specialists in the Mexican Government have developed a set of partial equilibrium models of their country's major agricultural sectors
- ❑ The original foundation of these models is the Mexico model (maintained and improved by James Hansen of ERS) that is used in the *USDA Agricultural Projections*




Mexico Baseline Model: Timeline

- ❑ 2000: Visit to Washington by staff member from FIRA (Fideicomisos Instituidos en Relación con Agricultura)
- ❑ 2005: Training of FIRA staff in baseline model, extension of Mexico Model to new commodities; ERS staff visit Mexico to improve their understanding of country's corn sector
- ❑ 2007: Visit to Washington by SAGARPA staff, incorporation of Mexico's official model, extension to new commodities, use in formal publications

Mexico Baseline Model: The Evolution

Original Model

SAGARPA's First approach

-
- | | | |
|---|--|--|
| <ul style="list-style-type: none">□ Livestock: (3 sectors)<ul style="list-style-type: none">■ Pork, Beef, and Poultry
□ Crops: (11 sectors)<ul style="list-style-type: none">■ Corn , Wheat, Rice■ Barley, Sorghum,■ Soybean, Rape seed, Groundnuts,■ Sunflowers■ Cotton■ Fruits, Vegetable Consumption |  | <ul style="list-style-type: none">1. Data
2. Segregate markets<ul style="list-style-type: none">a. White cornb. Yellow corn
3. Integrate new commodities<ul style="list-style-type: none">A. Fruits and vegetables<ul style="list-style-type: none">a. Tomatoes |
|---|--|--|



Mexico Baseline Model: Data

Main Data Adjustments

- Elasticities
 - Consumer price elasticities
 - Consumer income elasticities
 - Producers supply response elasticities

- Macroeconomic variables
 - Economic growth
 - Exchange rate
 - Oil prices (?????)

- Prices (Consumer and Producer prices)
- Per capita consumption
- Inventories

Mexico Baseline Model: Data

Original Model

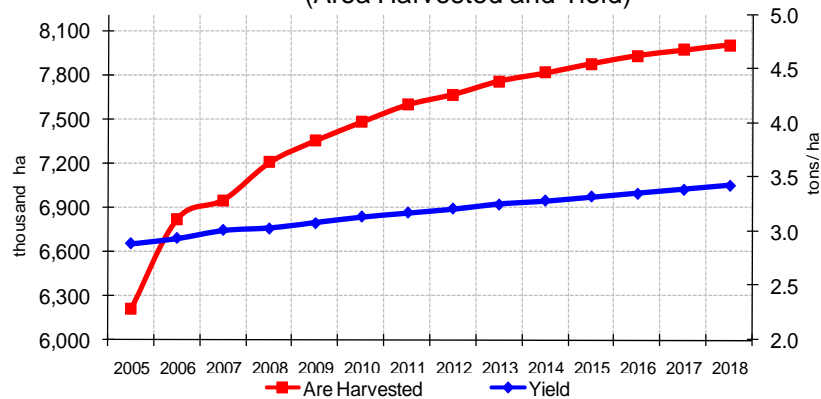
- *Macroeconomic*
 - World Bank
- *International Prices*
 - FAO and USDA
- *Domestic Prices*
 - PS&D
- *Domestic Variables*
 - PS&D

SAGARPA's Implementation

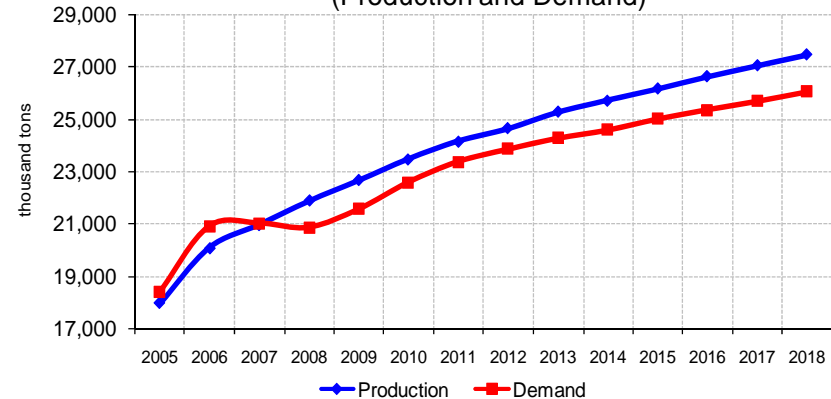
- *Macroeconomic*
 - World Bank
 - Banco de México
 - INEGI
 - CONAPO
- *International Prices*
 - FAO and USDA
- *Domestic Prices*
 - SIAP
 - Secretaría de Economía
- *Domestic Variables*
 - SIAP
 - INEGI

