THE PHILIPPINE SUGAR INDUSTRY: A CASE STUDY IN GOVERNMENT CONTROL

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The sugar industry is unquestionably one of the most heavily regulated industries in the Philippines. Considering that sugar is one of the Philippines' largest export industries, the effects of its regulation have far-reaching socio-economic implications.

This paper attempts to show how some aspects of the control of the sugar industry are mainly responsible for the relatively high cost of sugar production in the Philippines. Specifically, it will attempt to show how the present method of allocating domestic and export sugar quotas among the various planters and millers results in higher factor costs both in the farming and milling stages of production.

A BRIEF HISTORY OF GOVERNMENT CONTROL OF THE SUGAR INDUSTRY

The government has taken an active hand in the sugar industry since as far back as 1902 when the United States allowed Philippine sugar to enter her ports at seventy-five per cent of the general tariff rate then in effect. Other laws enacted by the U.S. Congress in the following decades gave Philippine sugar more favorable treatment and undoubtedly spurred the phenomenal growth of the industry during the first four decades of the century. The Payne-Aldrich Tariff of 1909 allowed up to 300,000 tons of Philippine sugar to enter the United States free of duty. This 300,000-ton ceiling was subsequently eliminated by the Underwood-Simons Tariff of 1914.

Absolute quantitative restrictions on the amount of Philippine sugar that could be shipped to the United States were re-established by the Philippine Independence Act of 1934 and the (U.S.) Sugar Act of the same year. Under these laws, the maximum amount of sugar that could be shipped to the United States was set at 952,000 short tons. This number of tonnage included refined sugars which did not exceed 56,000 short tons. These amounts were to be admitted into the United States free of duty.

Essentially the same quantitative restrictions were set by the Philippine Trade Act of 1946. The Act of 1946 also provided that production quotas be allocated among sugar producers on the basis of their average production during the years 1931, 1932 and 1933. In addition, the Act of 1946, as amended by U.S. Public Law 196 in 1955, provides for reciprocal duty-free treatment between the Philippines and the United

States until December 1, 1955. Thereafter, the U.S. tariff rates on Philippine goods will be adjusted gradually according to the following schedule:

Years	U.S. Rates on Philippine Articles as Percentage of Lowest Rate Charged Other Countries
1956-1958	5 per cent
1959-1961	10 " "
1962-1964	20 " "
1965-1967	40 " "
1968-1970	60 " "
1971-1973	80 " "
1974	100 " "

The preferential treatment accorded Philippine sugar by the United States since the turn of the century had two significant consequences:

(1) It stimulated the phenomenal growth of the sugar industry in the Philippines. Table I (see Appendix) shows annual industry output from 1901 to 1963. The rapid rise in sugar production was steady until 1934. The decrease in production during the following years reflects adjustments to the quota provisions of the Philippine Independence Act and the Sugar Act of 1934. The ravages of World War II caused production to drop to almost insignificant levels. The relatively slow increase in sugar production during the early post-war period reflects the slow and painful process of rehabilitation. It was not until 1954 that the Philippines was able to fill her basic U.S. quota.

Cuba's loss of her U.S. market in 1961 gave further impetus to increased sugar production in the Philippines. The output in 1962 of 1,620,000 short tons was a post-war record. Production in 1963 reached an all-time high of 1,740,000 short tons.

(2) By artificially creating favorable circumstances, the Philippines, to a certain extent, became a specialized one-crop area. This fact is all the more anomalous considering that the cost of sugar production in the Philippines is comparatively high.[1] Consequently, "the value of capital invested in the industry, the size of the labor payroll, and the volume of shipping to the (U.S.) mainland became directly dependent upon the continuation of protective policy."[2]

It was thus through these protective measures that the Philippine sugar industry developed; and it is through the continuation of these measures that it equally continues to survive, despite its competitive disadvantage with other sugar-producing countries.

THE LEGAL FRAMEWORK OF THE REGULATION OF THE SUGAR INDUSTRY

Since the Philippines assumed Commonwealth status in 1934, Philippine laws affecting sugar, in the main, have been measures designed to implement locally the provisions of the various U.S. Sugar Acts.[3]

The main statutory provisions concerning the allocation of sugar quotas and other matters pertaining to the control of the sugar industry are embodied in Act No. 4166, otherwise known as "The Sugar Limitation Law," as amended by Commonwealth Acts Nos. 77, 323 and 584; and by Republic Acts Nos. 279, 1072 and 3017. This law was enacted by the Philippine Assembly on December 4, 1934 in consonance with the provisions of the Jones-Costigan Act of 1934. Its provisions remain essentially intact, the amendments merely extending its effectivity or providing for such relatively minor matters as the representation of sugar planters and millers in the administration of sugar quotas. Act 4166 aims:

> First — to limit the production of sugar-cane in the Philippines to such an amount as would be sufficient to cover the quota alloted to the Philippines under U.S. laws and the needs of local consumption . . .
>
> x x x
>
> Third — to allot among mills and plantation owners the quantity of sugar which may be produced and marketed for direct consumption or held for reserve in the Philippines, and to make such allocation in such a way as *to offset and ameliorate hardships and inequalities that may result from allotments made under the laws of the United States.*[4]

Specifically, in consonance with the provisions of Section 6 of the Jones-Costigan Act, the Governor-General of the Philippines was authorized by the U.S. Secretary of Agriculture to allocate U.S. sugar quotas for the Philippines and to determine local consumption and reserve quotas.

