Determining the Feasibility of Yellow Corn Production in Mexico

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1. Introduction

Corn is a native crop in Mexico and the only agricultural commodity that is produced in all Mexican states. At the same time, corn is the major staple and main source of calories for most of the Mexican population, especially within the poorest sector. The country produces both white corn and yellow corn. Mexican corn producers generally specialize in white corn production, but because of increased domestic and world demand for yellow corn and higher prices in the global market, yellow corn production in Mexico has become more attractive to producers lately. Most importantly, domestic factors such as more grain fed to livestock have increased the demand of yellow corn. Yellow corn is generally used for feed in Mexico and is mostly imported from the United States.

Mexico is the fourth largest corn producer and the third largest consumer of the grain in the world (FAO 2007). Mexican producers will perhaps switch from white corn to yellow corn production. Successfully switching from white corn production to yellow involves good management, factor endowment availability and technical skills. Some of these aspects are not yet satisfactorily addressed in the Mexican agricultural sector, especially for traditional farmers (the majority). Furthermore, it is critical to evaluate the implications of switching to yellow corn as white corn has been the most important type of corn for centuries in Mesoamerica. The present study attempts to answer the question: Within which Mexican regions is it feasible to produce yellow corn?

Although it is intuitive that yellow corn production is generally associated with higher profits (high yield performance), statistical evidence suggests that this might not be true for all Mexican producers. Because the majority of Mexican producers are “traditional farmers”, Mexico will face many problems because structural conditions might not be adequate to support

such a shift. This study is significant mainly because of its policy implications within Mexican agriculture and producers facing this situation. The main objective of this paper is to determine the feasibility of producing yellow corn in different regions of Mexico. In addition, specific objectives are:

- Determine cost and profit of yellow corn production.
- Determine cost and profit of white corn production.
- Determine the break even point where total cost is equal to total returns.
- Determine yellow and white producer income sensitivity to price and yield changes.

2. Mexican Corn Situation

Mexico does not figure as an important exporter, since its domestic demand has steadily outpaced its supply. This situation leaves the country increasingly dependent on imports, which come mainly from the United States. In the United States, corn producers generally grow yellow corn because this type is associated with higher profitability.

From 1990 to 2005, Mexican corn production experienced important changes (Figure 1). Production from 1990 to 2005 increased by 23%, from 14.635 million metric tons (MT) to 18.012 million metric tons. At the same time, imports grew by almost 40%, from 4.104 million metric tons to 5.743 million metric tons. Most of those imports, coming from the United States, are yellow corn. Although Mexico is almost self-sufficient in white corn, imports of white corn have increased significantly in recent years. Possible explanation of this situation could be attributed to the fact that the United States can produce corn at about 40% of the cost of production in Mexico and differences in yield vary from less than 1 MT/Ha (15.93 bu/acre) in Mexico to 13.18 MT/Ha (210 bu/acre) in the U.S. This situation also denotes the competitive advantage that the United States has over Mexico in producing corn, especially yellow corn.

