



COMMONWEALTH OF PUERTO RICO

ECONOMIC DEVELOPMENT ADMINISTRATION

G. P. O. BOX 2350

SAN JUAN, PUERTO RICO - 00936

OVERALL ECONOMIC DEVELOPMENT PLAN

FOR THE COMMONWEALTH OF PUERTO RICO

First Revision

February 1967

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I. ORGANIZATION FOR ECONOMIC DEVELOPMENT IN PUERTO RICO

"I repeat it again, then, that is not gold, but good soldiers, that insure success in war."

Niccolo Machiavelli
The Discourses, Chapter X

In a sense it can be said that the entire governmental structure of the Commonwealth of Puerto Rico is dedicated to the creation of economic, social and physical development.^{1/} There are certain agencies which are concerned primarily with planning and allocation of resources while other agencies were created primarily for the purpose of generating economic and social development. The planning and development agencies of the Commonwealth government date back with but small change to 1942, when the political leadership realized that it must "devote a great deal of effort to the creation of production. 'Justice can distribute what there is, but cannot distribute what has not been produced.'"^{2/} It was recognized that "Puerto Rico must have all possible means for increasing production" with these objectives: "to accelerate its speed in order to keep pace with the increase in population;" "to diminish the unemployment which already existed;" and "to continue raising our standard of living above a subsistence level."^{3/}

In order to insure coordinated economic, social and physical policy-formation, planning and programming, the Puerto Rico Planning Board and the Bureau of the Budget were established in the Office of the

^{1/} Alvin Mayne, Designing and Administering a Regional Economic Development Plan, pages 35-36.

^{2/} Luis Muñoz Marín, "Development Through Democracy", The Annals of the American Academy of Political and Social Science, Vol. 258, January 1953, page 7.

^{3/} Ibid.

Governor. The implementation of the decision to utilize "all possible means for increasing production" was to be carried out through several new agencies utilizing the concept of the public corporation, namely the Puerto Rico Industrial Development Company, the Puerto Rico Agricultural Development Co., the Land Authority, and the Government Development Bank for Puerto Rico. Recognizing that it was necessary to develop the infra-structure of the economy to support the work of the primary development organizations, the following public corporations were also organized: the Water Resources Authority to provide electricity and water irrigation systems; the Aqueduct and Sewer Authority to develop and distribute domestic potable water supplies and a sewage system; the Communications Authority to cover the areas not serviced by the private telephone company; the Transportation Authority to develop and supervise the operation of the ports of the Island and provide public transportation within the Island.

In 1950, the Puerto Rican Economic Development Administration was created to coordinate "the functions of the economic development of the Government of Puerto Rico" which were dispersed throughout a number of agencies. The administration of the functions of industrial promotion and economic research were transferred from the Puerto Rico Industrial Development Corporation. Other economic activities such as tourism development and the functions of the Transportation Authority were included in the responsibilities of the new agency^{1/}.

^{1/} Reorganization Plan No. 10 of 1950, Economic Development Administration: Message of the Governor. See Appendix A.

The Economic Development Administration of Puerto Rico with its associated public corporation, the Puerto Rico Industrial Development Company and its parallel public corporation, the Government Development Bank, have been in the forefront in the field of devising methods and techniques for accelerating the economic development of Puerto Rico, particularly in the fields of industrial promotion and tourism. The fame of the work of these agencies is world-wide. In the words of one observer, "... it [the Commonwealth of Puerto Rico] has played a constructive part in the nation's [the United States] efforts to help other countries expedite their own developmental activities. The International Cooperation Administration [now the Agency for International Development] has brought...hundreds from Latin America, Africa, and the Near and Far East to Puerto Rico to observe its Economic Development Administration and to learn about methods used by EDA which might be adapted successfully at home."^{1/}

A. Puerto Rican Organization Responsible for Coordinating and Implementing EDA Programs and Projects under U. S. Public Law 89-136

Because of the long experience in the field of economic development in an organized manner, it was unnecessary to establish a new organization to supervise the preparation of Overall Economic Development Program and "to provide the leadership required for participation in EDA programs."^{2/} Accordingly, the Economic Development Administration of Puerto Rico was given the responsibility for preparing the Overall

^{1/} William H. Stead, Fomento - The Economic Development of Puerto Rico, National Planning Association, 1958, p.v.

