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COSTS AND RETURNS FROM MILK PRODUCTION IN EL VIGIA AREA

IN THE STATE OF MERIDA, VENEZUELA, 1969

by

Gustavo Pérez

A thesis submitted in partial fulfillment  
of the requirements for the degree

of

MASTER OF SCIENCE

in

Economics

Approved:

UTAH STATE UNIVERSITY  
Logan, Utah

1972

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ABSTRACT

Costs and Returns from Milk Production in El Vigía Area

In the State of Merida, Venezuela, 1969

by

Gustavo Pérez, Master of Science

Utah State University, 1973

Major Professor: Dr. Lynn H. Davis  
Department: Economics

An analysis of costs and receipts associated with the production of manufacturing milk in El Vigía area of Venezuela was the focus of this study. A personal interview survey of a sample of dairy farm operators was conducted.

Averages for costs, receipts, and net returns were calculated by size groups. Tabular analysis was used to study relationships between size and other factors and net return.

Net return per cow was positive on the average, but the study indicated a general need for improved levels of production. Size of operation and capital investment were two factors found to be associated with higher net returns.

(51 pages)

## INTRODUCTION

Milk production represents a continuously growing source of income within the agricultural sector of Venezuela. In 1950, about 9.1 percent of the value of products of the agricultural sector resulted from milk production. In 1960, milk production represented 13.0 percent of an increased value product, reaching 14.2 percent in 1965.

The estimated demand for milk and milk products indicates a needed ever-growing national supply if wants for milk are to be met from domestic sources.<sup>1</sup>

During the last 20 years, the number of dairy animals has increased three-fold, from 0.4 million in 1950 to an estimated 1.2 million in 1969 (Table 1).

As the number of dairy cattle has increased, the volume of milk production has increased at a faster rate. Milk production has increased more than four times since 1950. Since statistics are not available for number of cows milked, the reader is cautioned that the above statement may only indicate that more animals are milked, rather than an increased production per cow.

---

<sup>1</sup>The National Council for Rural Welfare estimates that milk and milk products demand will grow by 20 percent between 1965 and 1970, and by 24 percent from 1970 to 1975. Meanwhile, the internal production between 1965 to 1969 grew by 24 percent, or slightly faster than the projected internal demand. See "Proyecciones de la oferta y la demanda de productos agropecuarios en Venezuela. 1965-1970-1975." Consejo de Bienestar Rural, Caracas 1965, pp. 114-122.



Table 1. Number of dairy cattle and milk production in Venezuela, selected years, 1950-1969

Selected years	Dairy cattle <sup>a</sup>	Milk production <sup>b</sup>	Average annual production per dairy animal
	Number	Million liters	Liters
1950	417,230	173,565	415
1960	793,433	420,863	530
1965	1,029,901	625,671	607
1968	1,180,537	736,731	618
1969	1,230,359	779,461	623

<sup>a</sup>1969 Economic Report. Central Bank of Venezuela. Caracas Agricultural Sector. Table P.A.-VII-40.

<sup>b</sup>Agricultural Yearbook Statistics. Ministry of Agriculture. Caracas, June 1970. Table 645 and 647.

Venezuela has been and continues to be an importer of dairy products. Imported dairy products consist of powdered milk, cheese and butter.<sup>2</sup> The importation of dairy products is decreasing in relation to the total value of agricultural products imported into the country (Table 2).

Table 3 shows the trends in national milk support prices and wholesale values of pasteurized milk, butter and powdered milk. Price levels in 1969 were substantially higher than in the 1950's and show some correlation with increased national production. But, these production increases may not really continue to offset imports very much. For example, the rate of increase in milk production in the 1965-69 period, if maintained at 22-25 percent, would just equal the demand increase of

<sup>2</sup>As of this date, the value of powdered milk imports represents 98.5 percent of the total value of milk and milk products imports.

Table 2. Value of milk and other agricultural products imported into Venezuela, selected years, 1950-1969

Selected years	Milk and milk products	Other agricultural imports	Total agricultural imports
(1,000,000 Bs.)			
1950	124	265	389
1960	213	512	725
1965	187	493	680
1968	77	1,303	1,380
1969	109	1,248	1,357
Percentages			
1950	32	68	100
1960	29	71	100
1965	27	73	100
1968	6	94	100
1969	8	92	100

Source: Oficina Central de Coordinación y Planificación. "Síntesis del Diagnóstico del Sector Agrícola." December 1967. Table 6, p. 19.

Table 3. Trends in producer and handler receipts for various dairy products, Venezuela, selected years, 1950-1969.

Years	VENEZUELA			MERIDA STATE				
	Wholesale Prices			Producer Prices		Wholesale Prices		Producer Price
	Butter (Kg.)	Pasteurized Milk (Lit.)	Dry Milk (Kg.)	Subsidy (Lit.)	Fluid Milk (Lit.)	Butter (Kg.)	Dry Milk (Kg.)	Fluid Milk (Lit.)
Bs	Bs	Bs	Bs	Bs	Bs	Bs	Bs	Bs
1950				0.50				
1955				0.67				
1956		.89						
1958	6.61	.91	1.77					
1959	6.81	.91	1.79					
1960	7.21	.92	1.73	0.75				
1961	6.94	.92	1.72					
1962	6.90	.93	1.77					
1963	6.41	.94	1.93					
1964	6.39	.94	2.01					
1965	7.53	1.16	2.13	0.61	.74	7.00	2.49	.50
1966	7.50	1.04	2.73	0.72	.64	7.00	2.70	.52
1967	7.79	1.04	2.76	0.85	.65	7.42	2.70	.70 (1.7)
1968	7.85	1.04	2.75	0.76	.62	7.50	2.70	.66
1969	8.43	1.04	2.54 <sup>a</sup> (2.75) <sup>b</sup>	0.74	.63	7.86	2.43 <sup>a</sup> (2.69) <sup>b</sup>	.60

<sup>a</sup>26% fat

<sup>b</sup>28% fat

Source: Agricultural Yearbook of Statistics, Tables 650, 652, 651, 646, 647, 654, 655.