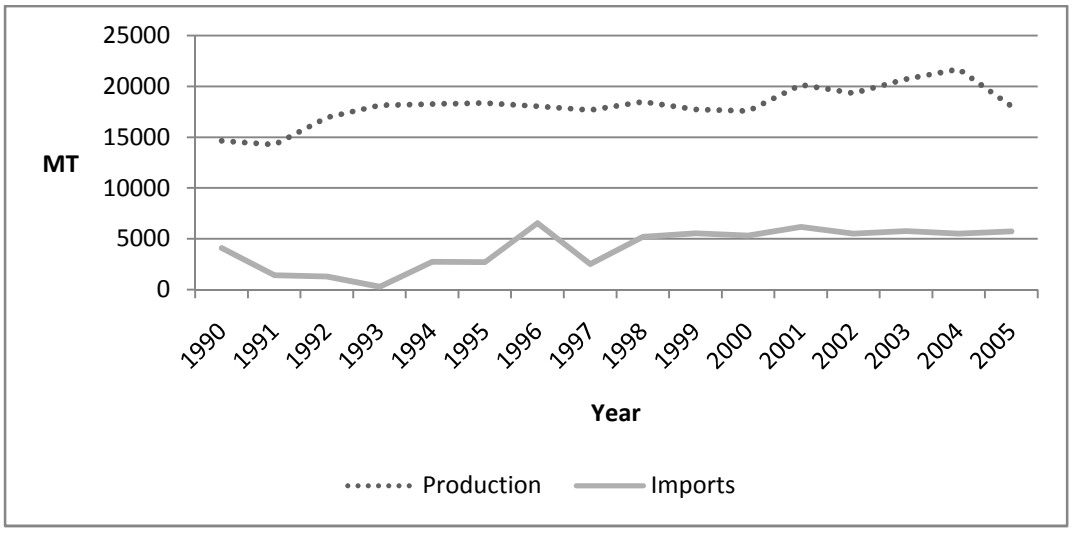

Figure 1. Mexico's Corn Production and Imports Trend 1990-2005 (thousand metric tons) Source: FAO Agrostat PC database (2007)

Many issues within the Mexican economy and the low participation in the market of some producers (mainly subsistence) forces Mexico to satisfy its internal demand for domestic and imported corn. The trend toward higher volumes of Mexican yellow corn imports is expected to continue and to worsen (Figure 2).

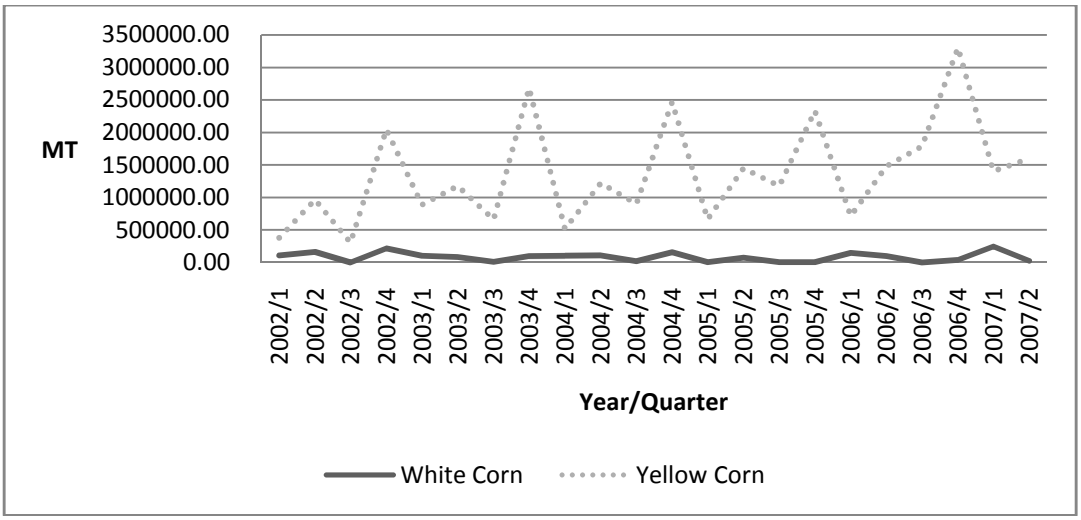

Figure 2. Imports of Yellow Corn and White Corn Trend 2002/1-2007/2 in MT

2.1. Corn Production in Mexico

Corn is the only crop that is produced in all the regions within Mexico in a wide range of agro-climatically diverse conditions by producers who differ in factor endowments, managerial structures and technical skills. Around seventy percent of the total production comes from eight states (Chiapas, Guerrero, Jalisco, Mexico, Michoacan, Puebla, Sinaloa and Veracruz). In addition, more than fifty percent of the total cultivated area in Mexico is devoted to corn production (Sagarpa 2007).

