Agricultural resource allocation in the Cauca Valley of Colombia
by Don Bostwick

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY in Agricultural Economics
Montana State University

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A Cobb-Douglas function with seven independent variables was fitted to sugarcane production data. No acceptable results were achieved with any of the various combinations of variables.

An enterprise budget was computed for beef production from two-year-old grade Cebus in a field trial on intensive pasture. The net enterprise income of 3,134 pesos per hectare per year in this trial compared to the -134 pesos per hectare per year of the hypothesis, led to rejection of the hypothesis of optimality for typical beef production enterprises in the valley.

An enterprise budget for intensive dairy production was computed from the data of a commercial dairy herd in the Cauca valley. The resulting net enterprise income of 5,065 pesos per hectare per year led to rejection of the hypothetically optimum return of -12 pesos per hectare per year netted by typical commercial dairy producers in the Cauca valley.

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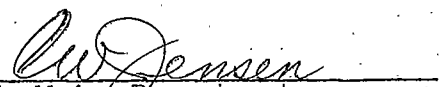

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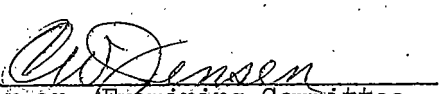

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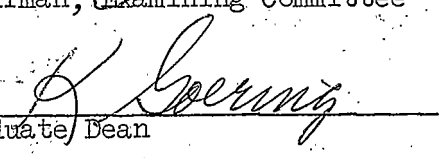

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Page

Table of Contents

List of Tables

List of Figures

Abstract

This study has attempted to test an hypothesis that certain agricultural production enterprises in the Cauca valley were optimal with respect to their net enterprise incomes. Sufficient data were thought to be available to allow tests of corn, sugarcane, beef, and dairy production enterprises.

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Chapter I: Description and Problem Setting

Guided development of the agricultural economy of the Cauca valley of Colombia may eventually be attempted. Such a development must rest on reasonable data of production techniques, of market structure, and of the social-political milieu. In 1962, these data were not yet available for rational planning, either in adequate quantity or quality.

The first purpose of this study is to explore and to bring together all of the available data of production processes for the agriculture of the Cauca valley. A second purpose is to analyze these data, to supplement them where possible, and to use them in the estimation of extant resource allocations and those that are possible in the future. The focus of the study is on the farm firm, as represented by theoretically constructed examples from aggregate production data.

Descriptive Information

The Cauca River flows generally south to north between the central and western ranges of the Andes mountains in Colombia, turning east around the end of the central range to join the Magdelena before that river empties into the Caribbean Sea. Midway of its south to north course, the Cauca flows through a large valley left when a glacial lake was drained some thousands of years ago. This is the Cauca valley, a rich agricultural area, and the locale of this study.

The valley lies at an average elevation of 1,000 meters (3280') above sea level, at a median latitude of three degrees north. The valley is about 200 kilometers long, and ranges from 10 to 30 kilometers wide (124 miles by 6.2 to 18.6 miles). The land area of the valley is about 350,000 hectares (865,000 acres). The area commonly referred to

as the "valley" or "the flat part of the valley" is within the political department of Valle del Cauca, except for a small portion on the southern end lying in the political department of Cauca. But the entire department of Valle del Cauca includes considerable areas of mountainside and of jungle along the Pacific shores. This leads to certain difficulties over the separation of available statistical data into that of the valley area and of the remainder of the department.

The valley has been covered by a lake at least four times since the Pliocene, and about 15 percent of the valley floor is still covered by lacustrine sediments.1/ The top soil ranges up to 10 feet in depth and is underlain by gravel and sand. Alluvial fans extend from the mouths of canyons and overlie this lacustrine deposit along the margins of the mountains on both sides. The constantly changing meanders of the Cauca river have produced a pattern of old dikes, flood plains, flat benches, and bog areas. The valley floor slopes less than one degree to the north, and only a little more steeply from the sides toward the river. In historical times the Cauca has been located along the western margin of the valley over about the northern two-thirds of the area.

According to Reese and Goosen 2/, the soils of the valley are distributed as follows: 12.6 percent terrace soils, 68.1 percent alluvial fans and plains, 9.6 percent levee soils, 1.2 percent slackwater soils, and 8.5 percent stony, mixed alluvial, and marshland soils. The terrace

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1/ William F. Reese, and Doeko Goosen. Reconnaissance Soil Survey of the Flat Part of the Cauca valley. CVC and FAO of the UN, Cali, Colombia: 1957, p. 6.