Mexico Baseline Model: White Corn

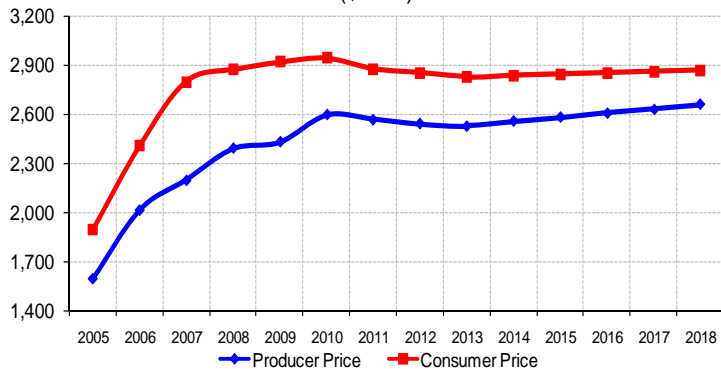
Baseline 2008-2018: White Corn
(Area Harvested and Yield)



Baseline 2008-2018: White Corn
(Production and Demand)



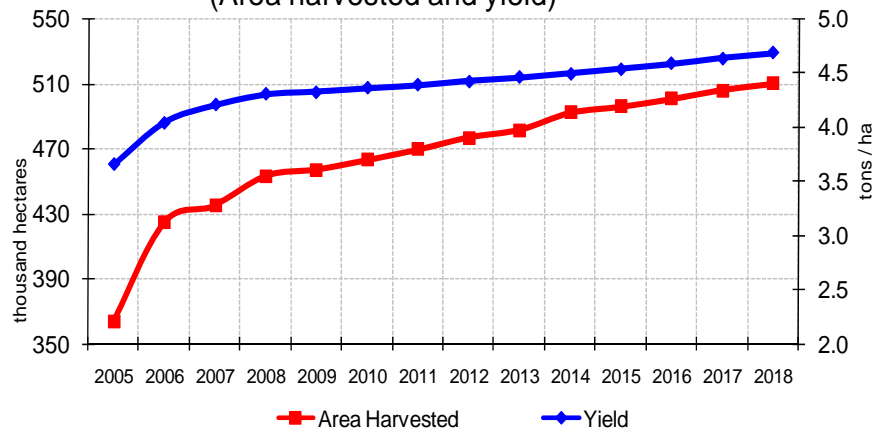
Baseline 2008-2018: White Corn
Prices (\$/ ton)



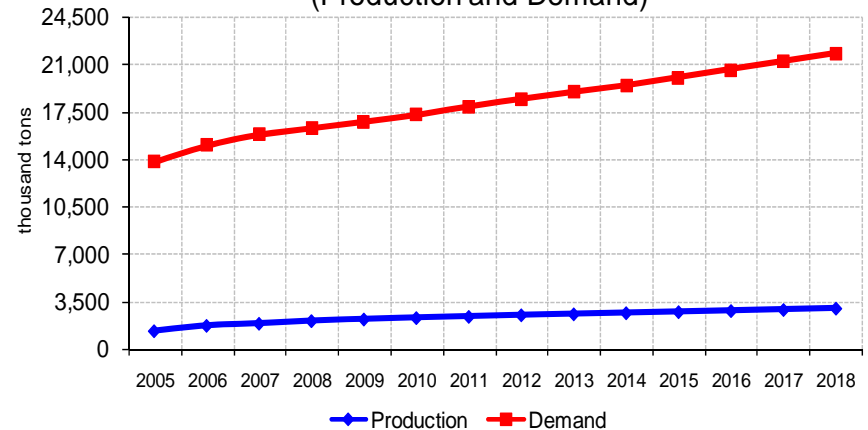
- Area harvested will surpass 7 million hectares in 2008.
- Surplus of 1 million tons is expected for 2008. Similar trend will continue over the long term.
- White corn prices are highly correlated with yellow prices.

