

## **Food self-sufficiency in Mexico: support prices *versus* direct payments to the producer**

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### **Abstract**

Domestic production of basic products has failed to meet the demand of the population. In addition to this, imports of bread wheat and rice have been increasing since the trade liberalization in Mexico. This research analyzes the performance of the support price policy and PROCAMPO through the methodology that consists of the calculation of the food dependence index, where production, population, imports, exports and product yield are considered to quantify it, this with the aim of observing in what magnitude each policy contributes to achieving the objective set by the Federal Government of achieving food self-sufficiency in the country. The analysis period includes 2011-2020 to observe more broadly the behavior of the national production of the selected products (bread wheat and rice), the results obtained in the analysis indicate that the direct payment policy (PROCAMPO) is more effective in increasing the productivity of the Mexican countryside than the support price policy; however, despite the efforts the main objective is still not achieved, there are still major efforts to improve the conditions of the Mexican countryside, because there is no reduction in imports of the products studied, they continue to oscillate in more than 50% of national consumption and have not shown significant reductions that indicate an improvement in the results of the implementation of the program.

**Keywords:** bread wheat production, direct payments, food self-sufficiency, rice production, support prices.

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## Introduction

The current conditions of developing and transition countries are reflected in the growth rates of these countries, which are on average 1.97% (FAO, 2018), in addition to the fact that the import levels of basic grains represent around 56% of the total consumption of the general population, as can be seen in Mexico, where the production of basic grains has been inefficient for the supply of domestic demand and it can also be observed in the increase in imports with the trade liberalization especially after the signing of the North American Free Trade Agreement (NAFTA), as a result of this situation, policies such as: support prices, loans to the word, subsidies for inputs to production, are developed and implemented, due to the urgency of the situation of the agricultural sector in the world.

Since their creation, governments have as their primary function to guarantee an egalitarian development among the inhabitants for which they have an important tool: the public budget. It is through this tool that governments manage to transfer public resources through public policies of various characteristics, which reach the population in different ways.

The consensus on the role of government in agricultural development has been changing over time towards less direct management of economic activities and fewer controls on prices and quantities of factors and products (FAO, 2004).

The way in which supply and demand participate in the agricultural sector causes market prices to be set differently from how market prices occur in other productive sectors with different characteristics. The agricultural market has certain specificities: 'the market for basic grains is a market composed of heterogeneous participants, which are far from constituting a 'perfect' market'. Rural markets in peasant agricultural regions are very complex because they depend on local and regional circumstances' (Appendini, 1991).

The level of support prices is a parameter that is generally taken into account for the establishment of market prices, in a variable way, but support prices will always have some effect on the prices that govern the market, although this does not mean that market prices are necessarily equal to the support price because the operating capacity of Segalmex, a decentralized agency of the Secretariat of Rural Development (SADER) in charge of carrying out the program and that among its attributions is to set the support prices (FAO, 2012).

In Mexico, agriculture for a long time was the main source of income and employment in rural areas, in recent years agriculture has represented on average 3.9% of the total gross domestic product (GDP) (CEDRSSA, 2019), in fact, in the poorest countries it often represents the largest source of jobs in the entire economy.

The objective was to determine the levels of dependence that Mexico has on imports of bread wheat and rice by calculating the index of dependence on imports of cereals proposed by FAO (2009), for two different periods of time and considering different agricultural policies such as PROCAMPO and support prices, to observe how these policies impact on the behavior of the supply of the selected products.

The dependence on imports that Mexico has developed on basic products has been increasing over the years, this situation is due to the fact that Mexico has trade agreements that force it to synchronize national prices with international ones.

Currently, the government proposes to encourage agricultural production that guarantees food self-sufficiency in basic grains and milk, for which it created the Decentralized Mexican Food Security Agency (Segalmex), which is sectorized in the Secretariat of Agriculture and Rural Development and is responsible for setting prices on basic grains in Mexico.

Statistics on trade in Mexico indicate that the annual average of imports of rice and bread wheat exceed more than 80% of national consumption, hence the result that the Support Price Program currently for these two products offers different incentives compared to rice and beans, for example (SIAP, 2019). At present, Mexico has continued with the process of reform of the agricultural sector, in the process of being able to establish a better link of this sector to the world market.