2/ Ibid., p. 32.

soils range from clayey to loamy; the alluvial soils from sandy loams to clays; levees are predominantly silty clay loams and clay loams; and the slackwater areas have soils that are fine textured silty clays and clays. Thirty percent of the valley soils have good permeability, 25 percent have permeability between good and poor, and the remaining 45 percent have soil permeability of poor or very poor.3/

A table of mean monthly temperatures for selected towns in the Cauca valley is included as Table A-1 of the Appendix. The average for the valley would be a little above 24 degrees centigrade (75 degrees Fahrenheit). The city of Cali, in the southwestern part of the valley, has an average mean monthly temperature of 24.3 degrees centigrade, with a minimum monthly temperature of 23.6 degrees centigrade in November, and a maximum mean monthly temperature of 24.8 degrees centigrade in February and March.4/ Appendix Table A-2 gives the average relative humidity for three stations in the valley. Cali has an average mean relative humidity of 63 percent with a minimum monthly mean of 68 percent in November, and a minimum monthly mean of 57 percent in July.

Rainfall in the Cauca valley is partly a function of the season and partly of the location where the recording is taken. Rain-bearing clouds come generally from the West. The higher peaks of the western range of the Andes force these clouds to drop their moisture on the Pacific slope, creating rain-shadows that may stretch nearly across the valley opposite

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3/ Loc. cit.

4/ Ibid., p. 17.

the highest mountains, and may never reach the valley floor opposite the lower passes.

Generally speaking, there is a major dry period in the summer months of June-August, and a minor one in the winter months of December-January. The major wet period comes in the spring months, with the minor one in the fall. But this is only a generalization, and and does not necessarily hold for any given locality of the valley. Cali receives about 1200 millimeters (47.2 inches) of rain during the year, and is representative of those parts of the valley that are not affected by rain-shadows. Appendix Table A-3 gives average monthly rainfall data for selected locations in the valley. The ground water table in most parts of the valley lies less than three meters (9.8 feet) below the surface, and in some areas is much closer than that.5/

Because of the location close to the equator, there is only a small difference in the daylight hours between the shortest and longest days of the year. The sun rises a few minutes before or after 6 a.m., and sets a few minutes before or after 6 p.m. throughout the year. Thus, the Cauca valley enjoys a year-round growing season for tropical and semi-tropical crops. There are few days during which there is not some degree of cloud cover, from scattered cumulus to solid overcast, so that the value of solar insolation received by plants is relatively low for three degrees of latitude. Crops such as corn, beans, soybeans, rice, sugarcane, cotton, tobacco, plantain, pineapple, manioc, avocado, cocoa,

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5/ Ibid., p. 20.

coffee, grapes, citrus, and most vegetables are produced in the valley with varying degrees of success. The elevation of the valley is too high for coconut and banana, near the upper limit for cocoa, and below the lower limit for the best quality of coffee. Temperate zone crops such as wheat, barley, oats, rye, apples, potatoes, peaches, and plums are not produced in commercial quantities.

The population census of 1951 shows a total of 422,000 people in the six largest towns of the Cauca valley, and a total urban population of just over half a million. The total population of the valley in 1961 was 1,106,000, about evenly divided between rural dwellers and those living in towns of 5,000 or more inhabitants.6/ Estimates made by the Corporacion Autonoma Regional Del Cauca (CVC) in 1964, gave the city of Cali just over 700,000 inhabitants, and the valley about two million people in total. Therefore, one may conclude that the total population of the Cauca valley doubled between 1961 and 1964, while the population of Cali increased at an even more rapid rate. This excessive rate of migration was caused primarily by two factors. Cali, as a rapidly expanding industrial and business center, has been exerting a pull on landless and submarginally employed rural dwellers. This tendency has been seen to operate in similar situations in numerous times and places, and is unremarkable. The more important factor was the push of civil violence and banditry in the outlying areas of the valley, and in the mountain areas surrounding it. The violence was endemic in some areas for ten years or more, and

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6/ 1951 Censo del Poblacion, Departamento del Valle del Cauca. Bogota, Colombia: 1964. p. 15.

encouraged many rural dwellers to migrate to Cali and other population centers where life was more certain.

One paved road, a part of the Pan American Highway, transects the Cauca valley, and connects Cali with other towns north and south. A branch of this road, also paved, traverses the central range of the Andes to Bogota, and a new paved road is under construction over the western range to the main seaport of Buenaventura. A reasonably complete system of graveled and graded secondary roads connects small towns and the countryside with the population centers, though some of these present "tactical" problems during rainy periods.

There is a narrow-gauge railroad through the valley that connects Cali with its satellite towns in the valley, and with Medellin and Popoyan in neighboring departments. There is also a narrow-gauge line connecting Buenaventura with Cali, and one that connects to Bogota (with a gap at the top of the divide, so that freight must be transshipped by truck between the two lines). Cali has an airport with limited international flights, and a regular schedule of domestic flights to the other major cities in the country. Two other towns in the valley, Cartago and Tulua, have airports, but these are used largely by aerial spray services and have limited use as commercial stops.

A highly developed and competitive truck and bus service connects rural and urban centers of the valley with the rest of the country. Telephone and telegraph communications are available in all towns, though service is limited in the rural areas.