Mexico Baseline Model: Yellow Corn

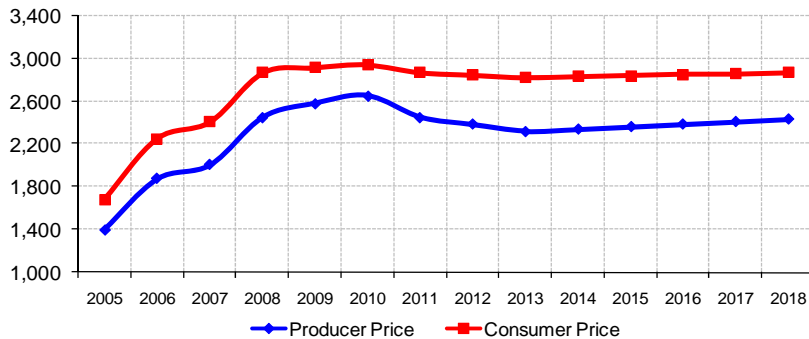
Baseline 2008-2018: Yellow corn
(Area harvested and yield)



Baseline 2008-2018: Yellow corn
(Production and Demand)



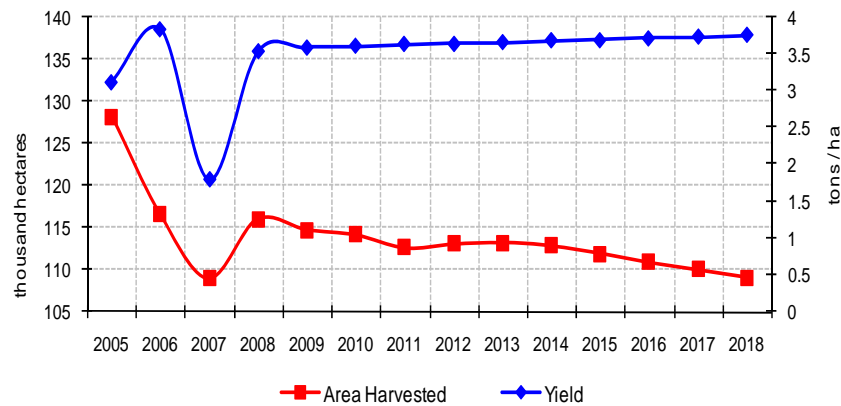
Baseline 2008-2018: Yellow Corn
Prices (\$/ton)



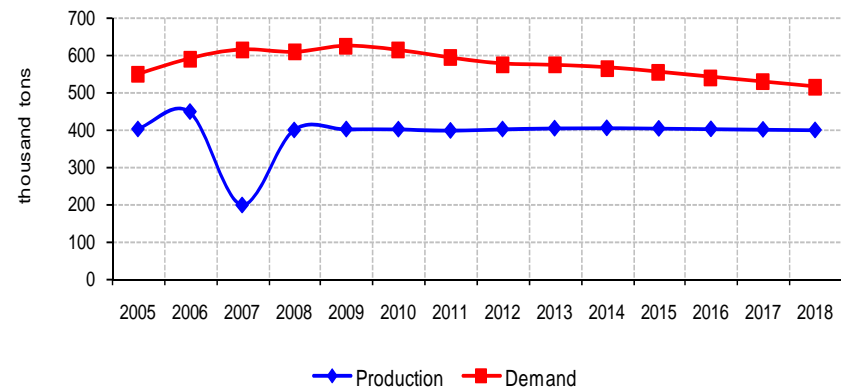
- Area harvested may reach 450,000 hectares in 2008. Ethanol prices will drive production.
- Demand and production will grow at average rates of 3.0% and 3.5%, respectively.
- Prices will keep growing until 2010.

Mexico Baseline Model: Cotton

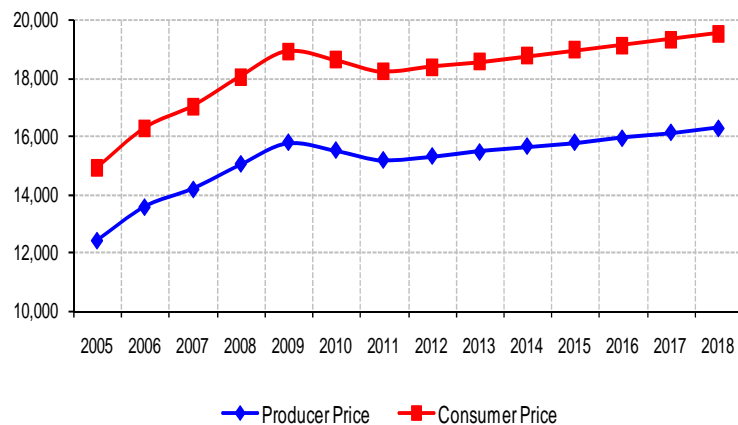
Baseline 2008-2018: Cotton
(Area Harvested and Yield)



Baseline 2008-2018: Cotton
(Production and Demand)