Corn production in Mexico is divided into two categories: commercial (large and medium farmers who produce white and/or yellow corn) and traditional (small and subsistence farmers who specialize mostly in white corn production). According to Badstue et al. (2007), traditional corn production (mainly in the north and west of Mexico) provides farmers certain advantages, especially low production costs. On the other hand, Yuñez, Juarez and Barcenas (2006) affirm that much subsistence or traditional corn production (primarily situated in the south and central parts of Mexico) is inefficient. Conversely, some commercial producers grow yellow corn with extraordinary yield performance (similar to the United States producers). Some authors (Badstue et al. 2007; Bellon and Risopulus 2001; Smale et al. 2003), Yuñez, Juarez and Barcenas (2006) suggest that white corn producers should switch to commercial seeds, as yellow corn producers have. However, this would increase farmers' cost, so many would be unwilling or unable to do so.

2.2. Corn Consumption in Mexico

According to FAO, Mexico is the third larger consumer of corn in the world, after the United States and China. Corn consumption in Mexico is used mostly for food and feed, but some important industries use corn as an input to make other commodities.

In Mexico there are about 9,000 corn mills that process white corn to flour and about 30,000 tortillerías, where tortillas are produced for their immediate consumption (Vega-Valdivia and Ramirez Moreno 2004). For yellow corn, one of the main industries that consume it is the starch industry. This industry uses about 2.1 million tons of yellow corn, of which 90 -95% is imported from the United States (Yuñez, Juarez, and Barcenas 2006). Moreover, the expansion of the livestock sector is another driver of higher demand of yellow corn in Mexico. The Mexican cattle and beef industry, along with pork and poultry production is developing and changing rapidly, primarily because of higher per capita meat consumption in the country (Peel 2008; Zahniser 2005). Evidence suggests that this situation has also contributed to the doubling of U.S. exports to Mexico of feed grains, oilseeds, and related products since 1993 (Zahniser, 2005). Other industries that use corn as an input are the cereal industry and the beer industry.

2.3. Corn Production Regions

Mexico produces around 18 million metric tons of corn. The most important types of corn that the country produces are white (77.85%) and yellow (6.67%). However, the country produces other types of corn that account for 15.47% of total corn production; those types include blue corn, hominy and popcorn (Sagarpa 2007).

There are five agricultural production regions: Central Region (CR), Central-Occidental Region (COR), Northwest Region (NWR), Northeast Region (NER), and South Region (SR) (Figure 3). As mentioned before, Mexico is a very diverse country. Corn production regions are not an exception; there are marked differences among production techniques and agro-climatic conditions. Within those regions there are small producers (mainly subsistence farmers, commonly called “traditional farmers”) and large producers (mostly commercial farmers).

Therefore, technology also varies from region to region and from state to state within those areas.

The Central Region includes six states (Distrito Federal, Hidalgo, Mexico, Morelos, Puebla and Tlaxcala). The main corn producer within this area is Mexico. Mexico's corn yield was 3.14 MT/Ha (50.02 bu/acre) during 2006 (SIAP-Sagarpa 2007). The Central-Occidental Region covers nine states (Aguascalientes, Colima, Guanajuato, Jalisco, Michoacan, Nayarit, Queretaro, San Luis Potosi and Zacatecas). The main corn producers within this area are Jalisco and Michoacan. During 2006, Jalisco produced 3,030,253.97 MT of corn with a yield of 5.29. Michoacan produced 1,405,551.12 MT of corn with a yield of 3.583 MT/Ha (SIAP, Sagarpa 1980-2006).

