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The potential of Mexican agriculture and options for the future

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Mexican agriculture, which had deteriorated as a result of the global adjustment process, only began to recover as from 1989. If the recovery of the national economy which began in 1987 becomes even more marked, it is possible that agriculture may not be able to respond with increased production.

In this article, it is suggested that the potential of Mexican agriculture is enormous. In order to evaluate the short-term potential of Mexican agricultural activity, the author calculates the volume of production which could be achieved if the maximum area cultivated and the peak yields of the recent past were achieved simultaneously. In order to estimate the indirect contribution of agricultural recovery to the national economy, he also calculates the level of imports that could be attained if the country's agricultural potential were fully exploited. On the assumption that insufficient import capacity limits economic activity and on the basis of the import coefficients of the past, the indirect contribution of agriculture is accordingly evaluated. According to a relatively optimistic hypothesis, the direct and indirect contribution of the increase in the sector's gross domestic product is estimated at the equivalent of 6% of total GDP. According to a less optimistic hypothesis, it is estimated that that contribution would raise total GDP by 3.2%.

That potential could be realized if the supply conditions of the sector were increased through recapitalization and other institutional measures. In addition, in order to stimulate supply it would be necessary to provide suitable incentives for producers, such as selective subsidies. These should be short-term subsidies and should be differentiated by product, type of producer and, possibly, by region.

Introduction

During the period of adjustment of the Mexican economy, the growth of the agricultural sector was even more limited than that of the rest of the economy. Thus, while overall economic activity began to recover in 1987, agriculture only began to make up for its past deterioration as from 1989, thanks to favourable weather conditions.

Clearly, limitations in the supply of agricultural goods may threaten national economic recovery. On the one hand, stagnation of agricultural production would directly weaken the overall economic growth rate. On the other hand, a significant part of the increased demand for food and agricultural goods due to the recovery would have to be covered by imports. In a situation of external constraints, this would restrict the possibilities of increasing demand and, hence, production. It is therefore necessary to see whether the recent recovery in agricultural sector production is based on solid foundations or not.

In this article, it is argued that Mexican agriculture does in fact have enormous potential and that realizing that potential would not only allow that sector to go along with the overall recovery but even stimulate it. Several general sectoral policy lines which could help take advantage of that potential are also explored.

I

The potential of Mexican agriculture and its impact on the national economy

Analysis of the main crops grown in 1988 –the latest year for which the data needed for the following exercises are available– makes it possible to identify the immediate causes of the agricultural stagnation which prevailed up to that year and to evaluate the agricultural potential. If the production of rice, beans, maize, wheat, sesame, soy beans, cotton, barley and sorghum (which account for 35.4% of the total value of agricultural production in that year) is considered, it may be seen that during the 1980-1988

period, both the area under cultivation and the yields per hectare declined for all those crops. [1]

This suggests that, in agriculture as in the national economy, productive resources were not adequately exploited. If both the (maximum) yields and areas under cultivation achieved previously had been maintained, the production of the sector could have been greater than that actually achieved.

It is interesting to try to quantify the foregoing statement. To that end, table 1 seeks to measure the loss of potential production (that is, the difference between the actual production and that which would have been achieved if the area cultivated and the yields had been at their maximum levels) due to the lower yields and smaller areas under cultivation. [2] In the table, a calculation is made of the volume and value of production that each of the crops in question would have registered in 1988 if the potential yields and areas under cultivation had been maintained. Subtracting the values actually achieved in that year from the amounts calculated in this exercise gives the potential production and its potential value.

The table shows that all the crops analysed could have reached higher production levels. Although the orders of magnitude must be viewed with great caution, the data clearly show losses caused by under-exploitation of resources. Thus, the loss in potential production in 1988 was of the order of 3 924.7 billion pesos: equivalent to 45% of the actual value of production of those crops. [3]

Moreover, further conclusions can be drawn from the fact that in that year gross agricultural production was worth 24 741 823 million pesos, whereas the sectoral GDP was 18 953 547 million pesos. If the potential yields and areas under cultivation had been achieved for the nine crops in question, and if those crops had registered the average ratios of GDP to gross production (0.766) obtaining for the whole

of agriculture, then the agricultural GDP would have been 21 959 320 million pesos, or nearly 16% higher than that actually achieved. Furthermore, the total national GDP, which came to 392 791 754 million pesos, would have been 395 798 074 million pesos: that is to say, 0.8% higher than it actually was.