Mexico with the passage of time became a net importer of foods, currently it imports them massively, in addition to the increasing decapitalization and lack of agricultural production. Inequality is one of the main characteristics of the Mexican countryside, on the one hand, the rainfed agricultural peasant with subsistence production, without support or with support of the government in small amounts and on the other, the irrigated production, production of business type for internal supply and export, with benefits and government support, where for many years the support of the countryside has been used as political power and social control.

Agricultural policy in Mexico has had a very marked performance in the institutional role for many years, this means that this topic has been central to research in many aspects and academic branches (Cano, 2014).

As well as Appendini (1985), who makes an analysis of this policy by making a historical account of how this public program impacted on the economy of the agricultural sector in Mexico, obtaining various results, among which the one that stands out is that a price policy cannot be isolated from a joint policy of support for agricultural production in terms of credit, input prices, technological change and that in general the supports must take into account the heterogeneity that exists between producers and the particular requirements of each sector of producers.

Van Ort *et al.* (2015) point out that for African countries, one of the food policy objectives in recent years is that of food self-sufficiency. He argues that most African countries are far from being self-sufficient to obtain their rice consumption due to population growth and diet change and concludes that countries cannot become completely self-sufficient in rice. This implies that, for the future, a mixture of expansion and imports will be necessary for the closing of the production and consumption gap.

Authors such as Valdivia *et al.* (2000) mention that one of the instruments that offer the most possibilities to stimulate the production of certain crops is the setting of a support price system. To understand the importance of this policy, it is essential to establish in detail the concepts

that will be addressed in this research work. The prices that will be used are the agricultural prices that are held internally in the country, because later the scope calculated on the support price policy will be mentioned, considering limitations and the difference in impact according to the types of producers.

This paper considers the prices of basic products participating in the support price program. Given the situation raised above and due to a decrease in the production of basic grains that meet national demand, the current government has set itself a policy objective in the National Development Plan 2019-2024 (DOF, 2019) to achieve food self-sufficiency through the implementation of various programs, among which is the Guarantee Price Program.

The Support Price Program consists of defining fixed purchase prices per product for those producers who meet certain characteristics, the collection centers designated by the authority receive and pay the support price to the producer, the model maintains that the small and medium-sized producer will have a price guarantee that will help them increase their income and continue with production, once the designated instance acquires the product, it will be responsible for selling it at the market price without affecting the final consumer.

### **Food self-sufficiency**

Food self-sufficiency, achieved when food needs are met through local production, is usually the main objective of national policies. However, this is complicated by food dependence caused by factors external to the economic situation of countries such as climatic, social and political factors (FAO, 2012).

The strategy of proposing food self-sufficiency in a country implies greater domestic production of grains, in particular corn, beans, bread wheat and rice, as well as in milk, beef, pork, chicken and fish. In pursuit of this goal, the country must increase the production of inputs that are required to produce food: seeds, fertilizers, diesel, fertilizers, machinery and equipment.

The advantages of food self-sufficiency are (FAO, 2004): protecting countries from sudden changes in international trade and fluctuations in the prices of agricultural products, securing food supplies to meet local needs, generating a food system of their own that considers not only food production, but also the activities inherent in it, such as industrial transformation, commercial activity, financial and strategic technological services, saving foreign exchange, producing food with care for the environment and generating better living conditions for producers in the countryside.

The Economic Commission for Latin America (CEPAL, 2014) defines food self-sufficiency as the situation where the reduction of imports can be achieved, and domestic demand can be supplied with domestic production.

Food self-sufficiency has risen higher on the political agenda in several countries following the extreme volatility of food prices experienced during the food price crisis of 2007-2008. (Clapp, 2016). In Mexico, since the beginning of the eighties, a comprehensive agricultural policy with strong support for the production of basic foods and producers of rainfed lands was established, since 1981 there is a tendency to recover real prices and the production of the main crops indicate increases for the following years.

The objective of the Program of Direct Support for the Countryside, called PROCAMPO, was to supplement the economic income of producers in the Mexican countryside, either self-consumption or supply, to contribute to their individual economic growth and that of the country as a whole, as well as to encourage the production of licit crops, through the granting of monetary support per area registered in the program, in accordance with the regulations, thus contributing to the attention of the needs regarding the right to food (DOF, 1994).