24 percent projected for 1970-1975.<sup>3</sup> The projected milk equivalent import gap in 1969 was estimated at something over 534,083 metric tons.<sup>4</sup> This means that Venezuelan production increases during the 1970-1975 period would have to be about 87 percent to cover demands solely from domestic sources by 1975.<sup>5</sup>

Since foreign exchange requirements for dairy product imports are currently in excess of Bs. 109,000,000 per year,<sup>6</sup> any national dairy policy that alters agricultural imports will have a measurable impact on Venezuela's economy. Any adjustments in dairy policy must also impinge on Venezuela's dairy farms, and upon domestic milk handlers and producers.<sup>7</sup> It is, therefore, appropriate to examine the current profitability status of various classes or groups of dairy producers in the hope that what may be learned will prove beneficial to those responsible for national dairy policies, as well as to the particular producers groups which cooperated with this study.

At present, one aspect of national dairy policy is a producer subsidy. The principal goals of the subsidy are to increase the income of milk producers and to increase milk production. However, the amount allocated, nationwide, for the subsidy fund has been limited to Bs. 40,000,000 since 1964. In some years the entire 40,000,000 has not been

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<sup>3</sup>Consejo de Bienestar Rural, *Proyecciones de la Oferta y la Demanda de Productos Agropecuarios en Venezuela*, a study for E.R.S., USDA, Caracas:CDBR, August, 1965. Table 118.

<sup>4</sup>Ibid. Table 830, p. 65.

<sup>5</sup>This assumes that demands are accurately forecast.

<sup>6</sup>Oficina Central de Coordinación y Planificación. "Síntesis del Diagnóstico del Sector Agrícola." December 1967. Table 6, p. 19.

<sup>7</sup>Newspaper reports and criticisms.

paid out, but the general effect of the ceiling has been to reduce the average subsidy per liter since national production has increased.<sup>8</sup> The effective decrease in subsidy levels has led to conflict between the government and dairy farmers. The Venezuelan Livestock Federation has asked its member associations to withhold milk at least once (1968) in an attempt to get the policy changed.<sup>9</sup>

The lack of equilibrium between import and domestic manufacturing prices has been cited as a policy area in need of revision. At present, wholesalers sell powdered milk for less than they pay domestic manufacturers, and make up the difference from profits on milk imports.<sup>10</sup> Finally, the official dairy policy really only covers powdered milk, and ignores other milk products and the interrelationships with meat and cattle production in general.<sup>11</sup>

#### Description of dairy production in El Vigia

El Vigia was primarily a small town until 1952. After 1952 urban growth started and the area around El Vigia began to develop into an important agricultural production area. Construction of the Pan American highway contributed further to this growth and allowed fast travel to the whole country.

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<sup>8</sup>Yearbook of Statistics Table 646. In Table 3 the amount of the subsidy shown is not necessarily received by individual farmers, their average share is only about 1/4 of the totals shown. For example, in an average year, some Bs. 10,000,000 of the subsidy, are paid to importers of powdered milk to offset the purchase cost of foreign exchange.

<sup>9</sup>Adopted in a meeting of the dairy producers in El Vigia area.

<sup>10</sup>Anonymous, El Nacional, Caracas Newspaper, Seccion Agricultura, Part "C", 31 Mar. 70, p. C-7.

<sup>11</sup>Anonymous, El Nacional, Caracas Newspaper, 28 April, 70, 13 Oct. 1970.

Prior to 1969, dairy producers in the El Vigia area sold their milk to the Association of Dairy Industries (INDULAC) plant located in Santa Barbara (Zulia State). After the El Vigia plant was constructed in 1969, local production was absorbed by this plant. In the process, local production increased due to enlargement of the dairy herds. The new plant, for example, agreed to provide certain loans to farmers on condition that they buy cows. The producer prices received in the El Vigia area have not changed as much as shown in Table 3 for the whole state of Merida.

El Vigia has been primarily a milk and meat producing area. Many local farmers believe meat production is more profitable than milk, nevertheless they produce milk to obtain a weekly cash income. This study was conducted to ascertain the relative profitability of milk production.

Normally the cows used to produce milk are local breeds known as Criollo or cattle from Colombia. Sometimes, foreign breeds such as Brown Swiss, Cebu and Holstein are utilized. Climatic conditions are such that imported breeds have difficulties in maintaining the same level of production that is achieved in more temperate climate zones. Whether this will be easy to rectify is not yet known.

Year round pasturing of cattle in this area is the usual management technique. Little "dry lot" feeding is practiced. In the winter the cows cannot consume all the forage because heavy rains flood the land. Pastures are supplemented by feeding molasses, minerals and salt.

Milk is marketed in El Vigia area throughout a processing plant known as INDULAC which produces powdered milk, or through small independent cheese plants. An important contributing factor in milk marketing

is the Asociacion de Ganaderos del Distrito Alberto Andriani (AGDAA). This association works with the farmers and helps solve problems that arise between the farmers and processors. The Association provides short term credit to farmers and aids in purchasing minerals, salt, and molasses at lower prices, by taking advantage of quantity discounts.

There are approximately 90 milk producers in El Vigia area. Only 61 are members of AGDAA. Generally the farms are not owner operated. Individual owners visit the farms about twice each month and give instructions to their foremen or farm managers.

#### Management techniques in El Vigia and production theory

Although this study is a straightforward summary of costs and returns associated with milk production in the El Vigia area of Venezuela, the general objective does not have theoretical implications relative to combination enterprises.

Some local producers expressed the view that beef production was more profitable than milk production. For the breeds (dual purpose) being kept on farms in the area, some combination of meat and milk may be most profitable. A brief discussion of enterprise relationships follow.

Three basic enterprise relationships occur. They are complementary, supplementary, and competitive. A complementary relationship occurs between two enterprises when an increase in the output of one enterprise stimulates the output of the second enterprise. This can be depicted graphically as a movement from A to B in Figure 1. Supplementary relationships occur when one output can be increased without affecting the level of output for the other product such as is depicted

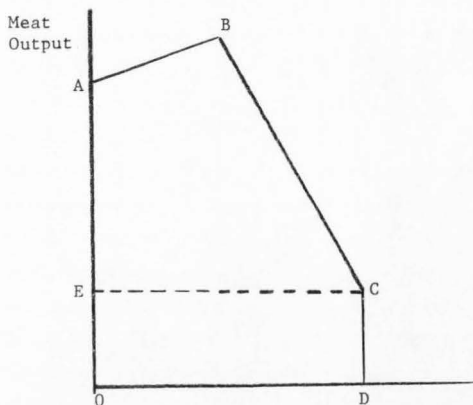


Figure 1. Possible production relationships between livestock activities.

by the line segment C-D. Competitive relationships occur when the output of one product is reduced as a result of increasing the output of the other product. This occurs along the line between points B and C.