Table I summarizes the land use pattern in the flat part of the Cauca valley in 1957, as estimated by Reese and Goosen.7/

There are also data available on land use from the 1959 Census of Agriculture. They include land that is outside of the flat part of the valley, and exclude land that is in the valley but outside the political department of Valle del Cauca (Table 2). The last column in Table II shows a calculated average area per farm, for the various land uses. Rice, cotton, and soybeans are unique among the cultivated crops in having an average area per farm that is large enough to utilize machinery.

Table III shows the tenure patterns of farms in the Department of Valle del Cauca by size groups. The proportions of owner-operators and of hired managers change rather drastically between the smallest and largest groups. Although there are no very precise data available, a large proportion of the farms in the two largest size groups tend to be livestock farms and sugarcane plantations. Both of these types of farms tend to be operated by hired majordomos, and they account for about 58 percent of the land area farmed in the department, although they represent only about 4.3 percent of the farms. At the other end of the size distribution, 3.9 percent of the land area is farmed by about 52.2 percent of the farmers in the department. Similar data for the flat part of the valley are not available, but knowledgeable observers in the CVC estimate that the farms in the valley are distributed between small owner-operator and large majordomo-operated farms in much the same fashion as for the department.

7/ Ibid., p. 26.

Table I: Land Use in the Flat Part of the Cauca Valley, 1957

Type of Use	Hectares	Acres
Sugarcane	45,000	111,150
Corn	25,000	61,750
Rice	15,000	37,050
Cocoa, coffee, plantain	10,800	26,676
Beans	9,000	22,230
Tomatoes	900	2,230
Fruits	800	1,976
Tobacco	600	1,482
Cotton	200	494
Grapes	100	247
Manioc	100	247
All cultivated crops	107,500	265,532
Pasture	222,500	549,575
Swamps and lakes	12,000	29,640
Urban areas	58,000	143,260
Total land area	400,000	988,000

Table II: Land Use in the Department of Valle del Cauca, 1958 & 1959

Land Use	1958		1959		Average Area per Farm (Ha's)	
	No. Farms	Ha's	No. Farms	Ha's	1958	1959
Maiz	16,968	57,669	19,427	40,269	3.40	2.07
Manioc	7,872	6,128	10,302	8,778	0.78	0.85
Beans	6,099	22,157	6,653	14,452	3.63	2.17
Vegetables	2,953	2,420	4,224	3,401	0.82	0.81
Tobacco	611	829	956	927	1.36	0.97
Cut Grass	530	2,697	659	3,440	5.09	5.22
Rice	264	14,240	272	10,051	53.94	36.95
Potatoes	143	777	235	957	5.43	4.07
Soybeans	160	5,806	118	2,638	36.29	22.36
Cotton	122	6,293	435	18,740	51.58	43.08
Wheat	92	976	123	748	10.61	6.08
Barley	58	239	77	250	4.12	3.25
Sesame	9	36	5	26	4.00	5.20
Coffee	--	--	35,014	110,444	---	3.15
Plantain	--	--	31,666	28,189	---	0.89
Citrus	--	--	21,185	596	---	0.03
Sugar Cane	--	--	8,511	67,837	---	7.97
Coco	--	--	5,177	4,875	---	0.94
Banana	--	--	2,995	2,183	---	0.73
Total Cultivated	35,881	120,267	43,486	104,677	3.35	2.41
Total Permanent	--	--	104,548	214,824	---	2.05
Total	35,881	120,267	148,034	318,801	3.35	2.15

Source: 1959 Census of Agriculture, Universidad del Valle, Cali, Colombia: September, 1963, p. 26.

Table III: Tenure and Population Distribution by Size of Farm

Size of Hectares	Farms operated by				Hectares in Group	
	Owners		Managers			
	Number	%	Number	%	Number	%
≤ 5	25,320	56.4	1,179	19.8	45,920	3.9
> 5 ≤ 20	13,675	30.5	1,796	30.1	157,456	13.5
> 20 ≤ 50	3,664	8.2	934	15.7	144,520	12.4
> 50 ≤ 100	1,320	2.9	749	12.6	142,257	12.2
> 100 ≤ 500	789	1.8	1,094	18.4	390,166	33.4
> 500	90	0.2	203	3.4	287,630	24.6
Total	44,858	100.0	5,955	100.0	1,167,949	100.0

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Table III: Tenure and Population Distribution by Size of Farm -Continued

Size in Hectares	Farm Population Engaged Primarily in Agriculture		Farm Population Engaged Primarily in Nonagriculture		Total Farms	Ave. Ha's per Farm	Ave. Acres per farm
	Number	%	Number	%			
≤ 5	23,205	51.1	3,142	64.7	26,499	1.73	3.81
$> 5 \leq 20$	14,565	32.1	795	16.4	15,471	10.18	22.40
$> 20 \leq 50$	4,216	9.3	338	6.9	4,598	31.43	69.15
$> 50 \leq 100$	1,763	3.9	249	5.1	2,069	68.76	151.27
$> 100 \leq 500$	1,481	3.2	292	6.0	1,883	207.20	455.84
> 500	207	0.4	43	0.9	293	981.67	2159.67
Total	45,437	100.0	4,859	100.0	50,813	22.99	50.58

Source: 1959 Census of Agriculture. Universidad del Valle, Cali, Colombia. September, 1963, p. 11 & 14.