Recent surges in international food prices have reinforced the distrust felt by many food-importing countries towards the international market as a supplier of affordable food. The possible answer is to become less dependent on food imports. Concern for food security thus becomes a concern for food self-sufficiency. But food security and self-sufficiency are different things and can be in conflict (Warr, 2011).

## Materials and methods

For the analysis of this work and the estimation of the levels of dependence on rice and bread wheat in Mexico after the implementation of the Support Price Policy in 2019, a comparison is made between the first results of this policy compared to a policy of direct payments to the producer (PROCAMPO).

FAO in response to the recommendation of the Committee on World Food Security presented a set of indicators to contribute to the fight against food insecurity, the index used in this research is within the stability section together with 6 other indicators.

To comply with the above, an index that measures Mexico's food dependence on bread wheat and rice is used. In this research as a dependence index (IDE), the concept of cereal import index estimated by FAO (2010) is used, which is obtained by solving the following quotient:  $IDE = \frac{M_t}{Q_t + M_t - X_t}$

As seen in the above equation, it is solved with the volume of the cereal plus the imported volume of cereal minus the volume exported. Since the demand for grain is not reported in Mexico, the apparent consumption of bread wheat and rice is calculated using the following expression:  $D_t = Q_t + (M_t - X_t)$ . Where:  $D_t$  is the apparent national consumption of the grain in year  $t$ ;  $P_{Dt}$  is the demand price in year  $t$ ;  $PIB_t$  is the gross domestic product, using as approximate the income in year  $t$ ;  $POB_t$  is the population in year  $t$  and  $D1$  is a dummy variable for the analysis period and finally  $\varepsilon_{DT}$  is the term error.

This indicator provides a measure of a country's or region's dependence on cereal imports, the values they take range from 0-1. The higher the indicator, the greater the dependence. This indicator, in other words, indicates how much of the domestic supply of food available for cereals has been imported and how much comes from the country's own production. It should be noted that this index is used for the two selected products, such is the case of rice and bread wheat.

The data used were obtained mainly from the databases of the Bank of Mexico (BM), as well as from the Agrifood and Fisheries Information Service (SIAP), in the same way to obtain the data such as the apparent consumption, they were obtained from INEGI.

## Results and discussion

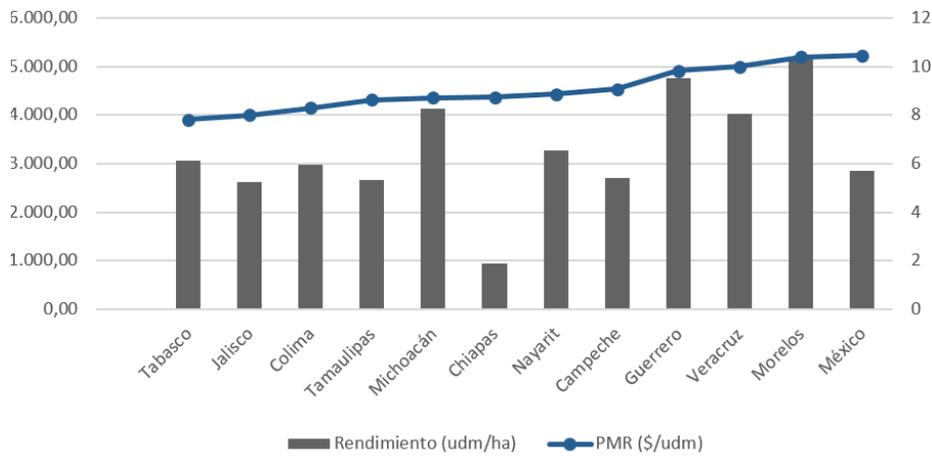
This section presents the results obtained from the calculation of the index described above, it should be noted that although the support price policy was announced in 2018 and the first year of disbursement was until 2019, two extra years were taken as a reference to be able to analyze from a broader context the behavior of the calculated index.