In the graph the total line A B C D represents the level of output for meat and milk using the given resources of the farm. At point A only meat is produced. At point D only milk is produced. For example, at point C the level of output for milk is OD and for meat it is OE.

Relative to dairy farm operation in El Vigia area there is no logical explanation for a complementary relationship assuming the resources constant. The supplementary and complementary relationships, however, can occur. The supplementary relationship probably explains why milk production occurs. In other words, cows can be milked on a rather extensive basis of production without altering the level of meat



production significantly. The sale of milk on a year round basis provides an income flow to pay hired labor and other variable costs to operate the farm.

## OBJECTIVES OF THE STUDY

The principle object of the present work is to ascertain if milk production is profitable in the area of El Vigia. This study will be made through the analysis of the following points:

1. Determination of total cost, unit costs, and returns for the dairy farms which are members of the Livestock Association, Alberto Adriani, El Vigia, Merida.
2. Analysis of factors that affect the costs for the dairy farms due to possible relationships between the size of the farm, number of cows, yield per cow, and technology of production.

## REVIEW OF LITERATURE

Net income of dairy farms has been the subject of few studies in Venezuela during recent years. This study of the cost of production of milk is the first work that has been done in El Vigia area of the few ever done in the whole country.

A study was made by E. Baldizan G. in the central part of Venezuela around Aragua and Carabobo. The time period studied was 1957-1964. He concluded the production of milk was profitable in that area if the cows produced 15.6 liters per day on an average, and the price of milk to the farmer was Bs. 0.86 per liter.<sup>1</sup>

A study made by the Development Corporacion of the State of Zulia (CONZUPLAN) of dairy farms in the western and southern areas of the Maracaibo Lake area shows that the average production of milk per cow is around 5 liters per day and the average cost of production per liter was Bs. 0.46.<sup>2</sup>

Dairy production in El Vigia area resembles the conditions in the Zulia state, and therefore, the possibility for obtaining profits is likely to be found at a lower animal productivity than the level of productivity quoted by E. Baldizan.

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<sup>1</sup>Costo de Produccion de Leche en el Estado Zulia, cited in CONZUPLAN, p. 97.

<sup>2</sup>Ibid. p. 93.

## METHODOLOGY

This study was conducted by using the personal interview survey technique. A sample of farms was selected and the owner or his manager was interviewed to obtain data relative to the dairy enterprise. A questionnaire was prepared to guide the interviews and gather the necessary data from each farm. Two students from the Department of Economics of the Universidad de los Andes helped with the interviewing. They were given training in the use of survey techniques.

Sampling

The population of AGDAA dairy farms in the El Vigia area was identified and specific characteristics related to size of farms and milk production were ascertained. Records of INDULAC and AGDAA were consulted for this purpose. The characteristics were total production, annual and monthly production of milk for the year 1969, hectarea of each property, number of livestock, and number of cows producing milk.

In general, it was found that relative rankings of the farm in regard to the above characteristics were little changed. That is, ranking of dairy farms in the El Vigia area is consistent whether based on farm size, annual level of milk production, or total number of livestock.

Information provided by the farmers to the INDULAC processing plant as a condition for selling milk or receiving loans was also available. This included pasture land and livestock ownership. In view of the limited number of farms in the population, and proximity of the farms, it was considered sufficient to draw a sample that would

include 20 percent of the small size farms, 25 percent of the medium size farms and 40 percent of the large size farms. There were six small, eight medium and eight large farms in the sample.

#### Data collection

After the sample, stratified by size, was drawn, each farmer selected in the sample was contacted and cooperation established for the interview at a later time. The AGDAA cooperated by requesting each farmer to participate in the study because the information would be beneficial to the area.

After the interviews were conducted, the data were analyzed on the basis of the total sample, as well as on the basis of the small, medium and large classification of the sample. Averages were calculated for costs and receipts by addition of the appropriate figures for each farm, Appendix Tables 1 through 5. Averages for selected groups of farms were calculated by dividing by the number of farms or another appropriate denominator depending on the kind of average that was needed. Tables that summarize the data for presentation in the thesis were based on average of groups of farms.

In the part of the questionnaire corresponding to "Livestock Inventory," the value of the livestock was determined in accordance with the evaluation tables given by the Ministry of Agriculture and according to the opinion of the owner.<sup>1</sup> With regard to the column of increases, calves born during the year 1969 were included. In the column of losses, livestock that disappeared or were lost during the year due to any cause were counted. The number of livestock at the end

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<sup>1</sup>The information from the MAC's Tables was used when the farmer could not answer the questions.

of the year was obtained by subtracting from the inventory at the beginning of the year the sales and the losses and adding the increases and the purchases.

#### Variable costs

##### A. Feed costs.

With respect to the "Inventory of Feedstuffs and Supplements" section of the questionnaire, a differentiation was made in the following way:

1. Pasture: This item included pastures in existence on each one of the farms visited, giving each one a value in accordance to standard evaluation procedures. The total of hectareas cultivated for each type of pasture and the area utilized for the dairy cattle was identified.
2. Feedstuffs: This included all the feed fed on the dairy farms to the livestock dedicated to milk production.

##### B. Labor costs.

Hired labor included only the labor that worked in milk production. The average value of the cost of labor per day of eight hours of work was Bs. 10.00. On some farms, the wage per day varied between six and seven bolivares, in addition to food for the workers. It was assumed that the average labor cost was 10.00 bolivares per day. In the area of El Vigia there has been no social security or social benefit paid as additional remuneration to the workers even though there are specific laws in that respect.

##### C. Power costs.

In relation to the cost of operation of machinery, the evaluation made by the Ministry of Agriculture (MAC) was adopted, in order to

determine the cost of operation per hour of labor in the event that the farmer was not able to answer these questions.