Table IV shows the amount of land in the flat part of the valley that is estimated to fall into the five basic land use productivity classes.8/

Problem Setting

This thesis is addressed to the problem of rationalizing the farm production in the flat part of the Cauca valley. The problem is much more vast and complicated as a planning problem than any one individual can hope to grasp, let alone to solve. There is no doubt that the required data of production techniques, as one of several necessary subject matter areas, are less than adequate for a meaningful planning effort. The objectives of this thesis are limited to an exploration of such production data as were available up to the summer of 1965, and to an attempt to organize these data in terms of the individual farm firms of the area. Rationalizing of the aggregate agricultural production of the Cauca valley, in terms of a planning model, must remain for other studies.

Agricultural production by farm firms does not take place apart from the broader milieu of the economy. The following paragraphs discuss some of the factors that affect the current organization of production on farms, and that would affect any adjustments an individual operator might make in his own farming system.

Firm Costs and Prices

There is no general cost and price index available for the agricultural sector of the Colombian economy, and none of both precision and of

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8/ Reese and Goosen, op. cit., p. 117.

Table IV: Extent and Percent of Land by Land Classes, Cauca Valley of Colombia

Class	Hectares	Percent of total	Description
I	141,055	33.3	good to excellent cropland
II	179,285	42.2	fair to good cropland, good pasture
III	13,845	3.4	poor to fair cropland, fair to good pasture
IV	42,095	10.0	poor to good pasture, not suitable for crops
V	46,935	11.1	poorly suited to agriculture
Totals	423,215	100.0	

Source: Reese and Goosen, op. cit., p. 117.

long-term coverage for any sector.9/ The data of costs and prices used in this thesis are those that were recorded in the process of collecting farm production data, and do not all rest on a well-developed statistical base, but they are thought to be reasonably representative of the production periods 1962-1964. It is necessary to assume that costs and prices for individual farms, and the supply and demand schedules in the aggregate, are constant at early-to-mid-1963 levels. This might be quite a heroic assumption for any applications of farm production data subsequent to 1963.

There was a devaluation of the Colombian peso late in 1964, and this changed the cost-price relationships in subsequent months. The peso dropped from its previously stable level of 10 Pesos/U.S. dollar, to levels fluctuating around 18 Pesos/U.S. dollar, over a period of only a few months. The important effects of this devaluation on the agricultural sector of the economy in the Cauca valley, and elsewhere, might be summarized as follows:

(a) The peso cost of production inputs that were imported from hard-currency areas went up in proportion to the devaluated purchasing power of the Colombian peso. This affected all agricultural machinery and parts, some agricultural chemicals, semen, feed additives, and component prices for agricultural equipment assembled in Colombia.

9/ For a first attempt at developing production indices for agriculture in the Department of Valle del Cauca, see: Jesus H. Colmenares. Analisis de la Produccion Agricola en el Departamento del Valle--Numero Indices de Produccion Agropecuaria 1955-1962. Univ. del Valle, Facultad de Ciencias Economicas, Cali, Colombia: 1964 (unpublished bachelors thesis).

(b) The peso cost of production inputs that were domestically produced was not visibly affected. This included seed, nitrogen components of fertilizers, gasoline, and replacement livestock.

(c) The prices received by producers for a list of "basic" foodstuffs did not increase. The consumer price of these items is fixed by the government, and this puts a ceiling on the price that may be received by the producer, outside of the black market.

(d) The net result over the short-run, for such basic commodities as refined sugar and corn, was that some of the input costs to the producer rose, while the price of his product did not. A classic cost-price squeeze was produced in these commodities.

(e) The short-run result for such nonbasic commodities as soybeans was that the increased cost of the imported components was soon reflected in higher product prices, and this was passed on to the consumer.

(f) The net result of the devaluation of 1964 was a consistent upward pressure on consumer prices, for all agricultural products.

If one assumes a standard set of production functions for the various products, the expectation would have been for some changes in the input mix for certain commodities, to reflect the changes in relative input costs. One would also have expected some changes in the supply of the "squeezed"

commodities, reflecting a lessened profit margin in relation to the "non-squeezed" ones. The extent to which either or both of these sets of expectations were realized is unknown.

Aggregate Supply, Demand, and Prices

An important segment of the effective milieu for individual farm operators is the overriding systems of aggregate supply, demand, and price relationships. The evidence of observation suggests that these relationships were not those of the classical model in which equilibrium is achieved by adjustments in price and/or in quantity supply, in response to a given demand.