As examined in this study, the producer, being a beneficiary of the support price program, receives an income greater than the market price for their crops, the consumer acquires at a price lower than the market price and when they acquire the products of the community stores, and the government acquires these products in local development through social transfers the resources of society, without the need, in theory, for higher taxes to be paid, in addition to the elimination of intermediaries, since the Federal Government supports in the same way with the payment of freight. In summary, for the two products the calculation of the index was observed as follows in the Table 1.

**Table 1. Results of support prices and PROCAMPO.**

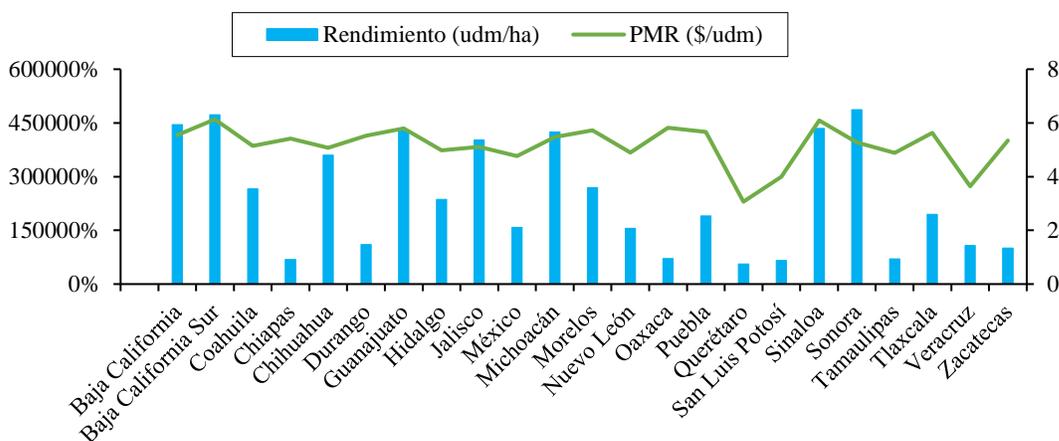
| Rice           |        | Bread wheat    |        |
|----------------|--------|----------------|--------|
| Support prices |        | Support prices |        |
|                | IDE    |                | IDE    |
| 2016-2017      | 0.8134 | 2016-2017      | 0.8639 |
| 2017-2018      | 0.8242 | 2017-2018      | 0.8387 |
| 2018-2019      | 0.8179 | 2018-2019      | 0.7917 |
| 2019-2020      | 0.7904 | 2019-2020      | 0.9016 |
| PROCAMPO       |        | PROCAMPO       |        |
|                | IDE    |                | IDE    |
| 2011-2012      | 0.7687 | 2011-2012      | 0.8019 |
| 2012-2013      | 0.7687 | 2012-2013      | 0.73   |
| 2013-2014      | 0.7769 | 2013-2014      | 0.7574 |
| 2014-2015      | 0.7786 | 2014-2015      | 0.7687 |

As is known, there is a heterogeneity in local wheat markets, both in the average rural price (3 880.56 ha, on average), and in the average yield per hectare (3.23 t ha<sup>-1</sup> on average) (Figure 1). There are not enough data to be conclusive regarding the relationship between the average rural price and the yield per hectare, but it can be observed that, on the one hand, the states with the lowest yield, which are Querétaro and San Luis Potosí, have the lowest average rural prices; as well as, states with a high rural average price, such as Chiapas, Oaxaca and Tamaulipas, are those with low yield (0.93 t ha<sup>-1</sup>), in contrast to those mentioned above that with a lower price (2 676 ha) have an average yield per hectare three times higher (2.07 t ha<sup>-1</sup>).