In other words, if the historical yields and areas under cultivation had been achieved in the case of only nine products, the sectoral and total products would have been 16% and 0.8% higher than they actually were. This would have been the direct contribution of agriculture, if its potential production had been realized. Below, it is demonstrated that its indirect contribution could have been even greater.

So, what would it mean for the national economy if agriculture could realize its potential production in those nine crops? Above and beyond the higher agricultural GDP already analysed, the most significant contribution would be indirect, connected with its effects on foreign trade and, in particular, its effect in helping to alleviate external constraints

Table 2 examines the contribution that could have been made by agriculture to foreign trade, if the potential production of these nine crops had been realized. For this exercise, it is assumed that the potential production would be used exclusively for export or for import substitution, and that it could be sold on foreign markets at the prevailing prices. Naturally, these are simplifications. A more realistic analysis would have to address the situation crop by crop.

The table makes it possible to arrive at some interesting conclusions. Firstly, if it is assumed that the potential production can be achieved without affecting previous levels of imports and exports, [4] it is seen that Mexico could have been not only self-sufficient, but even a net exporter, in the case of seven of the crops under consideration. Thus, it could have eliminated imports and achieved exportable surpluses in the case of beans, maize, wheat, sesame and barley, and it would only have been necessary to keep on importing soy beans and sorghum.

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[1] This statement is not based on trends in these variables, which were rather erratic, but rather on the fact that in 1988 both the area under cultivation and the yields were below the maximum levels achieved during the 1980-1988 period.

[2] It may be noted, for example, that in 1988 the total area under cultivation was 18 597 000 hectares, in contrast with the 23 964 000 hectares cultivated in 1983. Macroeconomic and trade policies which would help to restore the area under cultivation and yields to their maximum levels are considered below.

[3] It does not seem that the lower yields of 1988 were caused by the use of marginal land, since in that year the total area cultivated was less than in 1983, for example.

[4] This is a simplification: increased agricultural production would increase the demand and need for imports of inputs for the sector and would somewhat reduce its balance for exportation. This matter is considered below.

Table 1

MEXICO: POTENTIAL AGRICULTURAL PRODUCTION, 1988

	Rice	Beans	Maize	Wheat	Sesame	Soy beans	Cotton	Barley	Sorghum	Total
Real area planted (Si) (thousands of hectares)	171	2 344	8 029	965	103	155	298	246	1 941	14 252
Real yield (Ri) (tons per hectare)	1.75	0.37	1.32	3.80	0.33	1.46	1.65	1.42	3.04	
Production (thousands of tons)	300	857	10 600	3 665	34	226	491	350	5 895	
Production (millions of pesos)	200 494	835 184	4 143 155	1 148 007	37 559	175 620	166 317	122 719	1 948 976	8 778 031
Price per ton (Pi) (thousands of pesos)	668.31	974.54	390.86	313.24	1 104.68	777.08	338.73	350.63	330.62	
Potential yield (Rip) [a]	2.23	0.58	1.69	4.24	0.50	2.01	1.83	1.99	3.26	
Potential area (Sip) [a]	216	2 462	8 551	1 274	358	505	333	361	2 060	16 120
Rip*Sip*Pi	321 621	1 386 566	5 634 244	1 692 466	199 427	789 756	206 629	251 931	2 220 126	12 702 765
Ri*Si*Pi	200 494	835 184	4 143 155	1 148 007	37 559	175 620	166 317	122 719	1 948 976	8 778 031
ΣRip*Sip*Pi − ΣRi*Si*Pi										3 924 734
Rip*Sip	481	1 423	14 415	5 403	181	1 016	610	719	6 715	
Ri*Si	300	857	10 600	3 665	34	226	491	350	5 895	
Rip*Sip − Ri*Si	181	566	3 815	1 738	147	790	119	369	820	

Source: Prepared by the author on the basis of figures from the Annex to the First Presidential Report, 1989.
[a] Based on the maximum yields and areas cultivated in the period 1980-1988.

Moreover, if that production is valued at current international prices, [5] the realization of the potential production would have meant foreign exchange earnings (amount saved by import substitution, plus the earnings from increased exports), equivalent to US$1 581.5 million (table 2). That figure is slightly higher than the total agricultural exports registered in 1988, when agricultural exports and imports amounted to US$1 401 million and US$1 397 million, respectively.

It is now possible to estimate the total contribution of agriculture to the national economy, if the potential production of those crops had been realized. The direct contribution, as already noted, would have amounted to a 16% increase in the agricultural GDP and a 0.8% increase in the total GDP in 1988. However, the indirect contribution would have been much greater.