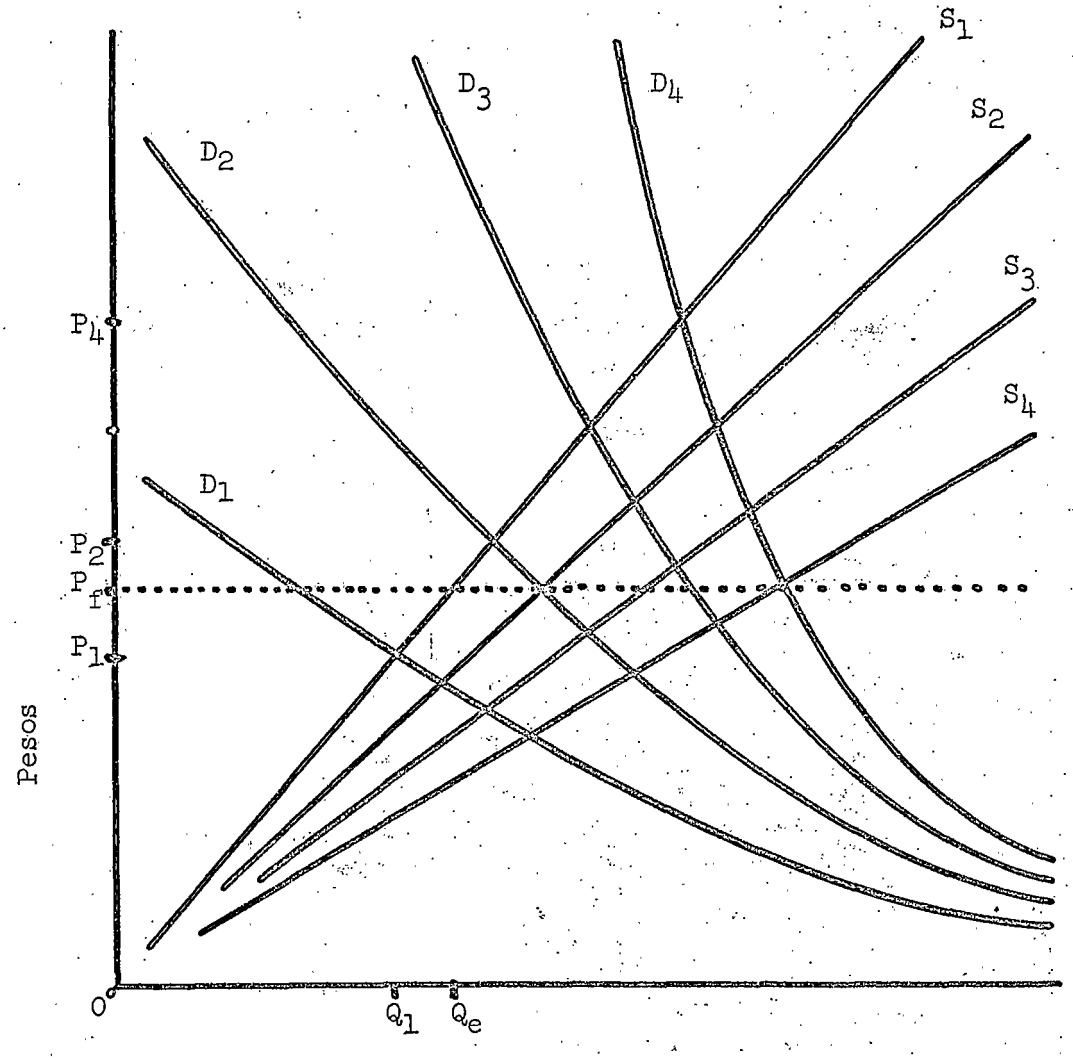
The demand for food in Colombia may be partitioned into two categories. One of these might be called the "basic" and the other the "luxury" category of food items. The basic category includes such items of the diet as potatoes, rice, manioc, refined sugar, and wheat flour. The luxury category includes such food items as meat, eggs, cheese, and milk. The policy of the Colombian government is that the basic items of food consumption be available as cheaply as possible. An extensive chain of government warehouses and retail outlets are maintained in which the basic food items are sold at retail, at published maximum prices. This system is intended to fix a price ceiling on the basic foods, and does so for all persons who desire to buy these items from government stores. This price maximum at retail sets an effective maximum price to the producer of basic food commodities, although not a minimum one. The prices of the nonbasic luxury items in the food diet are left to free-market determination.

A significant part of the population exists on an income so low as to leave the family food budget at or below basic subsistence levels. These people are faced with the unfortunate choice of buying the basic foods up to their income limits, in an attempt at least to fulfill the volume demands of their stomachs, or of buying substantially smaller quantities of the luxury foods and going perpetually unsatisfied in quantity terms. It so happens that the traditional and governmentally defined basic food items are also high in starch and low in proteins, the uncontrolled luxury food items are relatively high in proteins, and much more expensive than the basic foods. The aggregate demand function for basic foods would appear to be price-inelastic over most of its range.