**Figure 1. Price-yield evolution of bread wheat.** Elaboration with data from SIAP.

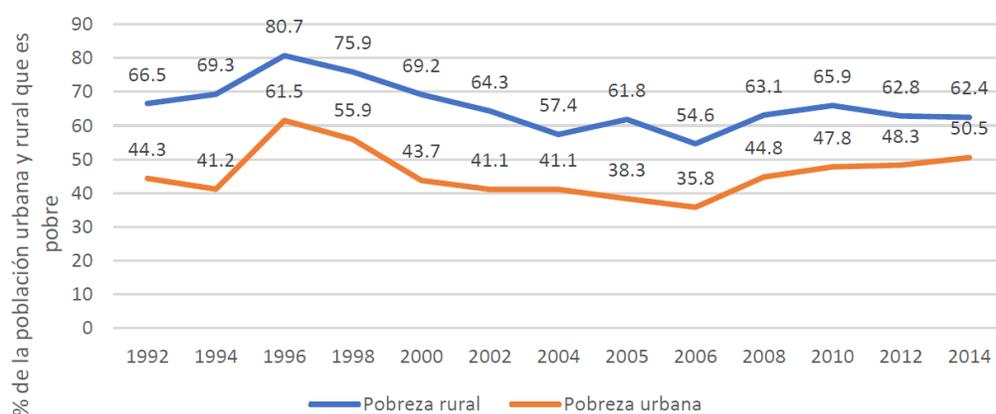
Similarly, for local rice markets there is heterogeneity, both in the average rural price (\$4 532.53 ha), and in the yield per hectare (6.53 t ha<sup>-1</sup>) on average. Unlike what occurs in local wheat markets, the highest average prices (\$5 138 ha) were registered in those three entities with the highest average yields per hectare (9.32 t ha<sup>-1</sup>). For this product, the government announced a price of \$6 120 t of rice as a support price, this with the aim of encouraging the production of rice (Figure 2).



**Figure 2. Price-yield evolution of rice.** Elaboration with data from SIAP.

This index, as mentioned above, consists of measuring how much the imports of the products selected in this investigation (rice and bread wheat) represent in apparent consumption, which is given by the sum of production and imports, minus their exports. When considering the objective of food self-sufficiency, products would be expected to show a decrease in this proportion; however, as observed above, until March 2020, it has behaved in a manner contrary to what was expected, showing that in Mexico, currently and for the selected products, 90% of the wheat consumed is imported and 79% of the rice is imported, which indicates that it is not yet in a position to tangibly observe an advance towards food self-sufficiency.

Mexico has had a deficit trade balance of agricultural products and high levels of poverty, especially in the peasant sector. In Mexico, approximately 62% and 50% of the rural and urban population is poor. This shows that after more than 20 years dedicated to combating poverty, more than half of the urban and rural population remains poor (Figure 3).



**Figure 3. Rural and urban poverty in Mexico (Fierro, 2019).**

Without neglecting the policy currently implemented in Mexico, the macroeconomic policy of the countries with which it has trade agreements must be considered, because establishing a policy in that way without taking into account international markets would generate an imbalance in the market, that is why the support prices must be above a minimum price, but always considering the price that the product has in the international market (Hayami and Barker, 1976).

## Conclusions

Within the agricultural policy, welfare support has been established for producers, that the price policy is a policy implemented by the Federal Government for several years and with different modalities and institutions under its charge. However, according to this research and past studies discussed in this paper, the support price policy does not reflect a good performance towards achieving self-sufficiency in the country, when compared with other types of policies such as PROCAMPO, it shows a lower performance towards encouraging producers to improve their productivity with the help of the agricultural policies implemented.

On January 18, 2019, the creation of the public agency Mexican Food Security was published by presidential decree, whose objective is to favor Mexican agri-food productivity and its distribution for the benefit of the most lagging population, in addition to the fact that it is in charge of the sale, distribution and, where appropriate, the import of fertilizers and various products that are used to achieve the objective; however, currently, this organism is still in a stage of adaptation and formation, which is not beneficial to reflect concrete results, because it is a new organism.

Support prices as an instrument of economic policy had already been applied before, until today, the policy instruments, in general, have not been effective in significantly promoting the production of basic products, so it has been necessary to resort increasingly to imports to help meet the demand of the population, this is previously reflected in the trade balance of the products studied. For example, in 2018, approximately 89% of rice and 67% of bread wheat were imported for national consumption, hence the main objective of the program.

For the products selected in this work, it was observed that, at least for rice, the production has increased, but it is still insufficient to meet the demand of the country, in addition to the failure to be an exporting country of the product, since regarding this grain zero exports continue to be reported. In the case of bread wheat, its importance for food production in the country is known; however, as in the case of rice, its production is still insufficient, for this product Mexico does report exports, in addition to being the most cultivated cereal, especially in Sonora.

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