The reason for this is as follows. Even though Mexico has regained access to international credit and the inflow of capital has been rising, the external situation of the country is still delicate. Moreover, after the debt crisis and the implementation of the new economic policy, all the new conditions for expansion have involved strong surges in imports.

The fact that the external situation is still difficult reduces the capacity of the State to apply policies which will increase demand, since it does not seem prudent to continue financing current account deficits with foreign capital much longer. This explains why, after several years of recovery, there is still a large amount of idle production capacity, along with unemployed labour. [6] In this sense, it is not too much to argue that, for Mexico, foreign exchange availability is a critical limiting factor on production.

[5] These represent the average price of Mexican exports and imports in 1988. Estimates were based on data provided by the Bank of Mexico.

[6] According to one estimate, the utilization of production capacity in 1990 was still 20% below the 1981 level (López, 1991a). Moreover, in various surveys made in 1991, manufacturing sector representatives indicated that 30% of their capacity was idle (see various recent issues of the Mexico City business magazine *Expansión*).

Table 2

MEXICO: REAL AND POTENTIAL FOREIGN TRADE
IN NINE AGRICULTURAL PRODUCTS, 1988

	Rice	Beans	Maize	Wheat	Sesame	Soy beans	Cotton	Barley	Sorghum	Total
Real imports [a]	1.0	31.0	3 125.0	1 189.0	-	989.0	44.0	7.0	1 523.0	
Real exports [a]	3.0	8.0	-	104.0	-	-	108.0	-	415.0	
Real net exports [a]	2.0	-23.0	-3 125.0	-1 085.0	-	-989.0	64.0	-7.0	-1 108.0	
Potential exports [a]	181.2	565.8	3 814.9	1 738.2	146.5	790.3	119.0	368.5	820.1	
Potential net exports [a]	183.2	542.8	689.9	653.2	146.5	-198.7	183.0	361.5	-287.9	
Average foreign price [b]	300	381	130	125	740	306	772	163	120	
Potential foreign exchange earnings [c]	54.4	215.3	494.0	217.3	108.4	241.8	91.8	60.1	98.4	1 581.5

Source: Prepared by the author. The average foreign price was obtained from Foreign Trade Statistics of Mexico.
[a] Thousands of tons.
[b] Dollars.
[c] Millions of dollars.

Now, agriculture produces goods which are tradeable in foreign markets, which means that the potential production could be exported and serve to substitute imports.[7] Greater availability of foreign exchange would make it possible to raise aggregate demand, and this would permit increased production, employment, wages and private profits in sectors limited by low demand. This is exactly what the indirect contribution of agriculture to the national economy would be, if its potential were realized: it would allow demand and production to expand in the other sectors, without causing inflation or unmanageable balance of payments problems.

Table 3, which was prepared on the basis of the same assumptions as the preceding table, together with those indicated below, seeks to measure the indirect contribution of agriculture, if the potential production of the nine crops had been realized in 1988.

In order to measure this contribution, it is necessary first of all to deduct the sector's foreign exchange requirements –which can be obtained for each crop by multiplying potential production by the corresponding coefficient for imported inputs– from the foreign exchange which would be saved or obtained thanks to this potential production. This

agricultural surplus can be expressed in physical units, as in the table.[8]

Secondly, it is necessary to estimate the *exportable surplus of agricultural goods*, which is calculated by subtracting from the agricultural surplus the domestic demand for agricultural goods. This latter demand is equal to the increased domestic consumption (or apparent consumption) of those goods which would arise from the expansion of GDP and personal income. In the table, it is assumed that the income-elasticity of apparent consumption is 0.8, or 80%; this is a pessimistic assumption, because the income-elasticity of demand for agricultural goods is actually quite low and, historically, has been below 0.4 (López, 1991a). The exportable surplus, multiplied by the average external price of each product, gives the *potential foreign exchange surplus*, both for each crop and for the economy as a whole. This latter factor would amount to US$1 363 million, which is only slightly less than total agricultural exports in 1988 (table 3).

[7] It should be noted that, from this point of view, the benefits accruing from the generation of exports and the substitution of imports are identical.

[8] The import coefficients for each crop were obtained from the "Input-output matrix for Mexico. Breakdown for the agricultural and forestry sector, 1980" prepared by the National Geographic, Statistical and Informatics Institute (INEGI) and the Ministry of Agriculture and Water Resources (SARH). It should be noted, as may be clearly seen in the table, that the agricultural sector is peculiar in an important and beneficial way: its inputs are mainly produced domestically, so that its coefficient of imported inputs is very low. Thus, few imported inputs would be needed to realize the potential production, with the result that the amount of foreign exchange freed for other sectors would be substantial.