Colombia is not entirely populated by families with extremely low annual cash incomes. There is a modest market for the luxury foods, even at the relatively high prices that obtain for milk and other high-protein foods under free-market conditions. The aggregate demand function for luxury foods would appear to be the opposite of that for basic foods; it should be price-elastic over most of its range. Supply would tend to equilibrate with the demand at a price high in relation to average expenditure for food of the average Colombian consumer.

Figure 1 posits a hypothetical model of the shifts in the demand function for basic foods, as incomes and tastes change with a development program. The curve D_1 represents aggregate demand in a relatively underdeveloped stage, perhaps the present period. The supply function for these foods is given as curve S_1, and the governmentally fixed price is shown by the line P_f. This effective price to the consumer is fixed at a

Figure 1: Shifts in Demand For a Basic Food in a Developing Economy, With an Administered Price Policy



level above what would be an equilibrium level (P_1) in order to encourage production of these foods. The equilibrium quantity that would be supplied at price P_f is Q_e, which is greater than the equilibrium quantity Q_1. The result of this dis-equilibrium between demand and supply at price P_f will depend on the relative bargaining strengths of producers and of the handlers in the marketing channels, since there is no reason to market the surplus product at prices less than that maximum fixed by the government.

As economic development progresses, and disposable incomes rise, the demand function might shift toward that represented by curve D_2, where demand for the basic foods is less price-elastic than in period 1. But given the same supply function and price P_f, the quantity supplied will not exceed Q_e, and there is a dis-equilibrium problem again. Assuming that the government stands fast with its previous price ceiling of P_f, the only recourse is a subsidy to producers of P_f-P_2. The other alternative for an equilibrium of supply with the new demand would be a change in the supply function from S_1 to S_2.

As the economy progresses through periods 2, 3, and 4, the hypothetical demand function for basic foods shifts toward the higher price-inelasticity of curve D_4. Assuming the same administered price maximum, there must be a producer subsidy of P_f-P_4, or a further shift in the supply function to that represented by S_4, in order for equilibrium to obtain between supply and price. But the equilibrium of supply and demand under the shifts in both, represented by the intersection of D_4 and S_4, for instance, can only come about if there are increasing efficiencies in the production and marketing of the basic foods. A government anticipating

economic development, part of whose benefit will be in income increases to the lower-income segments of the population, must be prepared either to subsidize producer prices of the supported foods, or to increase the efficiency of production and/or distribution of these products. The government of Colombia has been interested and active in the area of increasing the efficiency of production and in trimming the marketing margins of the products it places on the basic foodstuffs list.

The other part of the food production-consumption picture is that concerning luxury food products. Figure 2 is a hypothetical model of this subsector. Curve D_1 is the demand function for the luxury high-protein foods at period 1 of the development process. This function is price-elastic over much of its range, under the assumption that only a small segment of the population has income in excess of its survival needs, that might be spent on the relatively high-priced luxury foods.

As the economy progresses and incomes rise in the aggregate, the demand function for luxury foods is presumed to shift toward the situation represented in curve D_4, where the aggregate demand is highly price-elastic. In this model, the quantities demanded and the prices received both increase somewhat in proportion. If there are production and/or market channel efficiencies realized at higher levels of supply, the supply function might shift toward curve S_3. In this case, the quantities demanded would exceed those at equilibrium points on the original supply curve, and prices would be somewhat lower than they otherwise would be.

Figure 3 combines the supply curves S_1 and S_4, with the equivalent demand curves from both figures 1 and 2, giving a hypothetical model for

Figure 2: Shifts in Demand for a Luxury Food in a Developing Economy, With Free Market Price Policy