The Northwest Region covers four states (Baja California, Baja California Sur, Sinaloa and Sonora). The main corn producer within this area is Sinaloa, which produced 4,524,631 MT during 2006 with a yield of 8.927 MT/ha (SIAP, Sagarpa 1980-2006). Its high yield is because this state is one of the most developed regarding agricultural sectors within Mexico. The Northeast Region covers five states (Chihuahua, Coahuila, Durango, Nuevo Leon and Tamaulipas). The main corn producers within this area are Chihuahua and Tamaulipas. Chihuahua produced 678,609.08 MT of corn during 2006 with a yield of 4.295 MT/Ha (68.42 bu/acre). Tamaulipas produced 682,922.6 MT of corn during the same period with a yield of 3.453 MT/Ha that is equal to 55.01 bu/acre (SIAP, Sagarpa 1980-2006). Although the Chihuahua average yield is low, in some areas producers have a yield of more than 10 MT/Ha.

The South Region covers eight states (Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz and Yucatan). The main corn producers within this area are Guerrero, Chiapas and Oaxaca. Guerrero produced 1,215,411.17 MT of corn during 2006 with a yield of

2.588 MT/Ha (41.33 bu/acre). In 2006, Chiapas produced 1,592,173.64 MT of corn with a yield of 1.902 MT/Ha. Oaxaca produced 627,865.55 MT of corn with a yield of 1.313 MT/Ha (SIAP, Sagarpa 1980-2006). This region is generally associated with low productivity. Most of the farmers are traditional producers that grow mainly white corn. The South Region has producers that own less than 1 Hectare and do not have access to government aid. In addition, the poorest states are located in the South Region. Only Chiapas has produced yellow corn. White corn production faces important issues such as low productivity within this region.

3. Conceptual Framework

Agricultural producers face a variety of price, yield, weather, resource, and production conditions (Epplin 2004). For the present study, sensitivity is measured as income responsiveness to changes in yield and price. The sensitivity analysis used within Enterprise Budgeting is a way to measure this responsiveness. Another simple analytical tool that provides a dynamic way to interpret the relationship between cost and profits with respect to yield and price is the Break-Even Analysis. The break-even point (BEP) is where total costs (TC) are equal to total revenue (TR). BEP helps managers to establish the point where there will be no net loss or gain. BEP is meaningful because this point establishes at which level the producers can stop producing agood because if they go below that point they will incur losses. Break-even yield is the yield needed to cover cost given the expected price and other income such as government payments, while break-even price is the price needed to cover costs given the expected yield and other income (Oklahoma Enterprise Budget Software Basic User's Guide 2007). BEP over variable costs is calculated by the following formulas:

$$BEP_{VCP} = (VC\text{-}TR+I) / Price \quad (3.1)$$

$$BEP_{VCY} = (VC\text{-}TR+I) / Yield \quad (3.2)$$

In equation 3.1, total revenue (TR) and total income (I) is subtracted from variable costs (VC) and the result is divided by price. Similarly, equation 3.2 represents the BEP for yield. BEP over total cost is calculated as:

$$BEP_{TCP} = (TC\text{-}TR+I) / Price \quad (3.3)$$

$$BEP_{TCY} = (TC\text{-}TR+I) / Yield \quad (3.4)$$

Equations (3.3 and 3.4) represent the BEP that is calculated considering total cost (TC), total revenue (TR), income (I) and price or yield respectively. For any producer or manager, the main purpose is to maximize their profits. Cost of production and associated revenues are the main concerns to producers because these help them to make the best decision. The challenge for any producer or firm is to choose the optimal levels of input to produce a given level of output. If producers face an important change in their production conditions, their decisions are based on expected returns from any change (innovation) as compared with those of the old production system (Edwards and Bell 1972). Cost is a function of the output level (Y), input prices (Px_1, Px_2,…Px_n) and input quantities required to produce that good (Qx_1, Qx_2,…Qx_n):