Table 3

MEXICO: INDIRECT CONTRIBUTION OF AGRICULTURE TO
THE REST OF THE ECONOMY

	Rice	Beans	Maize	Wheat	Sesame	Soy beans	Cotton	Barley	Sorghum	Total
Production [a]	300	857	10 600	3 665	34	226	491	350	5 895	
Potential production [a]	181.2	565.8	3 814.5	1 738.2	146.5	790.3	119.0	368.5	820.1	
Real imports (volume) [a]	1.0	31.0	3 125.0	1 189.0	-	989.0	44.0	7.0	1 523.0	
Real exports (volume) [a]	3.0	8.0	-	104.0	-	-	108.0	-	415.0	
Real net exports (volume) [a]	2.0	-23.0	-3 125.0	-1 085.0	-	-989.0	64.0	-7.0	-1 108.0	
Import coefficient	0.0186	0.0138	0.0118	0.0162	0.0112	0.0175	0.0085	0.0221	0.0330	
External inputs required [a]	3.4	7.8	45.1	28.1	1.6	13.8	1.0	8.1	27.1	
Agricultural surplus [a]	177.9	558.0	3 769.8	1 710.1	144.9	776.5	118.0	360.4	793.1	
Domestic demand for agricultural goods [a]	13.0	38.5	600.3	207.8	1.5	53.1	18.7	15.6	306.3	
Exportable surplus [a]	164.8	519.5	3 169.5	1 502.3	143.4	723.3	99.3	344.8	486.8	
Average external price [b]	300	381	130	125	740	306	772	163	120	
Potential foreign exchange earnings [c]	49	198	410	188	106	221	77	56	58	1 363
Potential contribution to GDP [d]	778 587	3 111 947	6 462 061	2 956 509	1 670 682	3 484 817	1 206 331	884 760	919 607	21 475 301

Source: Prepared by the author.
[a] Thousands of tons.
[d] Dollars.
[c] Millions of dollars.
[d] Millions of pesos.

On the basis of these potential foreign exchange surpluses, it was possible to measure the potential indirect contribution of agriculture.

In making this estimate, it was taken into account that in 1988 total GDP came to 392 791 754 million pesos and that, in order to generate that GDP, US$24 948 million of imported goods and services were needed. This means that, for each million dollars spent on imports, 15 744 million pesos of GDP was generated.

If it is assumed that the import coefficients for the agricultural and non-agricultural sectors are identical (which is of course a simplification), the foreign exchange which agriculture could transfer to the rest of the economy in 1988, a total of US$1 363 million, would make it possible to generate an increase of GDP of the order of 21 475 301 million pesos. This would be equal to 5.5% of total GDP and 13.3% higher than the agricultural GDP for that year.

This would be the exact indirect contribution of agriculture to an increase in the GDP. Since, as estimated earlier, the direct contribution due to an increase in sectoral GDP would have been 3 006 320 million pesos (equal to 0.8% of GDP), it may be concluded that the total contribution from the realization of the potential of agriculture would be 24 481 621 million pesos: equal to more than 6% of the 1988 GDP.

II

Future prospects and options

Once potential resources and the insufficient current yields have been verified, the question arises of what can be done to avoid such inefficiency and realize the potential production: that is to say, what would be the most appropriate set of instruments to achieve those objectives.

In the recent debates about Mexican agricultural and agrarian policy, the main emphasis has been placed on organizational and institutional change. With the reform of Article 127 of the Constitution –which establishes the conditions for the functioning of the *ejidos*– and with the free trade treaty with United States and Canada, Mexico is seeking to reform its institutional and organizational frameworks in order to strengthen entrepreneurial activity in rural areas and make it more dynamic.

These reforms will probably help stimulate Mexican agriculture by attracting fresh investments and giving agricultural exports easier access to the North American market. However, the modernization of the agricultural sector will also depend on the macroeconomic and trade policies applied, since they will establish the conditions for the relative profitability of that sector. In the following pages, emphasis will be placed on those types of policies, without however ignoring the importance of organizational and institutional measures or of sectoral and microeconomic policies.

In an earlier study by the present author it was argued, on the basis of various econometric estimates, that agricultural production is partially determined by demand and, above all, by domestic demand (López, 1991b). For example, the drop in domestic demand which followed the debt crisis had an almost direct impact on agriculture, since there was no short-term possibility of selling part of that sector's production on international markets.