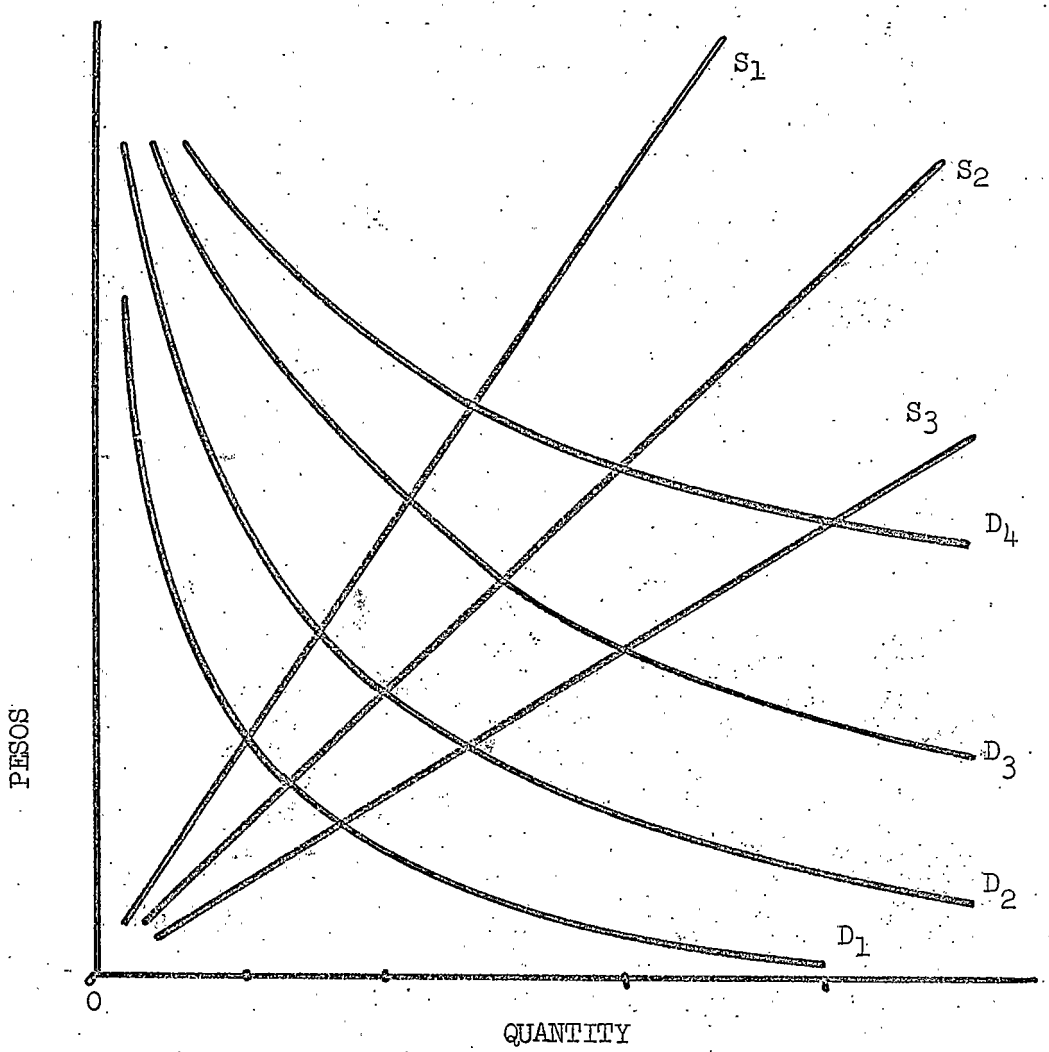
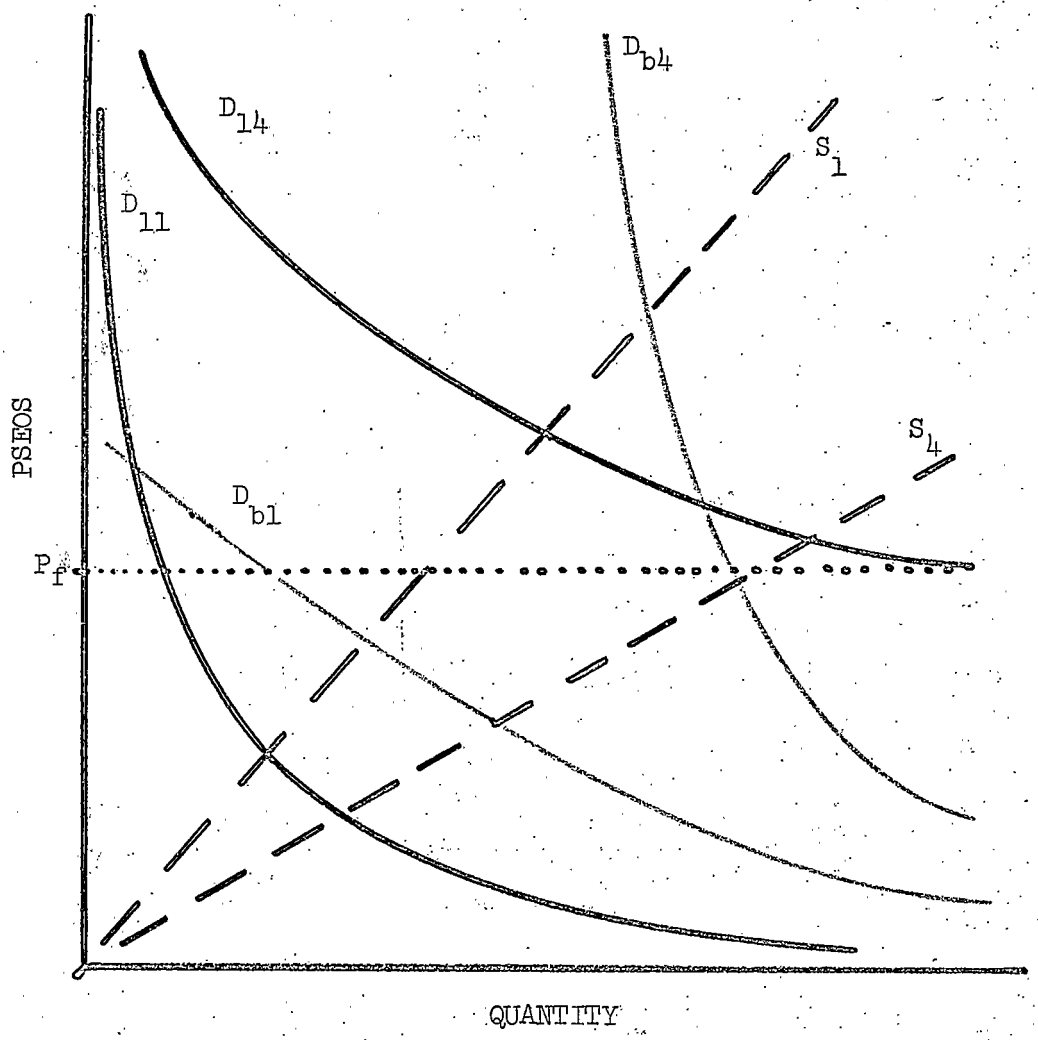