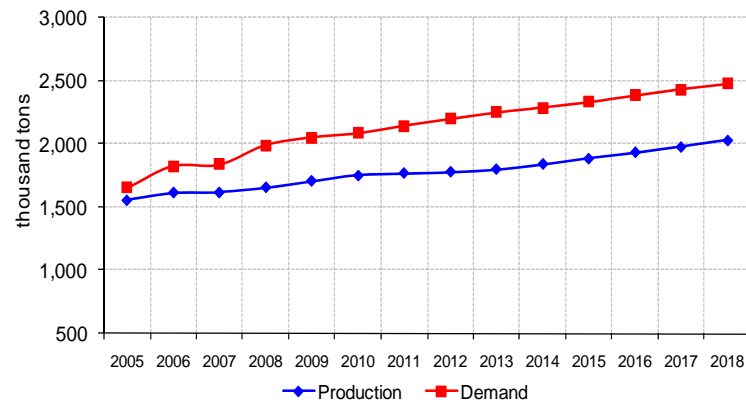
Baseline 2008-2018: Cotton
Price (Pesos/ton)



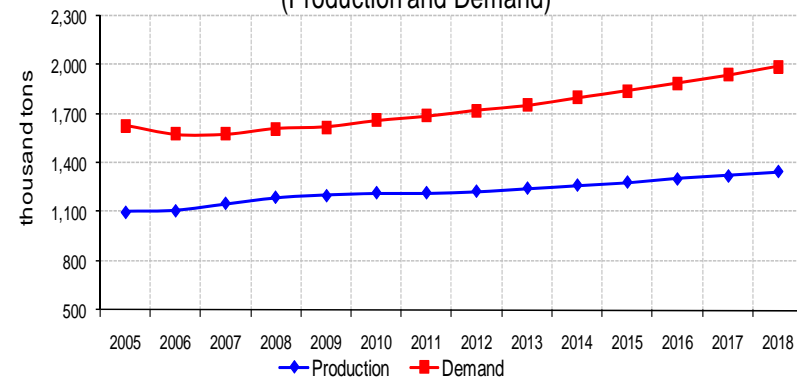
- Area harvested is expected to diminish in the long run.
- Demand is expected to decline due to the slow growth of the textile sector.
- Domestic prices will be influenced by the international price.

Mexico Baseline Model: Meat

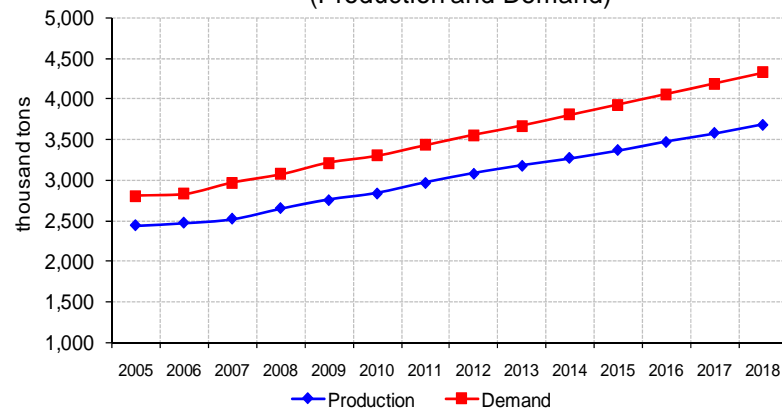
Baseline 2008-2018: Bovine
(Production y Demand)



Baseline 2008-2018: Pork
(Production and Demand)



Baseline 2008-2018: Poultry
(Production and Demand)



- Beef production may reach 2 million tons in 2008.
- Pork production will expand 1.1% annually, and demand will increase almost 2% annually.
- Poultry production and demand will grow at a considerable rate of 3%.



Mexico Baseline Model: Next steps

1. Improve policy components
2. Develop stochastic components
3. State level
4. New commodities
 - a) Sugar cane
 - b) Fisheries
5. Link to a North American component



Mexico-Focused GTAP Modeling

Computable General Equilibrium (CGE) Model

Zahniser and Burfisher (2006)

Evaluated impact of full implementation of NAFTA's provisions on production and trade

SAGARPA/ASERCA staff provided Mexican tariff data and evaluated the model's structure

Results circulated within U.S. and Mexican

Governments and presented at academic conferences

Ongoing research: Evaluate NAFTA's implementation in the current context of higher commodity prices



NAFTA with Higher Commodity Prices

Uses GTAP data within the standard IFPRI model, as modified by McDonald, et al. (2006), to allow for substitution among intermediate inputs

Two regions: Mexico and Rest of World

Twenty-one (21) sectors, 16 of which are agricultural, including white and yellow corn

Two scenarios:

- (1) Updated base scenario: GTAP database (2001) updated with 2008 tariff levels
- (2) Alternative scenario: Updated base scenario shocked with an exogenous price increase



Mexico: An Open Economy

Sector	Import tariff rate (percent)	Sector	Import tariff rate (percent)
1 Rice	0	11 Crops not elsewhere specified	1
2 Wheat	0	12 Dairy	3
3 White corn	0	13 Natural resources	3
4 Yellow corn	0	14 Meat	0
5 Other cereal grains	0	15 Oils and fats	3
6 Dry edible beans	0	16 Refined sugar	15
7 Other horticultural products	1	17 Other food	3
8 Oilseeds	0	18 Light manufacturing	3
9 Raw sugar	27	19 Petroleum	3
10 Fibers	0	20 Heavy manufacturing	3
		21 Services	0



Scenario of Higher Commodity Prices

Calculated using projections for MY 2009/10 from *USDA Agricultural Projections to 2017* and historical data for MY 2000/01 (or calendar years 2010 versus 2001)

Sector	Percentage change	Sector	Percentage change
1 Rice	103	11 Crops not elsewhere specified	48
2 Wheat	91	12 Dairy	19
3 White corn	105	13 Natural resources	84
4 Yellow corn	105	14 Meat	40
5 Other cereal grains	89	15 Oils and fats	171
6 Dry edible beans	12	16 Refined sugar	21
7 Other horticultural products	48	17 Other food	16
8 Oilseeds	96	18 Light manufacturing	25
9 Raw sugar	-4	19 Petroleum	219
10 Fibers	-7	20 Heavy manufacturing	25
		21 Services	25

Domestic output: Greater commodity production, less manufacturing production

Sector	Change in domestic output (percent)	Sector	Change in domestic output (percent)
1 Rice	32	11 Crops not elsewhere specified	1
2 Wheat	60	12 Dairy	-15
3 White corn	5	13 Natural resources	13
4 Yellow corn	43	14 Meat	2
5 Other cereal grains	8	15 Oils and fats	20
6 Dry edible beans	-6	16 Refined sugar	0
7 Other horticultural products	11	17 Other food	-1
8 Oilseeds	221	18 Light manufacturing	-2
9 Raw sugar	2	19 Petroleum	19
10 Fibers	-38	20 Heavy manufacturing	-5
		21 Services	0

Imports: Changes correspond to prices

Sector	Change in Real Import Quantity (percent)	Sector	Change in Real Import Quantity (percent)
1 Rice	-44	11 Crops not elsewhere specified	-5
2 Wheat	-41	12 Dairy	79
3 White corn	-11	13 Natural resources	-14
4 Yellow corn	3	14 Meat	-2
5 Other cereal grains	-4	15 Oils and fats	-60
6 Dry edible beans	80	16 Refined sugar	9
7 Other horticultural products	-15	17 Other food	34
8 Oilseeds	3	18 Light manufacturing	3
9 Raw sugar	21	19 Petroleum	-20
10 Fibers	30	20 Heavy manufacturing	2
		21 Services	4

Exports: Changes also correspond to prices

Sector	Change in Real Export Quantity (percent)	Sector	Change in Real Export Quantity (percent)
1 Rice	125	11 Crops not elsewhere specified	14
2 Wheat	147	12 Dairy	-22
3 White corn	63	13 Natural resources	26
4 Yellow corn	137	14 Meat	13
5 Other cereal grains	62	15 Oils and fats	130
6 Dry edible beans	-23	16 Refined sugar	-6
7 Other horticultural products	26	17 Other food	-12
8 Oilseeds	400	18 Light manufacturing	-3
9 Raw sugar	-30	19 Petroleum	65
10 Fibers	-58	20 Heavy manufacturing	-5
		21 Services	-2



Increased household consumption, higher wages for unskilled labor

Variable	Change (percent)
Real household expenditures	0.7
Real GDP	-0.3
Exchange rate (peso/world currency)	-21.2
Factor payments	
Land	17.0
Unskilled labor	0.9
Skilled labor	0.2
Capital	0.3
Input-output coefficients, refined sugar	
White corn	-1.9
Yellow corn	-3.7
Raw sugar	0.2



Collaborative Modeling: Conclusions

- ❑ Collaborative modeling between the U.S. and Mexican Governments has provided valuable insights about many aspects of the NAFTA agrifood sector:
 - Last step of NAFTA trade liberalization
 - Rise in commodity prices
 - Possible future course of the Mexican economy

- ❑ An approach that harnesses synergies
 - Expanded pool of knowledge, skills, and abilities
 - Mutual capacity building
 - Opportunity to disseminate research more widely