^{2/} U. S. Department of Commerce, Guide for Overall Economic Development Programs, page 3.

Economic Development Program for the Commonwealth of Puerto Rico and for providing the leadership and coordination for the Puerto Rican community and to direct the carrying out of the program. During the past year with the assistance from the U.S. Department of Commerce Economic Development Administration an office within the Commonwealth's Economic Administration was organized for the continuing task of coordinating the Commonwealth's effort to participate in the U.S. program.

1. Organizational Structure

The Economic Development Administration of Puerto Rico was designated in November, 1965 as the government agency to represent the Commonwealth of Puerto Rico in matters related to the Public Works and Economic Development Act of 1965^{1/}.

This is the governmental organization officially charged with the development of the industrial and tourism programs of the Commonwealth of Puerto Rico. The principal officers are Mr. Rafael Durand, Administrator, Mr. Manuel Sánchez Rivera, President of the Puerto Rico Industrial Development Company^{2/}, and Mr. Rubén Sánchez, Executive Director, Ports Authority.

The Ports Authority^{3/}, responsible for the development of ports in all parts of the Island, except in the municipality of Ponce which has its own Board for operating the piers, also comes under the policy direction of the Administrator of the Puerto Rico Economic Development Administration, as indicated in Chart 1.

The Economic Development Administration, together with its subsidiary, the Puerto Rico Industrial Development Company, employs a total of 845 persons of which 411 are technicians such as economists,

^{1/} Delegation letter appears in Appendix B.

^{2/} The Administrator of the Economic Development Administration acts as the Board of Directors of the Puerto Rico Industrial Development Company (PRIDCO).

^{3/} Formerly known as the Transportation Authority until 1955, when Law 17 enacted on April 19, 1955, created the Ports Authority.

lawyers, engineers, accountants, financial analysts, industrial representatives, personnel specialists, researchers, planners, public relation specialists, chemists, geologists, and specialists in other related fields. The organization of the Economic Development Administration and the Puerto Rico Industrial Development Company is presented in Charts 1 and 2, respectively. The organizational structure shown in these charts is the result of continual adaptation to changing conditions and problems which have been encountered during the last 21 years. Because of the importance of the Government Development Bank in the economic and social development process of Puerto Rico, Chart 3 presents the organization chart of that institution.

2. Summary of Legal Authority

The Economic Development Administration as well as the Puerto Rico Industrial Development Company were organized by acts of the Legislature of Puerto Rico, the former in 1950 and the latter in 1942. The Puerto Rico Industrial Development Company, which is organized as a public corporation, is empowered to purchase, exchange, sell, lease and construct buildings and/or land; to grant secured or unsecured loans; to negotiate, make and enter into agreements, contracts, covenants and undertakings of any kind whatsoever and to undertake surveys, studies and/or planning activities of any nature with the aim of stimulating in any way the economic development of Puerto Rico. As such, this Company is fully equipped to receive, manage and disburse funds which may be obtained from any source.^{1/}