In this sense, the continuation and enhancement of the recovery begun in 1987 seems to be a first condition for realizing the potential of agriculture. Indeed, during the two years 1990-1991 there was a degree of recovery in that sector, with an average annual growth rate of 4.5% in its GDP. To a large extent, this has been due more to the buoyant domestic market than to increased demand for exports, and it has not been accompanied by significant investments in agriculture, nor the channeling of substantial resources to that sector.

This latter aspect represents a further necessary condition if the record areas under cultivation and yields of the recent past are to be recovered. Because of the adjustment process, investment in rural areas virtually collapsed, and the ratio between federal public investment and the agricultural GDP, which had been 11.5% on average between 1980 and 1985, fell to 4.5% during the 1985-1988 period, while the participation of federal public investment in the agricultural sector, as a percentage of total public investment, fell from 11.6% to 8.4% over the same period. At the same time, credit for agriculture fell sharply: the share of farm credit in total credit granted by the consolidated banking system fell from 5.7% to 3.6% during those years, while farm credit as a percentage of the GDP of that sector went down from 35.3% to 28.4%. It seems doubtful, to say the least, that agricultural production can continue to grow without investment efforts in the sector.

Another condition –also necessary, although not sufficient in itself– for the realization of potential production is related to the recapitalization of agriculture. In other words, a significant part of the increase in overall demand should be converted into investment designed to modernize and capitalize the sector. This would make it possible to improve the material conditions of production and increase future soil yields and the productivity of agricultural labour. [9]

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[9] It is very probable that what are needed are not so much large projects as smaller complementary investments to rehabilitate the infrastructure, which seriously deteriorated during the adjustment process.

However, increased demand may not lead to increased production, even if agriculture is recapitalized; the sector faces growing marginal costs, [10] so that greater demand may simply lead to more imports. Consequently, a third condition seems to be higher relative prices for agricultural products. [11]

Would this latter measure be sufficient? In the past, higher relative farm prices have not always stimulated production. [12] It may therefore be affirmed that, although it is a necessary condition, raising these prices is not a sufficient condition in itself either.

In this context, and in view of the proximity of the free trade treaty with the United States and Canada, it is worthwhile considering what would happen if domestic producer prices were to come into line with international prices. In fact, the ratio between domestic and foreign prices has not remained constant: in some years, the former were higher than the latter, while in others the opposite has been the case. For the purposes of analysis, it may be useful to take as a reference the situation in 1990. In that year, the domestic prices of at least five basic products were higher than the

corresponding foreign prices. [13] Price alignment would therefore mean lowering prices and profitability for most crops. In the short term, at least, this would probably mean lower overall sector supply.

It could be argued that this phenomenon would not occur if, together with price alignment, the national currency were devalued, because in that case relative farm prices would improve. In fact, several analysts have asserted (with powerful arguments) that over-valuation of the national currency is particularly harmful to agriculture, because nearly all of the production of that sector is tradeable or potentially tradeable in international markets (Valdés, 1986).

Obviously, the advantages inherent in a devaluation would depend on general economic conditions and not only those of the agricultural sector. [14] However, if the decision to devalue is made, it must be borne in mind that this would give rise to another problem: the devaluation would stimulate inflation and also reduce domestic demand. It has been confirmed (López, 1991b) that there is a negative association between the real exchange rate index, on the one hand, and domestic demand and the GDP on the other. In this sense, it cannot be affirmed *a priori* that such a measure would benefit agriculture.

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[10] Agriculture, unlike manufacturing, faces increasing direct marginal costs.

[11] As an alternative —or together with these measures— the profitability of agriculture could be improved by lowering costs. However, there seems to be only limited leeway for this, especially if openness to foreign markets is continued and broadened. In fact, studies of effective protection show that at the end of 1987 —the last year for which figures are available— agriculture had a positive rate of effective protection of 4%, compared with an average negative effective protection rate of 28% for the other sectors of the economy. This, in a context of domestic prices for crops which seem to be higher than international prices, suggests that Mexican farmers do not pay higher prices for their inputs than world market prices.

[12] The past experience of Mexico —and of other countries— shows that, generally, higher relative farm prices tend to generate inflationary pressures, to depress the purchasing power of the lower-income groups, or both phenomena simultaneously. Because of this, and of the efforts of the State to control inflation by lowering its expenditures, domestic demand contracts, and this reduces the market for agricultural products. Thus, the supply stimulus associated with improved relative prices is cancelled out.

[13] In May 1990, the ratios of the international price to the domestic price for selected products were: yellow maize, 0.6; rice, 1.20; soy beans, 0.58, and sorghum, 0.88.