#### Presentation of costs

Total cost per cow was Bs. 598.34 per year (Table 4). Cost of feed was the most important component of total cost comprising Bs. 198.31 or 33.1 percent of total costs. The cost of labor was the second most important contributor to total costs with an amount of Bs. 127.54 per cow per year. Interest on investment in building and improvements, equipment and cost of cows totaled Bs. 116.00 per cow per year or 19.4 percent of total cost. Other costs, in total, were Bs. 156.49.

Pará was the most important kind of pasture. Pará cost Bs. 65.67 per cow per year or <sup>30.10</sup> percent of total feed costs (Table 5). Guinea pasture was the second largest at Bs. 57.50. Concentrates and minerals cost Bs. 30.26 and Bs. 17.53, respectively. The remaining pasture feeds included Yaraguá, Elephant grass, Gordura, Platino, and Pangola.

Hand labor required a total of Bs. 104.65 per cow per year which is 82.1 percent of labor cost and was the most important kind of labor (Table 6). Workers in the hand labor category were used to perform the following: Cleaning of the dairy quarters and corrals, stables, maintenance of livestock, feeding of livestock, milking and other tasks. For all this work, labor was hired. Family labor was used especially to manage and inspect the farm. Mechanic labor was the fourth highest part of total cost accounting for Bs. 3.15 per cow per year.

Table 4. Total costs per cow of producing milk for manufacturing on selected farms in El Vigia area of Venezuela, 1969

Item	Cost per cow per year	Percentage of the total cost
	Bs.	Percent
Cost of feed	198.31	33.1
Cost of labor	127.54	21.3
Interest on investment	116.00	19.4
Cost of operation	70.69	11.8
Depreciation	33.40	5.6
Medicines and veterinary	28.10	4.7
Repairs	23.22	3.9
Monthly payments to AGDAA	1.04	.2
Other expenses	0.04	--
	598.34	100.0



Table 5. Cost of feed and supplements per cow for selected milk producing farms in El Vigia area of Venezuela, 1969

Pastures	Units of feed per cow per year		Cost per cow per year	Percent of total
			Bs.	%
Pará	0.43	Has.	65.67	33.10
Guinea	0.38	Has.	57.50	29.00
Yaraguá	0.08	Has.	13.02	6.57
Elephant	0.05	Has.	7.50	3.78
Gordura	0.04	Has.	6.17	3.11
Platines	0.002	Has.	0.41	.21
Pangola	0.001	Has.	0.25	.13
Concentrates <sup>a</sup>	75.65	Kgs.	30.26	15.26
Minerals	41.73	Kgs.	17.53	8.84
			198.31	100.00

<sup>a</sup>The concentrate gave average price of Bs. 0.40 per Kg. and Bs. 0.42 per Kg. of minerals.

Table 6. Cost of labor per cow for the production of milk for manufacturing, selected farms in El Vigia area of Venezuela, 1969

Kind of word	Wages per hour	Labor per cow per year	Cost per cow per year	Percent of labor cost
	Bs.	Hours	Bs.	Percent
Hand labor	1.25	83.71	104.65	82.1
Foremen	1.50	7.76	11.65	9.4
Family labor	5.00	0.85	4.29	3.4
Mechanic	2.50	1.26	3.15	2.5
Tractor driver	2.50	1.07	2.68	2.1
Chauffeur	1.25	0.54	0.68	.5
Tractor driver assistant	2.00	0.22	0.44	.3
Total		95.41	127.54	100.0

## RECEIPTS

Milk producers receive money directly from the sale of milk, calves, and other surplus dairy animals. In an analysis of this kind the value of milk on the farm for family consumption or for feeding calves is counted as a receipt. The fertilizer value of manure was also credited to the enterprise.

Milk sales data, as well as the price per liter of milk sold to the processing plant, and the different subsidies received by transport and price differential were obtained from each farmer on a monthly basis.

INDULAC normally transports the milk. If a farmer delivers his milk to the plant directly he is paid from 1.5 to 2.5 centimos per liter for transportation, in addition to the price of milk, depending on the distance from the farm to the plant. A subsidy is paid to the farmer by the government. The subsidy is 14 centimos per liter if the milk is cooled, and 12 centimos if not cooled. INDULAC does the accounting for the determination of subsidy payments to the farmer. This information was obtained from the processing plant.<sup>1</sup>

Milk sales constituted the highest percentage of income to the average dairy enterprise. The total value of milk sold per cow per year was Bs. 473.91 (Table 7). The value of the calves produced by the average operation contributed Bs. 155.46 per cow per year, or 24.1 percent of the total income.<sup>2</sup> The price per calf averaged 200.00 Bs.

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<sup>1</sup>The tabulation was obtained from INDULAC, El Vigia, Merida, Venez.

<sup>2</sup>The calves were valued, taking into consideration the opinion of the proprietor and the evaluation of the MAC.

for male and for female calves Bs. 300.00, taken as an average of Bs. 250.00 per calf.

#### Value of milk not sold

About 0.9 percent of the annual milk production, equivalent to Bs. 5.78 is for home consumption. This does not include the milk utilized for feeding the calf. Generally the calf is allowed to nurse from the cow so that a separate value for the milk fed is necessary.

#### Value of manure

The amount of manure left by the animals in the pasture averages about five tons per cow per year.<sup>3</sup> Part of the manure accumulated in the corrals is not utilized in the fields and does not contribute to income. The benefit generated by the use of the manure (offsetting the need to buy fertilizer) is estimated as Bs. 10.00 per cow per year, which is equivalent to 1.5 percent of average total dairy income. A price of Bs. 2.00 per ton of manure was used in the calculations.

#### Net returns

To obtain net returns from the average milking enterprise, total costs were deducted from total receipts on a per cow basis. Net returns averaged Bs. 46.81 per cow for the 22 farms in this study. If the value of the family labor and operator is added to the net return, then the family has an annual return of Bs. 51.10 per cow on the average for their labor, management and capital (Tables 8 and 9).<sup>4</sup>

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<sup>3</sup>Manure valuation was based on Chapter 24 of "Feeds and Feedings" by Frank B. Morrison.

<sup>4</sup>Family labor and operator costs were included in the calculations of labor costs at the going market price, so that the costs must be added to net returns in order to establish returns for total family inputs.