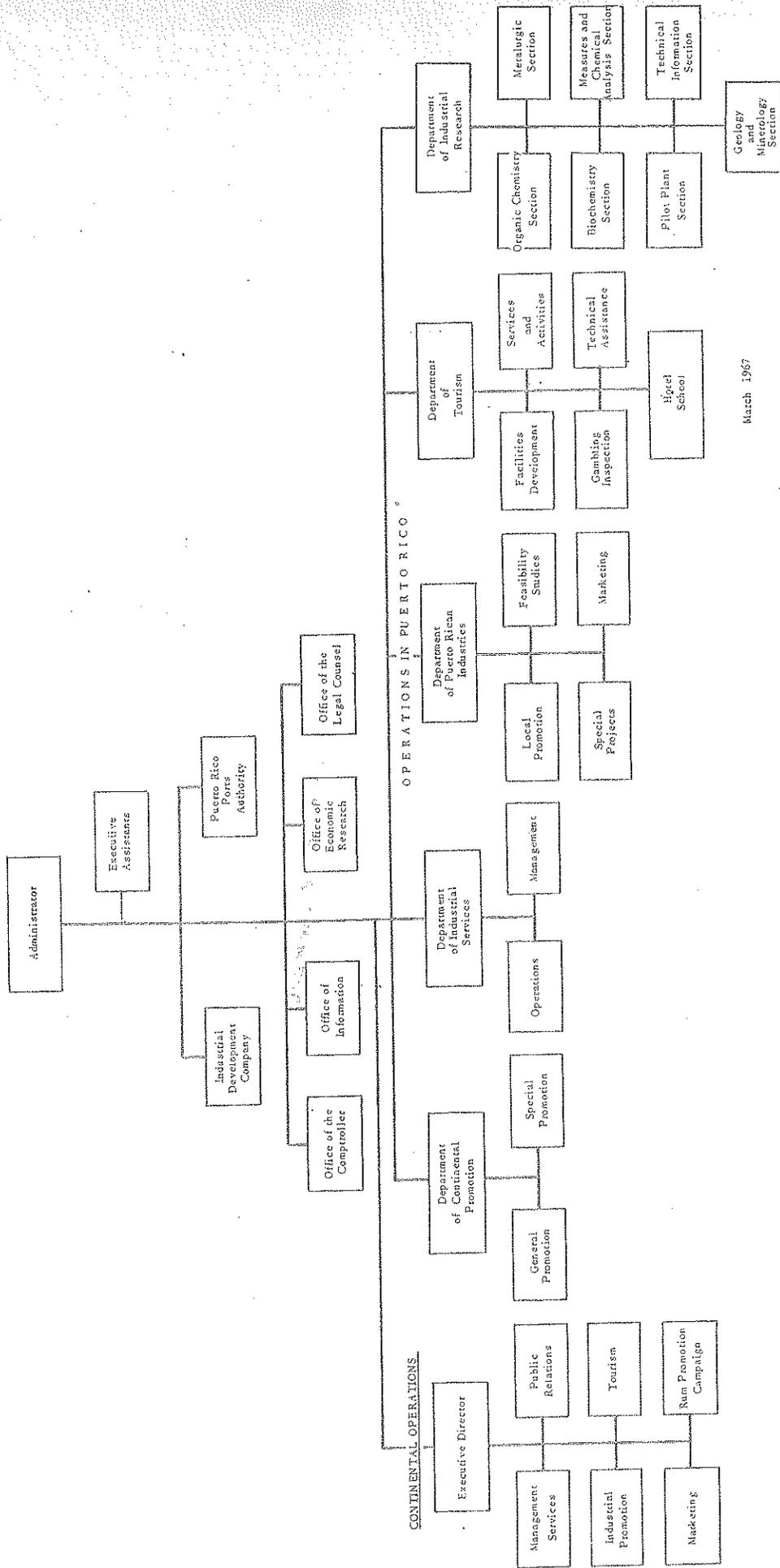
^{1/} The law under which the Puerto Rico Industrial Development Company operates is given in Appendix A.