$$C = f(Y, Px_1, Px_2,\ldots Px_n, Qx_1, Qx_2,\ldots Qx_n) \quad (3.5)$$

Total cost (TC) is the total cost to produce a good which are divided between fixed costs (FC) and variable or operating costs (OC). The fixed costs do not depend on the firm's output, while variable costs vary with the level of output (Pindyck and Rubinfeld 1997). Equation 3.6 shows this relationship between fixed and variable costs. Both fixed cost and variable cost are the sum of quantity of required inputs (Q_{OI}, Q_{FI}) multiplying their respective input prices (P_{OI}, P_{FI}), where operating inputs (OI) and fixed inputs (FI) are considered (Equations 3.7 and 3.8). Examples of operating inputs are fertilizers, seeds and pesticides while fixed inputs include land, insurance and machinery. Total costs, fixed costs and variables costs can be calculated as:

$$TC = VC + FX \quad (3.6)$$

$$VC = \Sigma(Q_{OI} * P_{OI}) \quad (3.7)$$

$$FX = \Sigma(Q_{FI} * P_{FI}) \quad (3.8)$$

In economic terms, profit (Π) is the difference between a firm's total revenue (TR) and total costs (TC): Π = TR- TC. Total revenue is the amount of income earned by selling any product. A firm should increase its output as long as the marginal revenue (MR=additional revenue earned by selling one more unit) is greater than the marginal cost (MC=additional cost of producing an extra unit). As MR becomes larger than MC, profit grows and vice versa.

In Mexico, the expected cost for production of yellow corn is considered to be greater than that of white corn. This higher cost may be associated to higher prices of inputs and increased quantities of inputs to produce that variety. Nevertheless, as mention before, yellow corn is also associated with higher yield performance than white corn. This higher yield may imply greater revenues for farmers producing yellow corn than for those who produce white corn.

The Mexican agricultural sector, similar to that in many developing countries, faces many vulnerable situations. Most agricultural producers grow their crops in a traditional way, a system that has been subject of many failures (lack of technology, limited resources) and provokes a high sensitivity to changes in yield (weather disasters) and price. On the other hand, commercial producers are those who have experienced more planned systems than those for traditional producers. In order to evaluate a short-term change in the production system, improvements for both may result from a change of variable inputs, such as seed and fertilizer (variable costs), but not changes in fixed resources such as farm size, machinery or irrigation system (fixed costs). This situation is considered in order to build the required budgets for this study. The expected

total costs (fixed cost + variable costs) and total revenue may be higher for commercial farmers than for traditional producers. The above conceptual framework leads to the following hypotheses for the study:

- In some regions of Mexico, where there is limited use of inputs, it is not feasible to produce yellow corn.
- Cost of producing yellow corn in Mexico is higher than that of producing white corn.
- Profits associated with yellow corn production are expected to be higher than those from white corn production.
- The break-even point of yellow corn production is expected to be higher than that of white corn production.
- Income of yellow corn production is expected to be more sensitive to changes in price and yield than that of white corn production.

4. Methodology

Mexico is the only top corn producer whose main corn type is white. However, recent evidence suggests that yellow corn production is growing at the expense of white corn (Sagarpa 2007). Enterprise Budgeting is a good technique to determine the feasibility of a new production system.

4.1. Enterprise Budget Methodology

An Enterprise Budget estimates profitability by considering incomes and expenses. Many authors have used Enterprise Budget Models to measure the feasibility of a production system of any commodity. Williams, Lacey and Olson (1996) employed Enterprise Budget to evaluate the economic feasibility of implementing a sheep enterprise to control leafy spurge on eastern Montana cattle ranchers. Other researchers that have applied Enterprise Budget analysis

were Martinez-Mejia and Rolando (2006); they analyzed the economic implications of export opportunities for Nicaragua in the U.S. market for tilapia fillets.

Enterprise Budgets are important tools when historical data availability is a problem which is the case of Mexico. They are also useful to develop linear programming models to analyze different scenarios (Epplin 2004). Like many crops, corn has been subject of Enterprise Budget modeling many times, especially in the United States. Many universities have developed their own Enterprise Budget software for the area of Agricultural Economics.