[14] The Mexican peso reached its lowest real value in 1987, when the real exchange rate index was 170 (on a base 1970 = 100), and it has since been gradually revalued. In October 1991 the index was 120, although this was still higher than its 1977-1979 level, when it is generally accepted that it was in equilibrium.

III

A suggested policy for the agricultural sector

The foregoing section demonstrates the complexities involved in designing a policy to stimulate agricultural production. No single measure, by itself, is sufficient. This, however, also leads to the general conclusion that agricultural production could be increased if several conditions linked to macroeconomic and trade policy are satisfied simultaneously:

i) That the upward trend and growth of demand continues and increases;

ii) That the sector is recapitalized;

iii) That producer prices are improved;

iv) That these increases are not offset by reduced demand for farm products.

This conclusion makes it possible to suggest a way of satisfying the necessary conditions: a policy of producer subsidies [15] which would increase profitability but would at the same time avoid acceleration of inflation and reduction of the purchasing power of the lower-income groups.

If that policy were complemented with improvements in the infrastructure and trade channels, the elimination of bureaucratic obstacles and similar measures, the expansion of supply would be stimulated and the potential production could be realized. Thus, measures for organizational and institutional modernization, especially reform of the *ejido* system and the entry into operation of the free trade treaty, would also be supported.

How much would such a policy cost in terms of public expenditure? That figure would depend on the amount of the subsidies and their relation to prices. Table 4 seeks to make a first approximation to this question. In it, it is assumed that domestic producer prices would rise for the basic crops considered above. In the case of rice, prices would be fixed according to external prices. With respect to the other products, the 1988 prices would be raised by

15%.[16] In order to raise producer prices, a subsidy equivalent to the difference between the new domestic price and the international price would be granted. At the same time, consumer prices would be brought in line with international prices, which would mean that (except for rice) those prices would fall. This would eliminate the implicit transfer which consumers had been paying to agricultural producers because domestic prices were higher than those on the world market.

How could such a subsidy be financed? One option would be for the State to collect in one way or another the implicit transfer which consumers are now paying, but which they would cease to pay if prices were lowered. However, a different proposal will be considered here.

In principle, higher producer prices generate extraordinary earnings, that is, earnings over and above those generated by previous production. [17] In this analysis, it will be assumed that those earnings are taxed at 100%. It will also be assumed that this measure is accompanied by other forms of support (for marketing, infrastructure, etc.) which will stimulate an increase in production to a level equal to the potential production of each crop.

Table 4 shows that, first of all, this measure would eliminate the implicit transfer which Mexican consumers are paying today and which amounts to 2 404 652 million pesos, equivalent to 0.6% of the 1988 GDP. Secondly, this measure would be accompanied by a net subsidy (that is, net of taxes on the extraordinary earnings) for producers, equivalent to 4 050 445 pesos. That subsidy would amount to only 16.5% of the total increase (direct and indirect) in GDP generated by the potential production [4 050 445 divided by 24 481 621]; (3 006 320) (direct contribution) + (21 475 301) (indirect contribution).

[16]These domestic prices were obtained by dividing the value of production by the total production (according to the figures contained in the Statistical Annex of the First Presidential Report, 1989). The ratios between domestic and foreign prices for maize, wheat, sorghum, rice and soy beans were obtained from direct information provided by SARH. For the other products, it was assumed that the ratio was equal to the average (simple) ratio of the five products already mentioned.

[17]These extraordinary earnings are equal to the product of the volume of original production, multiplied by the difference between the necessary price and the original domestic price.

[15] Another option would be a devaluation, accompanied by consumer subsidies (so that farm product price increases would not lower the buying power of the lower income groups and reduce domestic demand). The term subsidy is used here in a broad sense: it includes preferential credit rates, sale of inputs or products at reduced prices, etc.

This is not all, however: in reality it would not even be necessary to make such large outlays, because the subsidy would partially pay for itself for the following reason. Given that the subsidy would increase the product, other taxes collected would also increase. Assuming a tax rate of 12.27% (non-oil domestic taxes), which was the rate in 1988, the total increase in the product would generate greater tax income of the order of 3 008 895 million pesos. That figure is only 1 041 550 million pesos less than the net subsidy required, which represents the deficit that the State would have to absorb.

What problems would that deficit cause? Clearly, that amount is much less than the implicit transfer which Mexican consumers are paying today. From that point of view, there would be a net improvement in the general well-being of the community. Moreover, for each peso of the final deficit, 23.5 pesos of gross national product would be obtained (24 481 621 million pesos, divided by 1 041 550 million pesos), which is undoubtedly highly advantageous.