In June 1934, the Governor-General determined that allotments of quotas among mills, plantations and planters should be on the basis of their average annual production during the calendar years 1931, 1932 and 1933 (henceforth the index period). Forty-seven mill districts were established, each consisting of a mill and the plantations *from which cane had been delivered* during the index period. The U.S. quota was to be split among these mill districts proportionately *on the basis of their average annual production during the index period.* The same procedure applied in the allocation of quotas among sugar planters.

The allocation of domestic consumption and reserve quotas was to be effected through the same procedure, with the following qualifications:

(1) An "amelioration" quantity was to be alloted to four "sub-marginal" sugar districts (those whose maximum annual production was less than 4,000 short tons during the index period) by that amount that their total production requirements, including their "A" sugar allotments, would add up to a total equal to their maximum output during the index period.

(2) A total allocation of 4,000 short tons was to be alloted to each of four "marginal" mill districts (those whose maximum production during the index period was 4,000 s.t.).

(3) Domestic and reserve quotas, less the amounts set aside for "amelioration," were to be distributed among the other mill districts, and among mills and sugar planters, proportionately on the basis of their production during the crop year 1932-1933 or 1933-1934, whichever was greater.

(4) Rosario Central was given "special amelioration" whereby it was allowed to mill domestic sugar to the extent of its maximum capacity.

The agency presently charged with the responsibility of administering export and domestic quotas is the Sugar Quota Administration. Headed by the Sugar Quota Administrator, the SQA is under the Office of the Secretary of Commerce and Industry. The SQA was established in 1951 by Executive Order No. 392. Its functions as defined therein are:

(1) To declare and allocate the different quotas for the United States and other countries, for domestic consumption, as well as for emergency reserve;

(2) To register regular and emergency planters as stipulated by Act 4166;

(3) To serve as custodian of quota records;

(4) *To see to it that the different quotas are filled;*

(5) To mediate between millers and planters; and

(6) "To serve as *protector and defender* of the consuming public against *unreasonably high prices* for the commodity."[5]

A Sugar Board determines and formulates policies regarding the regulation of the sugar industry. It consists of the Sugar Quota Administrator, who is *ex officio* chairman, and a representative each from the National Federation of Sugarcane Planters and the Philippine Sugar Association. The Board was established by RA 3017 which was signed into law in August 1960.

THE REGULATION OF THE SUGAR INDUSTRY: SOME ECONOMIC IMPLICATIONS

The scope and purpose of this paper preclude a thorough analysis of the economic implications of the control of the sugar industry in the Philippines. We will concern ourselves solely with the effects of control on the cost of producing sugar. Even here, we will merely sketch the problem with a broad brush and base our analysis on inferences and generalizations that the small amount of available data allow us to make.

By cost we will mean the alternative returns on the economic resources ("factors of production") employed *by the industry*. Excluded in our notion of cost are certain "nonfactor costs" which, although they are

costs from the viewpoint of the firms in the industry, are not so from the viewpoint of the industry and the economy. Specifically, we exclude the rent on sugar quotas from our definition of industry cost.[6]

To the extent that U.S. and domestic sugar quotas are distributed among the different planters and millers in a more or less definite manner, the effects on industry costs of the present method of sugar quota allocation are not unlike those resulting from a market-sharing cartel. In both cases, the producers are assured of a fixed absolute (or proportionate) share of the market, thereby insuring the continued existence of the relatively inefficient producers and at the same time hindering the expansion of the more efficient ones. The special treatment of the law of "marginal" and "sub-marginal" producers, and its aim of preventing "inequities" and "suffering" that may result from the allocation of quotas, at once suggests the legal pampering of high-cost producers. This protective policy is decidedly one of the most important factors which make for the high cost of producing sugar in the Philippines. Such a policy, in the words of Stocking and Watkins, exhibits "tolerance of wasteful methods of production" and "solicitude for economic misfits."[7]

The provisions of law concerning the sharing of the sugar milled between the planters and the millers is one other factor which makes for high costs in the sugar industry. As will be discussed below, these provisions, which are extremely prejudicial against the mills, lessen the economic incentive for increased efficiency in the milling of sugar.

The present system of sugar quota allocation is probably the most important single factor responsible for the great disparity of costs among the various sugar producers in the islands.