4.2. Data Description

According to Epplin (2004), the number of budgets needed to construct a policy model depends upon policies, the level of aggregation and precision desired. This study considered the Mexican case as a unique situation regarding white corn. Since yellow corn production has grown in recent years, measuring the feasibility of growing this type of corn versus white corn is increasingly important. Many producers have seen yellow corn as a good alternative because this type of corn is associated with higher profitability than that of producing white corn. Many things have to be evaluated before making this decision.

In the present research Mexico is divided into five corn production regions (described above) according to Sagarpa's same divisions for published data. Within each region there are some states with significant levels in corn production. The present research analyzes nine states (Mexico, Jalisco, Michoacan, Sinaloa, Chihuahua, Tamaulipas, Guerrero, Oaxaca and Chiapas), chosen as the most representative states regarding high volume of production and large cultivated area.

For each state there are different scenarios for the corn production that include a traditional and commercial (recommended for those states that do not grow yellow corn at all)

production for white and yellow corn. Some states only include commercial budgets because it is easier to compare those given data availability. For those states that do not produce yellow corn, the present analysis will take the most technified production system according to statistical evidence and will develop recommended budgets for producers switching to yellow corn production. Comparison of these budgets is used to determine the feasibility of producing yellow corn in Mexico and within its different regions.

The OSU Enterprise Budget Software (based on excel spread sheets to calculate profitability of different crops) was revised to reflect different measurement units and other factors between Mexico and the United States.

To determine fixed and variable costs, the research included price of inputs (published by Sagarpa) and quantity of inputs required for each system (previous literature, data by Sagarpa, producer manuals for corn available in Mexico and personal interviews with experts). For some of the budgets (traditional systems) fixed costs were assumed to be zero because those producers do not incur those costs or their total opportunity cost is very low or very difficult to estimate. To calculate fixed and operating costs, the next formulas were used:

$$VC = \Sigma(QOI * POI) \quad (4.1)$$

$$FX = \Sigma(QFI * PFI) \quad (4.2)$$

Examples of operating inputs (OI) are fertilizers, seed and pesticides, while some fixed inputs (FI) are land, insurance and machinery. In equations 4.1 and 4.2, cost is the sum of quantity of inputs (QOI= quantity of operating inputs and QFI=quantity of fixed inputs) times price of those inputs (POI=price of operating inputs and PFI=price of fixed inputs). After determining fixed and variable costs for each scenario, the analysis proceeded to determine profit. The first spreadsheet includes the budget that calculates total operating cost and fixed

costs, returns above each of those and the return above all specified costs. This section also includes income from production and total receipts. This information will be useful to calculate returns (Income-Cost) and the grain break-even analysis that is calculated for yield (BEP_{VCY}, BEP_{TCY}) and price (BEP_{VCP}, BEP_{TCP}) over total cost (TC) and operating costs (OC). Break-even yield is the yield needed to cover cost given the expected price and other income such as government payments, while break-even price is the price needed to cover costs given the expected yield and other income (Oklahoma Enterprise Budget Software Basic User's Guide 2007). By calculating BEP, it could be possible to determine in which point producers could experience a possible shift to other crops or in which point producers could stop producing corn. Also, each budget contained several sheets that include:

Yield**.** This spreadsheet includes the yield per hectare per state and the price in pesos per metric ton (MT). Data was obtained from SIAP-Sagarpa (1980-2006) that includes white and yellow corn yield per state. Regarding prices, data was obtained from the *Secretaria de Economia* (SNIIM). This study considered the price of the market that was closer to the area of production.

Other income. This section specifies any other income generated or received, such as government aid to produce white and yellow corn. The data was based on published statistics by Sagarpa that provides producer information by states, the amount of the support and the program they belong to. For Spring-Summer 2007, government aid was 1,160 pesos per hectare, while for Fall-Winter 2007, government assistance was 963 pesos per hectare.