However, that deficit could generate inflationary pressures and/or put pressure on the balance of payments. Given the characteristics of agricultural production, there would be a lag between the moment of the expenditure (subsidy) and the time when the benefits of that expenditure would be felt. For that reason, it might be necessary to obtain foreign credit to cover that public deficit. However, those loans would pay for themselves, thanks to increased exports and the lower import coefficient which the subsidy would make possible.

Table 4

MEXICO: ESTIMATED COST OF AN AGRICULTURAL SUBSIDIES POLICY, 1988

	Rice	Beans	Maize	Wheat	Sesame	Soy beans	Cotton	Barley	Sorghum	Total
Domestic price per ton (Pi) (thousands of pesos)	668.5	974.5	390.9	313.2	1 104.7	777.1	338.7	350.6	330.6	
Ratio Pi/external price	0.9	1.2	1.8	11.1	1.2	1.5	1.2	1.2	1.2	
Equivalent domestic price	735.1	803.0	222.8	294.4	910.3	520.6	279.1	288.9	277.7	
"Necessary" price	735.1	1 120.7	449.5	360.2	1 270.4	893.6	389.5	403.2	380.2	
Subsidy (per ton)		317.7	226.7	65.8	360.1	373.0	110.4	114.3	102.5	
Gross subsidy per crop [a]		452 021	3 267 861	355 418	65 013	379 083	67 361	82 129	688 239	5 357 125
Implicit transfer [a]	-20 049	146 992	1 781 557	68 880	6 610	57 955	29 272	21 599	311 836	2 404 652
Extraordinary earnings	20 049	125 278	621 473	172 201	5 634	26 343	24 948	18 408	292 346	1 306 680
Net subsidy per crop [a]		326 743	2 646 388	183 217	59 379	352 740	42 413	63 722	395 893	4 050 445
Total net subsidy [a]										4 050 445
Gross production of sector [a]										24 741 823
GDP of sector										18 953 547
GDP of the economy										392 791 754

Source: Prepared by the author.
[a] Millions of pesos.

IV

Final considerations and conclusions

All the foregoing arguments could be questioned on the grounds of the assumptions made or the concepts or principles adopted. It could be said, for example, that the estimate of potential production is too high. It could also be argued that it is over-optimistic to assume that there will be export demand for surplus production.

Moreover, it could be argued that subsidies for producers or consumers –just like protection against external competition, for example– distort the market signs and therefore lead to sub-optimum resource allocation. If this were so, the benefits of the subsidies would be illusory or short-lived.

With respect to possible criticism of the assumptions made, it should be noted for a start that those used in the exercise do not pretend to be exact. In-depth research would be needed to achieve such exactness. Consequently, perhaps the best course for the present, until such research has been performed, would be to subject the results of the exercise to a sensitivity analysis: in other words, to see how far the results would be affected if other assumptions were used.

To this end, the same type of exercise was performed with the following different assumptions:

i) It will not be possible to increase the area under cultivation for the crops under consideration, although the potential yields could be attained for each of them. Thus, the potential production for 1988 would be obtained by multiplying the area actually cultivated that year by the potential yield for each crop.

ii) Because of lower farm prices, the income-elasticity of agricultural demand will be greater than in the previous exercise. A value of 0.9 is therefore assigned to that variable (instead of 0.8, which was itself high in comparison with historical values).

It is not necessary to go into detail about the specific aspects of this exercise, but its main results may be summarized as follows:

i) Potential production would amount to 2 117 204 million pesos. Sectoral GDP could have been 1 621 778 million pesos (8.6%) greater. The direct contribution to total GDP would be an increase of 0.4%

ii) Mexico could be self-sufficient and generate exportable surpluses, not only in rice and cotton –as in 1988– but also in beans, wheat, sesame and barley, while imports of maize, wheat, soy beans and sorghum would remain constant. The trade deficit for these nine products, which was US$935.8 million in 1988, would be only US$144 million in this case. The foreign exchange saving would thus amount to US$791.6 million.

iii) The indirect contribution of the sector would be to raise GDP by 10 729 053 million pesos, i.e., by 2.7%.

iv) Consequently, the total contribution would be to raise GDP by 12 350 831 million pesos (1 621 778 million plus 10 729 053 million). This is equivalent to 3.1% of the 1988 GDP.

v) The gross subsidy would be 4 667 729 million pesos, and the net subsidy, 3 381 098 million pesos. The net subsidy would represent 27.4% of the total GDP increase obtainable from the potential production.

vi) Taxes collected would amount to 1 539 192 million pesos, so that the deficit would be 1 841 906 million pesos. For each peso of deficit, 6.7 pesos of GDP would be generated.