Estimates of costs compiled by the Philippine Sugar Association in 1951 suggest the extent to which costs vary from central to central. Manufacturing and administrative costs of the twenty sugar mills then in operation are shown in Table II.

The disparity of the costs of farming among the various mill districts can be seen from Table III which shows the average yields per hectare by mill district during the crop year 1961-1962.[8] It will be noticed that the high average yield of 154.14 piculs per hectare is nearly five times greater than the low yield of 31.33 piculs.

Yields per hectare also vary greatly from farm to farm within the same mill district. This was shown by a study conducted recently by a group of agricultural economists and soil technologists from the University of the Philippines.[9] Their findings corroborate those of another study conducted by an accounting firm of several selected sugarcane

plantations in nine mill districts in the Visayas. A summary of the result of the latter survey is shown in Table IV. Note again the wide disparity of costs in all categories of farm size.

Considering that wages and salaries constitute the greater bulk of the cost of milling sugar, perhaps a reasonably useful index for gauging the efficiency of the different sugar centrals is the average daily output per worker. On the basis of periodic employment reports submitted by sugar centrals to the Department of Labor, the average number of workers in each mill was determined for the crop year 1960-1961. Output per day per worker was obtained by dividing the average output *per milling day* by the average number of workers employed during the crop year. A complete set of pertinent data was available for only seventeen of the twenty-four operating mills. The results are summarized in Table V.

It seems reasonably safe to infer from the wide variation in productivity per day per worker among the various sugar mills that costs of milling vary greatly from mill to mill.

These observations seem to offer a tolerably sufficient amount of evidence pointing to the fact that costs vary a great deal among sugar-producing units both in the farming and milling stages. Though these differences in costs can be partly attributed to such other factors as differences in climatic conditions, differences in the efficiency of management, differences in the types of capital equipment used, and differences in milling periods (which will be discussed in detail below), undoubtedly, the most important single factor responsible for this wide variation in "efficiency" among the various sugar-producing units (sugar-cane plantations and sugar mills) are the regulatory measures which tend to pamper high-costs producers at the expense of the more efficient ones.

Price theory tells us that a necessary condition for producing a given output at the lowest (industry) cost is the equality of the marginal costs of all the firms in the industry.[10] In the absence of an arbitrary scheme of output allocation, the free play of competitive forces is sufficient guarantee for a distribution of production consistent with this condition.

Under the present set-up, however, with output allotments for planters and mill districts (and hence, for millers) fixed by law, the inequality of marginal costs of the different producers is perpetuated. Consequently, average industry cost is higher than it would otherwise be in the absence of these regulative constraints.

Even within the framework of some scheme of non-competitive distribution of production quotas, it can easily be shown that by merely reshuffling production quotas away from high-cost producers to those with lower costs, a considerable reduction in industry costs will be realized.

Assume that there are only two firms in the industry, and that each firm has the same amount of production quota. In Figure 1, C_1 and C_2 are the marginal cost curves of Firm I and Firm II, respectively. OQ is the amount of production alloted to each firm. Firm I's total cost is $ACQO$, and Firm II's is $BDQO$. Average industry cost is $\dfrac{ACQO + BDQO}{2OQ}$.

Assume now that the government agency in charge of sugar quotas transfers $Q_1Q(=QQ_2)$ of Firm I's production quota to Firm II. Firm I will now be producing OQ_1 and Firm II will turn out OQ_2. Firm I's total cost decreases by $ECQQ_1$ and Firm II's total cost increases by DFQ_2Q. Since by assumption, QC QD, it follows that $ECQQ_1$ DFQ_2Q, and industry average cost decreases by $\dfrac{ECQQ_1 - DFQ_0Q}{2OQ}$. Minimum industry
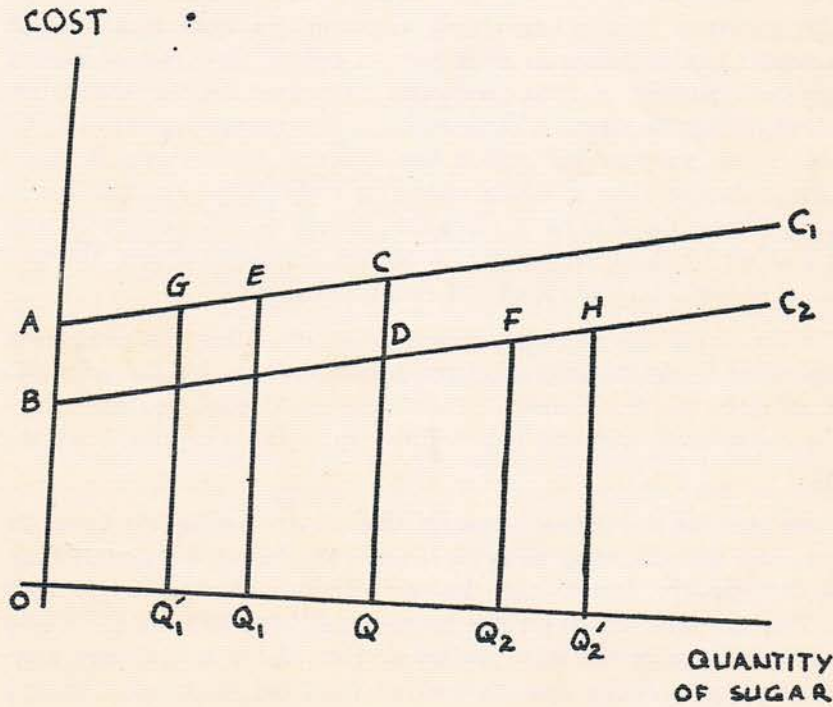