Table 7. Receipts per cow from the production and sale of manufacturing milk in El Vigia area of Venezuela, 1969

Item	Income per cow per year	Percentage of the total income
	Bs.	Percentage
Milk sold	473.91	73.5
Value of the calves	155.46 <sup>a</sup>	24.1
Milk not sold	5.78	.9
Manure	10.00	1.5
Total income	645.15	100.0

<sup>a</sup>The price per calf averaged 200.00 Bs. for male and for female calves Bs. 300.00 taken as an average of Bs. 250.00 per calf. The final value of the calves is Bs. 155.46 because of high mortality caused by brucellosis results in only about a 60 percent calf crop.

Table 8. Net returns per cow for the production of manufacturing milk in El Vigia area of Venezuela, 1969

Items	Per cow per year
	Bs.
Total receipts	645.15
Total costs	598.34
Net return to enterprise	46.81

Table 9. Measures of returns per cow per year per year from the production of manufacturing milk in El Vigia area of Venezuela, 1969

Item	Per cow per year
	Bs.
Net returns	46.81
Value of operator and family labor	4.29
Returns to management, operator and family labor	51.10

SIZE OF ENTERPRISE AND FINANCIAL SUCCESS  
OF OPERATION

It was expected that large dairy farms optimize the allocation of their available resources. To test this expectation, an analysis of the dairy farms by size was conducted. The results are presented in this section.

The six small farms had 352 cows or an average of 58 cows per farm. Medium size herds averaged 100 cows each. While large farms averaged 532 cows each (Table 10).

Capital investment in buildings per cow per year for the small farms averaged Bs. 344.68. The corresponding investment for large farm was Bs. 451.07. The scale of operation has undoubtedly an important effect in relation to average investment. Large farms are in many cases multiple units of small farms. All cows are milked by hand in similarly constructed sheds. Large farms use more than one shed located close to various pastures where the cows graze to minimize travel. Economies in the use of buildings are difficult to attain under such circumstances.

Labor cost per cow per year decreased as the number of cows per farm increased. Large dairy farms required about one half as many man-hours per cow as small farms resulting in considerable lower average labor costs for the large farms. There was not a consistent relationship between feed costs and the average number of cows per farm. Analysis of the data obtained shows that medium size farms have the highest average feed cost per cow. In the medium size group there was a marked tendency to engage in dairy as well as cattle

Table 10. Relation of number of cows per farm related to total cost of other measures, for farms producing manufacturing milk in El Vigia area of Venezuela, 1969

Groups	Cows per group	Number of farms per group	Cows per farm	Capital invested in building equipment per cow	Labor cost per cow	Feed	Interest and depreciation	Total cost	Recpt. per cow	Net return per cow
	Number	Number	No.	Bs.	Bs.	Bs.	Bs.	Bs.	Bs.	Bs.
Small	352	6	58	344.68	27.17	164.95	137.61	632.02	634.85	2.83
Medium	801	8	100	458.43	25.03	244.07	153.35	638.92	699.55	60.63
Large	4,260	8	532	451.07	11.24	185.93	157.68	521.66	605.05	79.39



for meat activities, thus there was a problem regarding the allocation of feed supplies, and the proper apportionment of costs involved.

Interest and depreciation charges are related to investment per cow and, therefore, tend to be higher for the medium and larger size farms. The relatively small difference between the respective interest and depreciation values was indicative of and compatible with the lower average fixed cost as the size of the operation increased. As was mentioned before, there was a concise pattern of diminishing fixed and variable costs as the size of the dairy operation increases. In this general analysis no allowance was made for management practices, a fact that appears to be the relevant variable in view of rigid prices in the factor market that both small and large farm operators are subject to.<sup>1</sup>

Net income per cow per year for the year for the different size farms increased considerably for the medium size farms as compared with small farms. Large farms show higher net income per cow per year than medium size farms.

#### Milk production per cow

The level of milk production represents the summation of the amount of milk produced per cow per year. Moreover the level of milk production reflects the capacity and quality of the dairy animals together with the

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<sup>1</sup>Even though the different input requirements are considerably higher for the large farms, the inelastic response of factor prices due to less than competitive factor markets, minimizes larger input requirements, i.e., there are not necessary economies on account of large quantity purchases.

care given to the cow plus the management practices utilized in the dairy operation. Theoretically, farms with high average milk production per cow should have larger per cow profits, because higher unit yields are commensurate with higher unit revenue without corresponding increases in costs.

The sampled dairy farms in El Vigia area show that medium size operations have the highest average production of milk per cow per year 778 liters compared with 528 liters for the small farms and only 508 liters for the large farms. It is possible to infer that the reason why the largest farms have the lowest per unit yield is due partly because large farms are mostly dual operations, part dairy and part cattle for meat, while small operations tend to provide better care to their limited operations. Another reason is that large farms are largely absentee owner operated, whereas the small farms are owner operated.

Larger farms had lower production per cow but also lower total costs (Table 11). There was no consistent relationship between the production of milk per cow and cost of feeding. For a larger production of liters of milk per cow, 778, a larger cost of feeding corresponded with Bs. 244.08, nonetheless, for the lowest production of milk per cow per year, 508 liters, lower costs did not correspond.

There was no relationship between the liters of milk produced per cow per year and the total capital invested other than in cows; for a larger production of milk per cow, 778 liters, a larger investment of capital per cow Bs. 656.03 corresponded, but for a lesser production of milk per cow, 508 liters, there was no reduction in investment per cow per year.

Table 11. Liters of milk produced per cow per year by size group for farms producing manufacturing milk in El Vigia area of Venezuela, 1969

Groups	Number of cows per farm	Liters of milk produced per cow	Labor cost per cow	Total capital invested other than in cows	Market value/cow	Feeding	Interest depreciation	Total cost
	Number	Liters		Bs.	Bs.	Bs.	Bs.	Bs.
Small	58	528	27.17	809.50	771.02	164.95	137.61	632.02
Medium	100	778	25.03	656.03	930.33	244.08	153.35	638.92
Large	532	508	11.24	838.44	838.61	185.93	157.68	521.56

Level of production

Receipts per cow were not related to fixed costs, variable costs or labor costs. No relationship was found between net receipts per cow or per liter and the number of cows or liters produced per farm. When the farm records were ranked by liters per cow a relationship with net receipts became evident in that all farms with outputs above 650 liters per cow per year were profitable while farms with less than this level of production were generally unprofitable (Table 12).