Figure 3: Shifts in Demand for Luxury and Basic Foods in a Developing Economy



both of these food groups. In this supply-demand model, aggregate consumption patterns shift with rising income from the basic toward the luxury foods. This model assumes that no less of the basic foods will be demanded; indeed, it assumes that more will be demanded with rising incomes. This might be explained partly by an increasing population base, and partly by a slightly increasing per capita consumption of the traditional diet. It is the excess spending capacity that is shifted toward an increase in the luxury foods consumption, e.g., the demand functions for the basic and the luxury foods are inversely related to the aggregate income of the country. As this income rises, the demand for basic foods shifts from price-elastic toward price-inelastic, while the aggregate demand for luxury foods shows the opposite tendency. If this model reflects actual conditions under the present relatively underdeveloped, and future relatively developed situations, then it would appear that the policy of the government is one of encouraging an increasing supply of the basic foods, paid for by producer price subsidies and/or allowed by increasing efficiencies of production and marketing. It would also appear that the policy includes letting prices of the luxury foods adjust freely to demand-supply conditions in the developing economy.

Firm Production Models

One could theorize about the production by individual producers in the Cauca valley that would fit the preceding models of supply and demand for the two classes of agricultural products. Something like this was

attempted for the demand for refined sugar and the supply of sugarcane,10/ but this was meaningful only because all of the refined sugar consumed in Colombia is produced in the Cauca valley. No other food item of national consumption importance is produced only in the Cauca valley, and some foods of importance (such as potatoes, bananas, and wheat) that are consumed in the valley are not produced there.

There are some peculiarities of individual agricultural producers that require discussion in order to set the background for this thesis. The discussion is organized around four classes of producers:

(1) latifundia, beef cattle

(2) latifundia, sugarcane

(3) minifundia

(4) "commercial" producers

The word "latifundia" is translated as "large land-holding." This is a relative term that depends on the position of the observer, interacting with the socially accepted meaning of the term. A farmer operating 5 hectares might consider anyone who operated 50 hectares to be a latifundista, while society in general might agree that anyone operating 500 hectares is a latifundista, and the farmer operating 50 hectares would heartily agree. The term "latifundia" might be somewhat equivalent to the term "wealthy." One might get agreement between the individual definition and that of the

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10/ Maxwell I. Klayman and Don Bostwick. Analisis Economico de la Produccion de Cana de Azucar en el Valle del Cauca. Centro de Formacion Profesional e Investigacion Agricola, Monografia No. 11, Cali, Colombia: 1965.

public, only at an exceedingly high level of the index by which the condition is measured.

If we accept a definition of latifundia that would include only agricultural operations of 500 hectares (1235 acres) and above, we see that there are some 293 members of this set in the department of Valle del Cauca (cf. Table III). The average would be about 982 hectares in each farm, or about 2,426 acres.

The origin of such large land-holdings is in the history of the settlement and patenting of land in Colombia. When the Spanish conquistadores first came into the Cauca valley some 430 years ago, the flat part of the valley was largely forest and swamp, while the hillsides were brush and grass. The valley soils were obviously preferable to those of the mountainside. They were preempted by the new conquerors, and legalized by grants from the Crown of Spain. The initial improvements made by these new settlers were limited to the clearing of trees from the nonswamp lands, and the erection of fences that separated one hacienda from the next. The cultural concern for ownership of land, combined with the law of inheritance by primogeniture, has served to keep a significant portion of the land in the Cauca valley concentrated in the hands of a relatively few owners.

Now, a little more than halfway through the 20th century, an economist concerned with land use must include a class defined as "latifundia," with a subclass called "beef cattle." Large tracts of the land in the flat part of the Cauca valley are left in unimproved pasture that produces only beef. The land, the buildings, and the cow herd are all inherited by the son from the father; thus, there was no original cash investment by the