COST

FIGURE 1

cost will be realized were Firm I to produce OQ_1 and Firm II to produce OQ'_2. At these levels of output, both firms' marginal costs (Q'_1G and Q'_2H, respectively) are equal.

One other aspect of the control of the sugar industry in the Philippines which is of great economic significance is the legal provision

concerning the sharing of the sugar milled between the millers and the planters. Republic Act No. 809, otherwise known as "The Sugar Act of 1952," provides that, in the absence of a written agreement between the miller and the planters of a mill district, the sugar milled shall be shared according to the following schedule:

Production (Piculs)	Per Cent Share of Centrals unspecified	Per Cent Share of Centrals unspecified
below 149,999	40.0	60.0
150,000 to 400,000	37.5	62.5
400,001 to 600,000	35.0	65.0
600,001 to 900,000	32.5	67.5
900,001 to 1,200,000	30.0	70.0
over 1,200,000		

This provision of the law clearly discriminates against the millers and dampens any initiative on their part to reduce their cost of milling through the expansion of their productive capacities and the installation of modern milling facilities. For instance, a mill producing, say, 400,000 piculs of sugar per year will realize less marginal profits were it to expand its production than it would otherwise realize were no such law is in effect. Unless the decline in marginal revenue of 6.25 per cent is sufficiently offset by the corresponding reduction in marginal cost, the mill would rather use the required capital funds elsewhere.

The law is all the more anomalous considering that the percentage rates specified in the Act are, in effect, maximum rates for the mills and minimum rates for the planters. The latter could easily enforce these rates by conveniently refusing to enter into any written contract with the central!

Even ignoring the regressiveness of the rates as applied to the mills, the fact alone that the sugar milled is shared in a definite proportion (say, 60-40) dampens the initiative on the part of the millers to reduce their cost of milling. The reason for this is not too difficult to see. Since only a small percentage of the sugar milled accrues to the miller, only a relatively small part of the benefits derived from the increased efficiency will be enjoyed by him; the greater part will be enjoyed by the planters who do not bear any part of the cost of improvement of the mill.

Certain observations lend credence to what has been said about the reluctance of sugar centrals to improve their milling operation. Save for a few exceptions, notably the Central Azucarera de Tarlac, the Victorias Milling Company, and the Hawaiian-Philippine Sugar Company, sugar centrals are still using mills which have been installed thirty or more years ago. Few have installed added facilities. Facilities for maintenance and

repairs are meagre in many sugar mills. Of all centrals visited by the writer, only three — the same onces mentioned above[11] — change their mill rollers at fairly close intervals. Modern labor-saving devices are few in many centrals. Only one, to the writer's knowledge, has installed automatic factory control panel. This same mill is the only one that has installed an electrically operated automatic mill which requires only one man to operate.

Until recently, only two or three mills had installed automatic bulk-handling facilities. Although the number of mills with bulk-handling facilities has increased in recent years, a good many more have yet to install this extremely labor-saving and waste-minimizing device.

One other way by which milling costs can be reduced is by increasing the daily milling capacity in order to shorten the period necessary to mill the required production. The milling period which insures the highest sugar recovery rate (piculs per ton of cane) is estimated to be somewhere around 120 days (or 100 24-hour milling days). Climatic conditions in the Philippines are such that only within that milling period can crops be staggered so that cane can be milled at its highest sugar-yielding age.[12]

The recent increases in production requirements occasioned by Cuba's loss of her U.S. market made it necessary for the mills to extend their milling periods considerably. The usual milling period is from the middle of November to the middle of April. Many centrals now grind from September to June. The grinding of very young and very old cane results in low average sugar recovery rates, and hence, higher cost per picul of sugar milled.