Table 12. Comparison of dairy farms with high levels of production with farms having low levels of production, El Vigia area, Venezuela, 1969

	Liters/cow	Labor	Variable	Fixed	Net income	
					Cow	Liter
High <sup>a</sup>	1,046.5	150.17	249.41	211.05	265.11	0.244
Low	425.2	138.07	331.54	210.58	-67.59	-3.07

<sup>a</sup>High category includes all farms with production above 650 liters per cow per year.

## SUMMARY

This study was made with the object of obtaining the costs, receipts, and net income for farms that produced manufacturing milk in El Vigia area. The sample of farms was selected from the membership of the Livestock Association of the District Alberto Adriani, in the State of Merida, Venezuela. The population in its totality was dedicated to the production of milk for manufacturing, and at the same time to the production of meat. Costs and receipts associated directly with milk production were analyzed in this study. Allocation of selected costs was necessary.

The variables that were utilized for finding the criteria of classification for sampling purposes were the following: annual and monthly production of milk for the year 1969, area of each property, number of livestock, and number of cows producing milk, cultivated existing pastures, and distance in kilometers from each farm to the manufacturing plant, INDULAC. The chosen sample constituted 36.06 percent of the population and included six small farms and eight each of medium and large farms.

Farm operation costs and returns were collected through personal interviews with farm owners or managers. The analysis was presented on a per cow per year basis, by size of farm, and average output per cow per farm.

Costs of production in the three size groups had a range of Bs. 521.56 to Bs. 638.92 per cow per year. The cost of production averaged Bs. 598.34 per cow per year. In the costs, the following items were

included: costs of feeding, 33.1 percent; cost of labor 21.3 percent; costs of interest 19.4 percent; costs of operation, 11.8 percent; depreciation, 5.60 percent; medicines and veterinary services, 4.7 percent; repairs, 3.9 percent; and Livestock Association quotas, 0.2 percent.

Receipts from sales of milk for manufacture ranged from Bs. 605.05 to Bs. 699.55 per cow per year. Milk sales contributed 73.5 percent to total receipts; the value of calves, 24.1 percent; the value of the milk used on the farm, 0.9 percent; and the value of the fertilizer (manure), 1.5 percent of total receipts.

Net return per cow was calculated by subtracting total costs from total receipts. Net return per cow varied from Bs. 2.83 to Bs. 79.39 per cow per year from the size groups.

The number of cows per farm was associated inversely with total cost per cow. As the number of cows increased, the cost per cow diminished. There was a direct relationship between the number of cows and the net income per cow; upon increasing the number of cows, the net income increased. For an average of 58 cows per farm, they obtained a net return of Bs. 2.83, but for an average of 532 cows there was a net return of Bs. 79.39.

The level of production per cow was not consistently associated with size of herd.

There was no consistent relationship between the number of hours of labor and the number of cows. When the number of cows increased from 58 to 100 the number of hours increased from 114.97 per cow to 140.19. For the larger herds the number of hours per cow decreased to 57.89 hours.

There was no consistent relationship between feed costs and size of the dairy enterprise.

The buildings and equipment on the various sized farms tended to be similar in construction and, therefore, costs. The primary difference was in the size of buildings.

Costs per cow tended to be a function of size and enterprise. Large farms realized some economies of scale by milking more cows in larger buildings which cost less per square meter to construct. Small farms sometimes did not have concrete floors in the milking shed and thus reduced investment per cow.

There was a positive relation between the capital invested in buildings and equipment and the net income, although not in a consistent way. For an investment of Bs. 344,68 in buildings and equipment, a net income per cow of Bs. 2.83 corresponded. For an investment of Bs. 458.43 per cow, an income net of Bs. 60.63 corresponded. Finally, for an investment of Bs. 451,07 per cow, a net income of Bs. 70.39 per cow per year corresponded.

There was no consistent relationship between the capital invested in buildings and equipment and the total cost per cow.

Analysis of individual farm records indicated that level of production per cow per year was correlated with profitability. Six hundred fifty liters of milk per cow per year appeared to be the break even level of production. Farmers should strive to achieve at least this level of production by improved farm management.

## CONCLUSIONS

The production of milk in the area of El Vigia is profitable. The return to capital is positive, but not very attractive. The present work showed an average net income of Bs. 46.81 per cow per year.

The largest farms did not have the greatest production of milk per cow per year. Lower labor costs on large farms resulted in greater net returns for that group of farmers. This does not especially mean that the production of cows increase, the net income should increase constantly through time. This study did not include an analysis of the capacity of production of milk per cows. That, no doubt, is the greatest factor and of the greatest importance in regard to production. Higher levels of production are important if they can be obtained through selection of the cows, better management in breeding, feeding, and caring for the general health of the cows at cost levels that are not excessive.

There was no consistent relationship between the production of milk per cow and the cost of feed. For the highest average producer of milk per cow, the highest cost of feed corresponded, but for the smallest average producer per cow the smallest cost did not correspond (see Table 11, p. 28).

Net income was related to the number of cows per farm. Larger herds of cows were associated with a small average production of milk per cow which indicates that there is a possibility of increasing the net income per cow through better selection. Diminishing the



number of cows will diminish the cost of maintenance with fewer higher producing cows on the farm.

As labor per cow diminishes, the net income increases. A smaller number of capital hours could signify lack of care of the cows, but for this study the lower number of hours of labor spent per cow corresponded almost to the largest net income average per cow per year and the highest production of milk per cow.

There was a relationship, although not consistent, between the amount of feed fed per cow and the average production of milk per cow within groups. For Bs. 244.08 spent in feeding per cow, the largest production per cow, 778 liters, corresponded; but for the lowest cost of feeding of Bs. 164.95 there was no correspondence to the lowest production of milk per cow per year, 508 liter. The normal known practice is to give the cows the adequate quantity of feed and in this way a larger production will be obtained and a larger income per cow.

The group that had the highest costs in investments in buildings and equipment obtained the lowest costs average. Here the cost totals were diminished due to the number of cows per group.

#### INDULAC policies

During 1969 INDULAC paid the subsidy to farmers exclusively without regard to the production performance of farms. The subsidy has helped farmers inasmuch as it has been able to increase their incomes. Richer farmers have been benefitted in greater degree than poorer ones.