Seed. This sheet includes the seeding rate required per hectare and the price of commercial seed. This information was obtained from Sagarpa's website, which published some seed prices per enterprise and per state.

Fertilizer. This sheet considers fertilizer type, amount (Liter or Kilogram) applied per hectare, fertilizer price per unit (kg or L) and custom application charge or labor payment for applying fertilizer. Prices were obtained from Secretaria de Economia (SNIIM 2008), which publishes monthly data of fertilizer price per states. For labor, this study assumed the minimum wage within Mexico during 2007.

Pesticides and Herbicides. This sheet included the same criteria as fertilizers. In this section, the data included was: pesticide and herbicide types, amounts required in their respective units (Liter or Kilogram), pesticide and herbicide price per unit (pesos per kilogram or pesos per liter) and custom application charge or labor payment for applying agrichemicals (Pesos/Day). Prices were obtained from Secretaria de Economia (SNIIM 2008).

Insurance. In most cases, insurance was not included since it is not required in Mexico. Few states pay insurance because it represents a high cost for producers. For those states and budgets that included this section, data was obtained from published budgets (Sagarpa 2007).

Machinery. This section includes non-harvest machinery costs. If the producers do not own any machinery, this sheet comprises customized operations and their respective costs per hectare. This segment also contains repair-cost, taxes and annual average depreciation. Data was obtained from published budgets of different states (Sagarpa 2007) and previous studies.

Irrigation. This spreadsheet contains total operating costs of water per hectare to be applied and different associated expenses with this activity. For some states that use irrigation, this amount was not included as a fixed cost since it depends on the crop's need for water and also because in some areas the irrigation is conducted by gravity , without any technology or equipment. Data was obtained from published budgets (Sagarpa 2007).

Other expenses. This sheet includes items not accounted for in other sections. The information presented in this section is the activity and its respective cost (pesos per hectare). For this study, this section includes data from published budgets (Sagarpa 2007). For some of the budgets, fixed cost was zero, because there is no insurance, labor is contracted just for the activity required, there is no annual operating capital, machinery and equipment is not owned, and irrigation does not exist.

The last step was to make a sensitivity analysis over price and yield. The first step is to choose a percentage of change to make the sensitivity analysis. Then, including information from the budget, returns are calculated while yield and price varies in the established change. With this result is easy to determine if the production system is sensitive to changes in prices and yield and how this change should be beneficial or not, especially regarding profitability.

5. Results

Table 1 shows the results from Enterprise Budgeting for corn production in Mexico. The traditional budget of white corn that has the highest profit is the state of Michoacan. The state that has the lowest profit is Oaxaca because this state is characterized by the least productive farming systems. In addition, some farmers grow corn on small acreages. Also, public investment within Oaxaca is very low and this state is the poorest state in Mexico. Other states that face the same situation are Guerrero and Chiapas, and to some extent, the State of Mexico.

Traditional yellow corn production in Mexico is not very common; few states grow this type of corn. According to statistical evidence which suggest that the State of Mexico has experienced a low yield by producing yellow corn, the present study concluded that producers are using very traditionalistic practices to grow this type of corn. Results show that profits derived from this type of production is very low, only $738.10 pesos/Ha, about $27/acre.

For white corn commercial budgets, results suggest that the state experiencing highest profits is Sinaloa. It is important to mention that commercial production is highly associated with good returns. Yellow corn produced by commercial farmers within Mexico is more profitable in few states than white corn production. For Chihuahua it is more profitable to grow yellow corn than white corn; however this state still produces large amounts of white corn due to the large demand of this type within the country. Chihuahua is also one of the main producers of forage corn varieties within Mexico and has extraordinary yield in those. According to the obtained results in the present study, commercial producers in Tamaulipas could produce more yellow corn than white corn, allowing other states to produce the latter one because profits from producing yellow corn are four times higher than those from producing white corn.