Given the required output, the milling period can be shortened by increasing the daily milling capacity. Many centrals have recently installed added facilities to increase the amount of cane that can be ground per day. But in almost all cases, these additions constitute only improvements upon existing facilities, the maximum capacities of which are technically fixed. The most that can be accomplished is to make full use of these existing facilities, such as boilers, evaporators and mills. Consequently, the actual amount of cane that can be ground per day cannot be expected to increase to any significant extent.[13]

Many reasons can be given for the hesitance of sugar centrals to install additional capital equipment to streamline their milling operation. One is the relatively high cost of capital equipment, especially after the full decontrol of foreign exchange was implemented early in 1961. Another is the extremely high rates of interest on investment loans which reflects the dearth of credit in the Philippines. Still another factor is the uncertainty about the future turn of events that may affect the sugar in-

dustry especially after the Philippine Trade Act of 1946 shall cease to be in effect in 1974. Specifically, the prospects of the adoption of a global quota system by the United States is a probability which Filipino sugarmen think about with no little apprehension.

To a very great extent, however, these factors are offset by the enormously high returns on sugar, especially after the decontrol of foreign exchange and the rise in the price of sugar in recent years. There is little doubt that the provisions of Republic Act No. 809, which give very little participation to sugar centrals in the sharing of the sugar milled are, at the very least, a contributing factor to the hesitance of sugar mills to invest in additional facilities to reduce their cost of milling.

The improvement of the operation of the sugar mills will necessarily reduce the amount of cane needed to mill the same amount of sugar; or, conversely, with the same amount of cane, more sugar can be milled. In neither case will the planters be prejudiced against. Should it be necessary to reduce the acreage devoted to sugar, the land released from the (extensive) margin can easily be planted to other crops such as rice, of which there is a perennial shortage. Or, were the same amount of cane to be milled, the competitive bargaining between the planters and the miller will insure both of their "appropriate" shares of the increased revenues resulting from the larger sugar output.

The legal pampering of sugarcane planters is also an important factor in the high cost of sugar production in the Philippines. The large net returns realized by sugarcane planters, especially in recent years, have made it less compelling on their part to widen their profit margin by reducing costs. Many small "haciendros" and not a few big ones are prone to leave their farms in utter neglect and live in luxury in the cities.

We have seen in Table II the wide disparity of average yields among the different mill districts. Within the same mill district, there also is a wide disparity in productivity among the different plantations. In the Victorias district, for instance, yields vary from a low of 33 piculs per hectare to a high of more than 180 piculs. Low yields, according to a recent survey of that district, appear to be associated with the following practices: (1) preference for animal power in plowing and harrowing; (2) insufficient or no use of lime in acid soils; (3) frequent ratooning; (4) low rates of nitrogen and potash applications; and (5) reliance on "remote control" in management.[14] This same study finds that these practices are most common among the small plantations. Figure II is a graph relating yield per hectare to farm size.
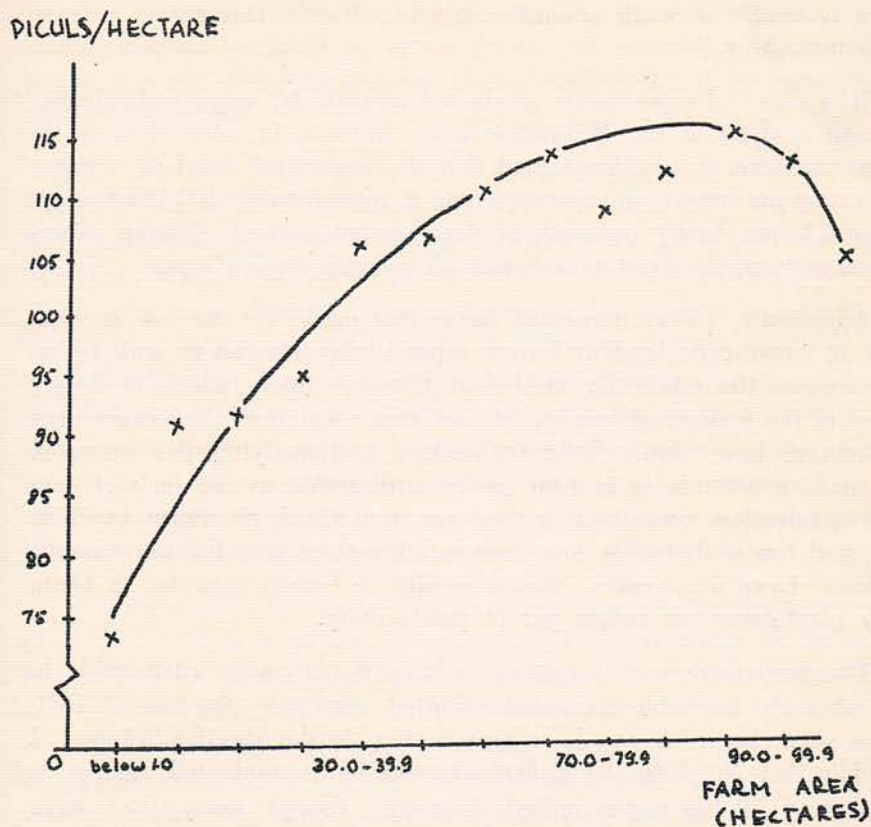
PICULS/HECTARE

FIGURE II

It will also be noted in Table II that there is a wide variation in regional productivity. The average yield in Luzon Island is around 76 piculs per hectare, as against 119 piculs per hectare in Negros.