## RECOMMENDATIONS

1. In respect to the milk producers, the recommendations could be very wide, but in synthesis, we could restrict them to the following: acquiring or obtaining full knowledge of the operations that they are conducting, pointing out that for the farmer it is important to have basic notions of management of farms. This is the basic problem. The interviews taken on the visits to these farms indicated the total lack of knowledge of management concepts. Indeed, without exaggerating, we could state that 90 percent of the farmers that were interviewed did not even know the amount of investment that they had in their own farms, or their production. In the same manner accounting systems are sadly lacking.
2. With reference to the recommendations for the manufacturing plant of INDULAC and its system of payments, the idea would be to make a detailed study of processing costs and at a later date to make recommendations with reference to their system of payments. Without knowing functions of this manufacturing plant, it would be very difficult to be able to recommend anything. Apparently these processing companies are obtaining benefits. INDULAC is the best equipped in South America and its construction cost was Bs. 25 million which makes us suppose that the company has had positive net incomes. There is a possibility that these companies, which handle large amounts of money, have a great influence with the government. For example, in the year 1970 for the month of July, the government through the Ministry of Agriculture, required the

processing milk companies to make payment of 5c more to the producers of less than 1,000 liters per day and 3c more for producers who produced above that quantity. Exactly 20 days after the consumers presented a demand to the government to lower the price of powdered milk which had reached almost Bs. 2,000 per can, (28 percent fat per five pounds). At this writing the national government through the Ministry of Development has not been able to obtain a lower price for the consumer.

3. With respect to the government we could recommend that it should start campaigns of literacy in the area through qualified persons who would teach farm owners the details of the operations that are under their care. It is very possible that through education, the government could increase in a very short time the production of milk by possibly 30 percent and this could be made in a short period. Benefits for all the farm owners might be handled in such a way that the government could use the money now being paid as a milk subsidy in El Vigia to provide some agricultural services, such as hiring engineers, veterinary doctors, zootechnists, economists, as well as agricultural technicians. This would result in a better technique about pasture, cattle and animal management.
4. The government might consider forming cooperative ownerships of all processing plants.

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## APPENDIX

Table 13. Financial measures of individual dairy farm records,  
El Vigia area, Venezuela, 1969

Record No.	Net/cow	No. cows	No. of liters	Net per liter	Costs per cow		
					Var. costs	Fixed costs	Labor costs
	Bs.	No.	No.	Bs.	Bs.	Bs.	Bs.
P 16	367.40	21	26,395	0.37	151.95	154.63	133.34
P 17	-275.94	120	39,489	-0.22	323.13	177.64	112.50
P 18	-230.14	35	20,386	-0.60	680.67	260.50	154.28
P 19	267.90	30	20,200	0.44	209.74	18.50	118.80
P 20	119.96	90	67,247	0.16	223.24	120.67	160.00
P 21	51.10	50	19,839	0.16	175.00	117.08	129.60
M 1	84.00	25	26,064	0.08	315.40	254.98	216.96
M 10	271.95	115	194,915	0.16	363.97	396.83	194.71
M 11	9.27	120	49,201	0.10	183.59	176.45	108.00
M 12	40.40	90	53,732	0.08	294.88	162.57	192.00
M 13	-60.51	91	43,537	-1.24	309.45	110.91	102.97
M 14	-2.74	100	44,897	-0.02	292.42	147.10	322.75
M 15	-56.40	130	70,149	-0.62	174.77	91.18	25.65
M 22	269.30	130	141,463	0.23	270.08	208.60	110.65
G 2	-39.00	1400	278,640	-0.16	1,176.65	839.36	270.85
G 3	387.30	600	615,675	.27	117.75	250.84	165.20
G 4	470.90	200	42,719	2.18	222.75	230.04	89.32
G 5	-39.98	400	250,856	-0.08	259.90	312.78	137.40
G 6	-18.20	500	177,070	-0.05	148.14	91.16	62.14
G 7	138.88	500	166,827	0.30	200.34	145.64	43.14
G 8	253.10	500	561,369	0.24	343.16	223.39	101.68
G 9	-247.10	160	70,928	-0.20	443.91	165.58	82.50

Table 14. Relationship of liters of milk produced per cow to costs and net income for dairy farms in the El Vigia area, Venezuela, 1969

	Liters per/cow	Costs per cow			Net income per cow	Per liter
		Variable	Fixed	Labor		
		Bs.	Bs.	Bs.		
M 10	1,694.9	363.97	396.93	194.71	271.95	0.16
G 8	1,122.7	343.16	223.39	101.68	253.10	0.24
M 22	1,088.1	270.08	208.60	110.65	269.30	0.23
M 1	1,042.6	315.40	254.98	216.96	84.00	0.08
G 3	1,026.1	117.75	250.84	165.20	487.30	0.27
P 16	977.5	151.95	154.63	133.34	367.40	0.37
P 20	747.1	223.23	120.67	160.00	119.96	0.16
P 19	673.3	209.74	78.50	118.80	267.90	0.44
G 5	627.1	259.90	312.78	137.40	-39.98	-0.08
M 12	597.0	294.88	162.57	192.00	40.40	0.08
P 18	582.4	680.67	260.50	154.20	-230.14	-0.60
M 15	539.6	174.77	91.18	125.65	-54.40	-0.62
M 13	478.4	309.45	110.91	102.97	-60.68	-1.24
M 14	448.4	282.42	147.10	322.75	-2.74	-0.02
G 9	443.3	443.91	165.58	82.50	-247.10	-0.20
M 11	410.0	183.55	176.45	108.00	9.27	0.10
P 21	396.7	175.00	117.08	129.60	51.10	0.16
G 6	354.1	148.14	91.16	62.14	-18.20	-0.05
G 7	333.6	200.34	145.64	43.14	138.88	0.30
P 17	329.0	323.13	177.64	112.50	-275.94	-0.22
G 4	213.5	222.75	230.04	89.32	-216.59	-1.54
G 2	199.1	1,176.65	839.36	270.86	-39.0	-39.00