For those states with few commercial producers and little statistical evidence available, the present study calculated recommended budgets. According to the results, all the states experience higher profits when they consider a more commercial production technique by growing both white and yellow corn. The present study only assumed changes in operating costs such as more agrochemicals and the use of commercial seeds. Results suggest that if producers want to increase their profits and to have a larger participation in the corn market, they should switch to commercial seeds and use more inputs in the production process.

According to recommended budget results, the state that has highest profits from growing white corn is Michoacan. Conversely, Oaxaca profits are very low in comparison to other states. In this state the study limited ability to increase agrochemical costs in significant amounts because farmers in this region are very difficult to convince to abandon traditional farming methods. This issue is mainly because farmers do not expect to produce for the market, they are mainly subsistence. They do not want to increase their costs because they will not be able to

afford more inputs in their production process. In addition, farmers in Oaxaca (possibly also in Chiapas, Guerrero and some parts of the state of Mexico) do not want to stop producing with their seeds from previous harvests.

With respect to yellow corn production in a commercial production system (recommended budgets), most of the states can expect lower returns than those of producing white corn in the same scenario. However, it is important to mention that the present study assumed the same yield for white and yellow corn. In practice, yellow corn commercial seeds are generally associated with higher yields than commercial white corn seeds. Thus, it can be implied that profits could exceed those that were obtained for the present research. However, there are few yellow corn varieties developed and adapted for diverse production areas such as the high altitude central Mexican regions. Michoacan is also the state that could experience highest returns if they switch to yellow corn production under a commercial production system. Oaxaca, again, is the state that could expect very the lowest returns in comparison to the other states.

As mentioned before, the present study used previous researches that suggest higher yield evidence within Chiapas by using commercial seeds. Although yellow corn production has lower returns than white corn production for commercial producers in Chiapas, results suggest that if producers take into consideration more use of inputs and start growing corn during Fall-Winter, profits can be more than double from Spring-Summer production and from traditional farmers.

Table 1. Profits from growing white and yellow corn in Mexico
Comparison between traditional budgets and commercial or recommended budgets

STATE	TRADITIONAL		COMMERCIAL		RECOMMENDED	
	WHITE	YELLOW	WHITE	YELLOW	WHITE	YELLOW
Mexico	$2,781.05	$738.10			$2,756.87	$2,794.63
Jalisco			$8,819.00	$8,722.60		
Michoacan	$3,528.59				$8,644.87	$8,693.87
Sinaloa			$21,547.00	$20,122.60		
Chihuahua	$1,919.83		$10,184.00	$23,812.60		
Tamaulipas			$1,492.60	$4,549.00		
Guerrero	$2,043.39				$2,116.45	$1,566.45
Oaxaca	$57.01				$595.99	$157.99
Chiapas	$1,345.66				$3,034.89	$374.39
					$7,906.80	$6,970.80

6. Conclusions

Although the former corn situation suggests that yellow corn is profitable. Mexican corn situation is a unique case. The next conclusions can be derived from the present study:

- Producing yellow corn is feasible for certain areas, specifically for Jalisco, Sinaloa, Chihuahua and Tamaulipas.
- For other states such as Michoacan, Chiapas, State of Mexico and Guerrero it is not very feasible since producers would expect very low returns, although they use a recommended production technique.
- Some states can grow yellow corn and get more revenue than from producing white corn. This situation can only be fulfilled if those producers simultaneously use more agrochemicals and commercial seeds, otherwise, they will face lower yield than that expected with a traditional production technique (that is the present case in the State of Mexico).

- For other states, such as Oaxaca, revenues associated with yellow corn could easily turn into negative if there is a small variation in price or yield.
- Although growing yellow corn is feasible for some states that currently do not produce this type of corn; switching from white corn to yellow corn will imply to sacrifice white corn production, the most important corn type produced and consumed in Mexico and also the variety which is most significant culturally.

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