Mainly responsible for this is the difference in land tenure in the two areas. Tenants operate about 98 per cent of the farms in Luzon, or roughly 80 per cent of hectarage, many of which are plots of not more than two hectares. Owners have very little say in the management of the land. For obvious reasons, these farms are crudely operated. Isolated attempts at mechanization and "scientific" farming have failed. Not only are tenants hostile to mechanization, but they are also wont to use fertilizers and other applictions that have proved to be profitable elsewhere. Except in a very few large plantations, the carabao-drawn plow and harrow are the only types of farm equipment used. Even where fer-

tilizer is used, the small amount applied is hardly enough to increase yields noticeably.

In a series of experiments conducted recently by sugar technologists and soil analysts of the Philippine Sugar Institute in selected farms in Tarlac province, it was determined that the "optimum" level of nitrogen application per hectare of sugarcane land is approximately 132 kilograms.[15] In most farms, barely one-sixth of that amount is used. Similar observations were made about potash and phosphorus applications.

Admittedly, a very important factor that makes for the low productivity of sugar cane land in Luzon, especially in Pampanga and Tarlac provinces, is the inherently inefficient tenancy system which is deeply rooted in the socio-economic life of that area. But the fact remains that land-owners have shown little enthusiasm in remedying the situation. This passive attitude is in turn partly attributable to the lack of economic motivation, contented as they are with the high return on their land, and the traditionally low remuneration they give for the tenants' services. Even in Negros, where hardly a tenant operates a farm, many plantations are below par in productivity.

The perpetuation of the situation is no doubt partly attributable to the extremely favorable treatment afforded sugarcane planters by Philippine sugar laws. As we have seen earlier, in the specific instance of Republic Act No. 809, the millers are clearly discriminated against in the sharing of the sugar milled. Likewise, though many laws have been passed in the interest of agricultural workers in the sugar industry,[13] these laws have been in effect only in paper. Any casual observer of Philippine agriculture will not dispute the fact that the (real) absolute share per capita of sugarcane farm workers has not increased significantly since pre-war days.

CONCLUSIONS AND RECOMMENDATIONS

We have attempted to show in the preceding pages that the government regulation of the sugar industry in the Philippines is primarily responsible for the very high production cost which characterizes the industry. Specifically, we attributed the over-all "inefficiency" of the Philippine sugar industry to the following: (1) unequal costs at the margin resulting from the arbitrary allocation of domestic and foreign sugar quotas among planters and millers; (2) the lack of initiative on the part of sugar centrals to reduce milling costs due to the provisions of Republic Act No. 809 which fixes their share of the sugar milled at a relatively low level; and (3) the lack of incentive on the part of sugar producers, especially the planters, to reduce costs due to the relatively high incomes they realize from the sale of sugar.

The necessary remedial measures suggested themselves in the course of our analysis, but have not been spelled out explicitly. The following policy measures are some avenues through which the situation may possibly be improved:

(1) Abandon the present method of allocating sugar production and allow instead the development of an organized sugar quota market where buying and selling of quotas, especially export sugar quotas, can take place unhampered by any government restrictions.[17]   There will then come into being a national demand curve for quotas (the horizontal sum of the "marginal revenue product" curves of sugar quotas of individual producers) which, in interaction with a perfectly inelastic supply curve, will establish a market price of quotas. This uniform price of quotas will serve to readjust the outputs of the various producers so that marginal costs of all firms (including the rent on quotas) are equalized. This implies that marginal (factor) costs are also equal since marginal rent on quotas will be uniform throughout the industry.[18]

[In Figure III, d_a, d_b and d_c are the marginal revenue product curves of quotas of firms A, B and C, respectively. The positions of the curves are such as to show that Firm A is the highest-cost producer and Firm C the lowest-cost producer. The horizontal sum of d_a, d_b and d_c will give us D, the industry demand curve for quotas. S is the supply curve of quotas. OP_e is the market rent for quotas. At the rate OP_e of the rent for quotas, the total production quota OQ_e will be shared by firms B and C (who will rent OQ_b and OQ_c, respectively). Firm A, the highest-cost firm, will withdraw from the industry; its factor costs are so high that it cannot afford to pay the rent on sugar quotas and continue to produce at a profit.]

Presently, quotas are considered as "permanent improvement upon sugar land." Quotas, therefore, are saleable together with the land. But even so, transfers could only be affected within a mill district. Since there is only, in effect, a mill district market for quotas, the desired minimization of industry factor cost is not realized.