Table 15. Income measures for each survey farm, El Vigia, Venezuela, 1969

Farm number	No. liters sold	Income from milk	Income from calves	Value of manure
P 17	39,498	24,480	16,000	1,200
P 16	32,679	16,792	5,000	270
P 18	45,665	23,285	7,000	350
P 19	20,200	12,726	7,500	300
P 20	67,243	42,809	12,000	900
P 21	19,839	12,393	11,250	500
Average	37,519	22,214	9,792	587
M 1	26,064	16,994	4,800	700
M 10	194,915	124,654	16,500	1,800
M 11	49,201	32,280	25,000	1,200
M 12	53,732	35,062	11,000	900
M 13	43,537	28,108	14,000	900
M 14	44,897	27,836	20,000	1,000
M 15	70,149	44,384	14,000	1,300
M 22	141,463	87,606	24,000	1,300
Average	77,995	49,615	16,163	1,138
G 2	278,690	185,484	80,000	14,000
G 3	615,675	400,188	90,000	6,000
G 4	42,719	27,602	37,500	2,000
G 5	250,856	167,268	100,000	4,000
G 6	177,070	109,783	32,000	3,000
G 7	166,827	115,457	96,000	3,000
G 8	561,369	360,700	100,000	3,000
G 9	70,928	43,975	27,500	1,600
Average	270,511	176,307	70,375	4,575

Table 16. Cost measures for each survey farm, El Vigia, Venezuela, 1969

Farm number	Dues to Association	Feed costs	Labor costs	Cost of machinery operation	Medicine & veterinary	Interest on investment	Depreciation	Repairs	Total cost	
Bolivares										
352 cows	P 17	240	31,950	13,612	5,086	1,500	11,901	2,666	6,750	73,705
	P 16	240	3,363	3,700	--	500	3,636	474	65	11,978
	P 18	240	7,915	5,850	14,688	1,000	5,107	2,286	1,725	38,811
	P 19	120	5,805	5,184	68	300	1,420	281	650	13,828
	P 20	120	15,618	20,400	1,037	1,200	1,387	1,905	2,490	44,157
	P 21	120	8,430	8,640	--	800	4,201	953	700	23,844
	Average	180	1,218	9,564	3,479	883	4,609	1,427	2,063	34,387
	.51	34.60	27.17	9.88	2.51	13.09	4.05	5.86	97.69	
801 cows	M 1	240	7,065	6,384	--	800	4,309	665	1,400	20,863
	M 10	360	32,729	27,792	5,167	3,600	37,474	6,762	1,400	115,284
	M 11	120	19,215	16,800	196	2,500	15,277	3,277	2,560	60,005
	M 12	360	14,018	21,840	11,491	1,000	10,274	4,326	3,080	66,389
	M 13	300	20,994	13,930	6,566	3,600	4,653	1,871	3,569	55,483
	M 14	300	26,292	33,775	--	15,000	8,307	2,004	4,400	90,078
	M 15	300	15,660	19,035	12,960	3,800	11,221	1,518	1,139	65,633
M 22	360	19,830	20,860	12,420	2,500	19,881	4,410	2,820	83,081	
Average	293	19,475	20,052	6,100	4,100	13,925	3,112	2,546	69,602	
	.37	24.31	25.03	7.62	5.12	17.38	3.89	3.18	86.90	
4260 cows	G 2	840	128,400	48,720	691	34,800	144,483	6,602	9,430	373,966
	G 3	900	90,330	104,880	16,474	10,000	126,786	18,403	5,316	373,089
	G 4	240	46,782	3,600	9,360	3,000	36,557	4,797	5,155	109,491
	G 5	600	85,920	58,560	8,640	8,000	73,316	18,970	32,825	286,831
	G 6	360	65,430	46,100	5,280	3,000	28,381	7,927	9,275	165,753
	G 7	480	86,250	31,168	12,442	1,000	53,027	8,318	11,475	204,160
	G 8	1200	117,502	74,362	16,876	36,000	78,457	27,580	5,656	357,633
	G 9	240	46,575	15,600	24,211	15,000	20,230	5,183	1,400	128,439
	Average	607	83,399	47,874	11,747	13,850	70,155	12,222	10,067	249,920
	.14	19.58	11.24	2.76	3.25	16.46	2.87	2.36	58.66	

Table 17. Physical measures for each survey farm, El Vigia, Venezuela, 1969

Farm No.	No. cows	No. of calves	No. of liters milk	No. labor hours	Amount of milk sold (liters)	Amount of pasture (Has.)	Concentrate per farm (Kgs.)	Minerals per farm (Kgs.)
P 17	120	80	39,489	134	39,489	180	14,086	3,286
P 16	21	20	33,409	29	32,679	22	--	149
P 18	35	28	46,395	33	45,665	51	8	1
P 19	30	30	20,565	26	20,200	35	844	517
P 20	90	60	69,368	116	67,243	90	1,800	471
P 21	50	45	21,964	52	19,839	51	1,800	1,000
M 1	25	24	27,408	41	26,064	38	--	3,428
M 10	115	110	194,915	142	194,915	104	34,778	7,662
M 11	120	100	52,121	104	49,201	120	954	1,366
M 12	90	40	56,287	122	53,732	90	876	400
M 13	91	70	45,362	65	43,537	135	1,335	343
M 14	100	65	44,897	256	44,897	150	5,280	4,714
M 15	130	70	71,589	113	70,149	100	990	629
M 22	130	120	145,133	103	141,463	116	1,800	4,071
G 2	1,400	400	285,360	300	278,640	600	36,000	57,143
G 3	600	450	615,675	711	615,675	471	37,500	11,143
G 4	200	150	44,544	138	42,719	297	2,160	3,257
G 5	400	400	257,336	348	250,856	550	3,000	5,571
G 6	500	160	177,070	91	177,070	401	4,200	3,257
G 7	500	320	177,627	22	166,827	497	--	27,857
G 8	500	500	563,559	19	561,369	750	7,504	4,764
G 9	160	110	70,928	96	70,928	175	15,919	33,232

## VITA

Gustavo Pérez

Candidate for the Degree of

Master of Science

Thesis: Costs and Returns from Milk Production in El Vigía Area in the State of Merida, Venezuela, 1969

Major Field: Agricultural Economics

## Biographical Information:

Personal Data: Born at Merida, Venezuela, September 18, 1941, son of Ana Julia Pérez. Married.

Education: Graduated from Universidad de los Andes, Merida, Venezuela, November 1967. Completed requirements for the Master of Science degree at Utah State University in 1972.

Experience: Farmed in El Vigía, Venezuela.