Thus, it may be seen that even with less optimistic assumptions than those used in the original exercise, the balance would be very favourable, if measures to realize the potential production were implemented.

What should be done, however, if the international market does not absorb the exportable surplus?

First of all, it should be noted that a substantial part of the foreign exchange benefits would come from the substitution of domestic products for imports, so that, at first, the domestic market should not be a problem for this production increase.

In the exercise performed earlier, for example, import substitution alone would produce foreign exchange benefits of US$464 million, equal to 50% of the original deficit of those crops in 1988 and to 59% of the foreign exchange benefits obtained from the potential production. Those foreign exchange

savings alone would raise GDP by 7 305 216 million pesos, or 1.9% of the total 1988 GDP. Thus, even in these less favourable circumstances, taking advantage of the potential production would raise total GDP by 2.3% (0.4% directly and 1.9% indirectly).

If this were not enough, however, and if it were really impossible to sell the additional potential exports, another option could be considered. This would involve encouraging a change in crops, favouring those which would replace the remaining food imports. This would not be easy, because resources are not perfectly flexible. However, with adequate incentives –such as more favourable relative prices and credit and tax support– a good deal of progress could be made in this direction.

This reasoning shows that intervention above and beyond the signs given by the market may be preferable to doing nothing and leaving everything to market forces. In certain circumstances, intervention would make it possible to realize the potential production and utilize resources which would otherwise remain idle.

Such a proposal is usually associated with structural thinking. How different is it from conventional theory?

Although a detailed analysis of this question is not possible here, it can be stated that, when factor mobility is limited and wages cannot be lowered, neoclassical theory also recognizes that governmental intervention may be preferable to leaving the situation to market forces. [18] In fact, the main difference between neoclassical theory and the protectionist concept, for example, does not derive from the rejection of government intervention. The difference is rather that neoclassical theory recommends the application of subsidies or taxes up to the specific point at which domestic distortions are produced.

As already noted, this seems to be a reasonable conclusion. Be that as it may, however, it applies only at the theoretical level. Nothing has been said of the practical difficulties which may be involved in the proper implementation of subsidies, and this is where the main inconveniences and problems could arise. After all, agriculture has been heavily subsidized in Mexico in the past and the results have been far from satisfactory. [19] However, practical examination of this point goes beyond the limits of this paper.

To sum up the arguments and conclusions of this paper, it may be affirmed that Mexican agriculture definitely has unexploited potential. Realizing the potential production of basic crops would allow agriculture to increase both its production and its added value.

According to a relatively optimistic hypothesis, the *direct* contribution arising from an increase in the sector's GDP could be as much as 0.8% of total GDP. Even a less optimistic hypothesis gives an estimated 0.4% increase.

Moreover, and more importantly, that potential production would make it possible to save and generate foreign exchange, a large part of which could be transferred to other sectors of the economy, where it could finance additional imports and increase production. According to an optimistic hypothesis, such an *indirect* contribution from agriculture could raise total GDP by 5.5% with respect to the 1988 level, so that the total contribution accruing from the realization of potential production would be over 6% of the total 1988 GDP. According to a less optimistic hypothesis, the indirect contribution of that sector would raise GDP by 2.8%, so that the total contribution would be a 3.2% increase in the 1988 GDP.

[18] In the current debate on the economic policy that should be pursued in the light of the forthcoming free trade treaty with the United States and Canada, agricultural subsidies have been defended on the grounds that those countries also have such subsidies. This is an important argument, but it is different from that developed here. The article which may best express the position of the neoclassical school on this point is that by H. G. Johnson (1981). See also M. Chacholiades (1985) on this topic.

[19] Naturally, it must be noted that those subsidies have been granted in order to compensate for sectoral losses caused by the maintenance of low prices, while –due to protectionism– the prices of inputs have often been higher than international prices: in this case, the intervention was designed to correct a distortion in economic policy, which it perhaps did not fully offset.

That potential could be realized if the sector's supply conditions were improved through recapitalization and other types of institutional measures. In addition, in order to stimulate supply it would be necessary to grant producers adequate incentives, such as subsidies, which would guarantee them prices higher than those on the international market and which could be complemented by taxes on extraordinary earnings. Such subsidies should be short-term and differentiated by crop, type of producer and, perhaps, by region.

With such policies, the total contribution of agriculture to the national economy could be enormous and could produce increased tax revenues which would finance a substantial part of the subsidies that it would be necessary to grant to the sector, either directly or indirectly, while at the same time eliminating the implicit transfer which consumers are currently paying to agricultural producers.

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