(2) Repeal Republic Act No. 809 and allow sugar centrals and sugarcane planters to bargain among themselves as to the manner of payment for milling services. Specifically, sugar mills should be allowed to buy the cane from the planters at a price agreed upon by both parties. Aside from providing the necessary incentive to reduce the costs of milling, this will simplify the marketing of sugar, allow for some economies of scale in distribution, and prevent unscrupulous middlemen from taking advantage of the large number of credit-poor small quota holders.
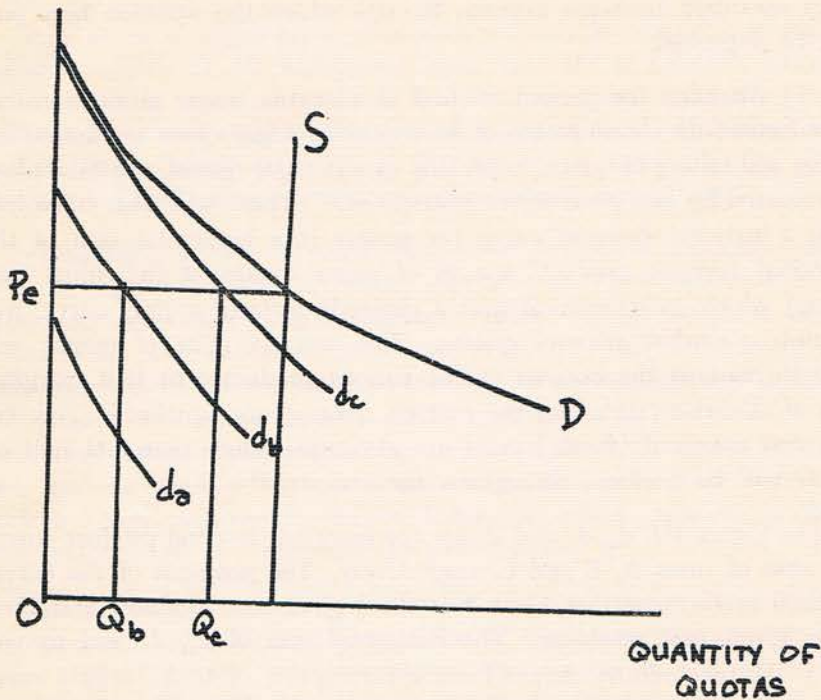
QUOTA RENT

FIGURE III

NOTES

1. A study conducted by the U.S. Tariff Commission in 1934 showed that the cost of producing sugar in the Philippines was 3.537 U.S. cents per pound. This was almost thirty per cent higher than the cost of producing sugar in Cuba. See Chamber of Commerce of the United States, *The Sugar Problem in the United States* (May 1941).
2. John E. Dalton, *Sugar: A Case Study of Government Control* (New York: MacMillan, 1937), p. 32.
3. In 1934 the United States abandoned tariffs in favor of the quota system to protect her domestic industry.
4. Section 3, Act 4166. Underscoring mine.
5. Manalansan and Anunciacion, *The Sugar Quota Administration* (Mimeographed, 1962). Underscoring mine.
6. Quota rent is not to be considered as cost to the sugar industry because quotas have no alternative returns (i.e., returns on quotas in other industries are zero). It is however, a cost to the firms in the sugar industry.
7. Stocking, G.W. and Watkins, M.W., *Cartels or Competition?* (New York: 20th Century Fund, 1948), p. 141.
8. Though differences in yield per hectare do not, strictly speaking, imply differences on cost in its present context, we may use differences in yield as a rough approximation of differences in costs. We assume implicitly that factors of production are more "optimally" combined in higher-yielding farms. We also assume away differences in the quality of soil.

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9. See Caintic, Iglesia and Von Oppenfeld, *Management Practices, Costs and Returns of Sugarcane Farms in the Victorias Milling District*, U.P. College of Agriculture. Technical Bulletin No. 10 (Los Baños: U.P. College of Agriculture, 1962).

10. Provided that all firms produce a positive output.

11. It is interesting to note that Central Azucarera de Tarlac and Victorias Milling Company both own and operate large sugarcane plantations in their respective districts.

12. This is true of all milling districts except Victorias and Lopez where the uniform rainfall during the year makes it possible for the mills to grind practically throughout the year.

13. Only Victorias and Tarlac, to the writer's knowledge, have installed complete mills in recent years.

14. Caintic, *et al, op cit.*, p. 5.

15. Mariano B. Lopez, *et al*, "Quantitative Fertilization Tests Conducted at TADECO, San Miguel, Tarlac," *Philippine Sugar Institute Quarterly*, December 1962. Computations were made on the basis of prices of sugar and nitrogen at ₱15.00 per picul and ₱0.81 per kilogram, respectively.

16. RA 908 also provides that sixty per cent of any increase in proceeds from sales accruing to the planters shall be shared by the farm workers.

17. The sale of quotas is generally discouraged — even within the same mill district. Inter-district sales are almost impossible. Whereas the leasing of quotas is common, this can only be allowed if the holder is unable to fulfill his production requirement for valid reasons. Strangely enough, until recently, one of the valid reasons is the loss of land. There are at present a large number of quota holders who do not own sugarlands.

18. We have all the while assumed a more or less constant average cost within the relevant range of output, implying further that within that range of output, average cost and marginal cost are almost equal.

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APPENDIX

Table I

Annual Production of Sugar in the Philippines
1901 — 1963

(1,000 short tons, raw value)

Year	Production	Year	Production
1901	63	1932	1,174
1902	609	1933	1,343
1903	94	1934	1,653
1904	96	1935	755
1905	120	1936	1,043
1906	143	1937	1,186
1907	141	1938	1,116
1908	160	1939	1,149
1909	143	1940	1,142
1910	168	1941	1,148
1911	269	1942	665
1912	281	1943	150
1913	345	1944	150
1914	408	1945	75
1915	421	1946	115
1916	412	1947	184
1917	425	1948	398
1918	475	1949	730
1919	453	1950	685
1920	467	1951	935
1921	589	1952	1,080
1922	533	1953	1,134
1923	475	1954	1,434
1924	529	1955	1,372
1925	780	1956	1,219
1926	607	1957	1,143
1927	767	1958	1,378
1928	808	1959	1,512
1929	934	1960	1,529
1930	984	1961	1,563
1931	958	1962	1,620
		1963	1,747 [e]

[e] Estimate
Sources: U.S. Cuban Sugar Council, Sugar Facts and Figures (1952).
           U.S.D.A. Economic Research Service, *The Sugar Situation* (various years).
           (Philippine) Sugar Quota Administration, *Annual Report* (various years).

TABLE II

Manufacturing and Administrative Costs of
Sugar Milling Companies, 1950 — 1951
(per picul, ex mill warehouse)

Mill	Cost of Manufacture	Administrative Cost	Total
A	₱5.72	₱1.96	₱ 7.68
B	7.42	2.80	10.22
C	6.93	2.45	9.38
D	4.17	1.68	5.85
E	4.01	1.91	5.92
F	3.99	1.95	5.94
G	3.69	1.60	5.29
H	5.88	.80	6.68
I	4.46	3.49	7.95
J	4.21	2.38	6.59
K	7.76	.25	8.01
L	4.30	.76	5.06
M	3.67	2.14	5.81
N	4.78	2.45	7.23
O	7.93	.14	8.07
P	5.15	1.48	6.63
Q	5.46	1.89	7.35
R	3.42	2.01	5.43
S	5.42	2.70	8.12
T	3.99[c]	.94[c]	4.93 [c]
Average	₱5.10	₱1.79	₱ 6.89

[c] For crop year 1949—1950.
Source: Philippine Sugar Association.

Table III

Hectarage and Yield per Hectare in the Various Mill Districts, Crop Year 1961—62

Mill District	Area Cropped (Hectares)	Production (Piculs)	Yield/Hectare (Piculs)
LUZON			
Bamban	3,702	115,586	31,22
Canlubang	9,302	1,125,222	121,00
Del Carmen	13,362	1,007,734	75.42
Don Pedro	12,773	971,714	76.08
Hind	1,159	73,719	63.61
Paniqui	2,300	192,746	83.80
PASUDECO	17,953	1,038,350	57.84
Tarlac	13,377	1,119,546	83.69
NEGROS			
Bacolod-Murcia	11,916	1,148,674	96.48
Bais	6,914	1,048,021	151.58
Biscom	23,193	2,583,875	111.31
Hawaiian-Philippine	10,907	1,595,601	146.29
La Carlota	13,993	1,717,863	122.73
Lopez	8,731	831,771	95.47
Ma-ao	10,925	1,009,088	92.47
San Carlos	5,532	852,761	154.14
Talisay-Silay	9,332	1,140,972	122.25
Victorias	23,000	2,858,644	124,29
PANAY			
Asturias	3,385	322,097	95.20
Pilar	5,296	633,470	119.60
Santos Lopez	4,456	427,795	95.64
CEBU			
Bogo-Medellin	4,184	540,738	129.25
LEYTE			
Ormoc Rosario	5,284	484,638	92.35
TOTALS/AVERAGE: [1]	224,399	23,193,025	103.44

[1] Include mill districts without operating centrals.

Source: Philippine Sugar Association, *Final Weekly Mill Executives' Report* (1962).

TABLE IV

Farming Cost Per Picul of Sugar in Selected Farms by Farm Size, 1960—1961

Farm Size (Hectares)	Number of Farms	Cost Per Picul		
		Average	Low	High
50— 99	16	₱8.26	₱4.80	₱11.34
100—149	14	8.65	7.73	10.74
150—199	11	8.84	5.98	13.31
200—299	9	8.04	6.08	12.09
300—399	3	7.80	7.30	10.46

Source: Miller, Cruz and Company, Certified Public Accountants