Chart 1

Commonwealth of Puerto Rico

ECONOMIC DEVELOPMENT ADMINISTRATION

Organization Chart



March 1967

Chart 2

COMMONWEALTH OF PUERTO RICO
PUERTO RICO INDUSTRIAL DEVELOPMENT COMPANY
SAN JUAN, PUERTO RICO

GENERAL ORGANIZATION CHART

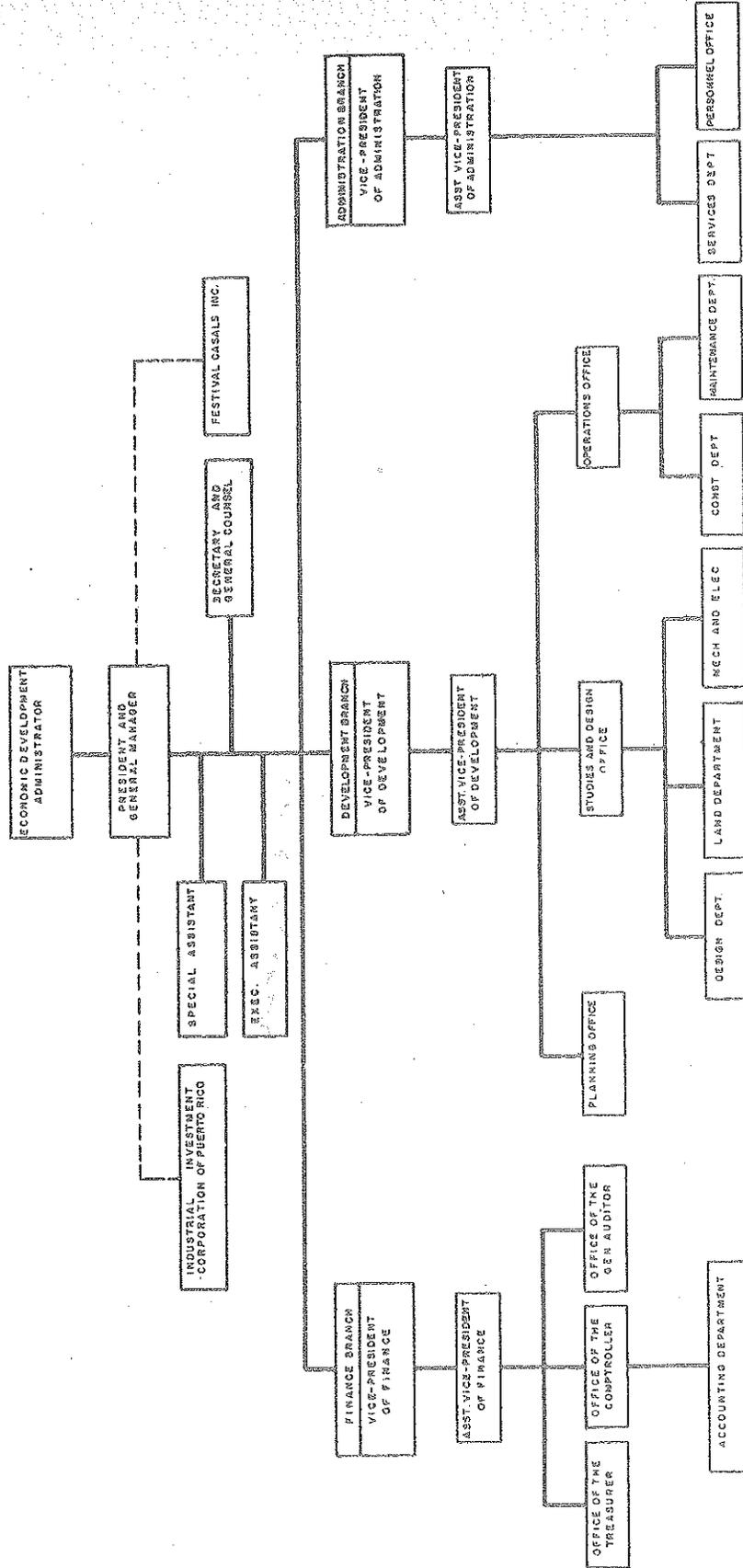
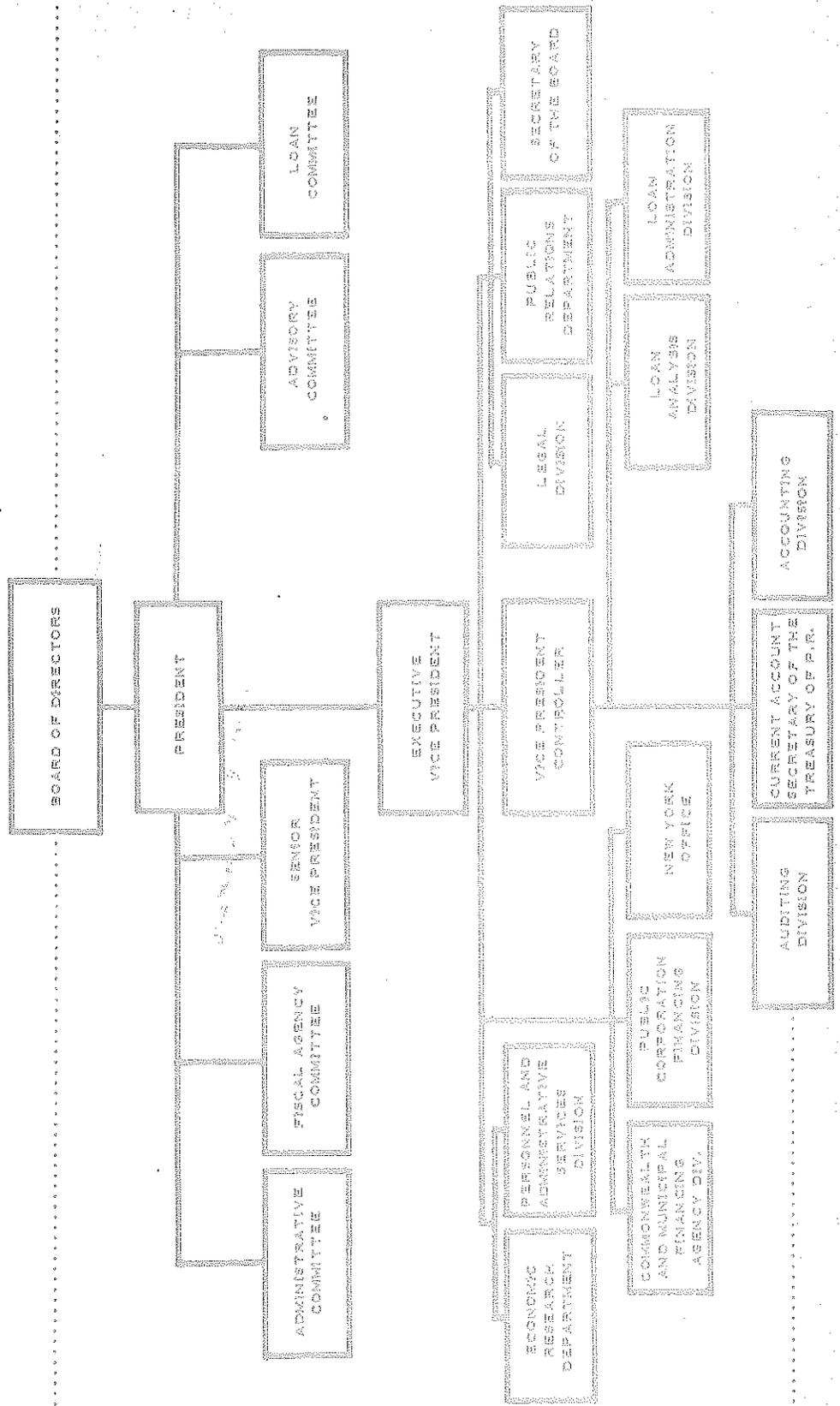


Chart 3

COMMONWEALTH OF PUERTO RICO
GOVERNMENT DEVELOPMENT BANK FOR PUERTO RICO

ORGANIZATION CHART



3. Summary of Effectiveness of the Programs of the Puerto Rican Development Agency

The Economic Development Administration has been active since 1950 and the Puerto Rico Industrial Development Company since 1942. Jointly, they have been responsible for the establishment of approximately 1,400 industrial concerns which employ over 89,000 workers. In addition they have stimulated the construction of around 7,294 hotel rooms. These hotels currently employ over 7,300 workers. The industrial establishments promoted by these two agencies are responsible for the generation of \$400.4 million in net income which represent 15.9 per cent of the total net income of the economy and 65.5 per cent of the net income generated by manufacturing.

The total capital investment in the plants promoted reached \$1,150 million by June 30, 1966. Approximately \$1,066 million were contributed by private investors. The remaining \$84 million were derived from investments made by the Puerto Rico Industrial Development Company and the Government Development Bank. The Puerto Rico Industrial Development Company invested a total of \$72 million of which some \$59 million represents the value of industrial buildings which are leased to the promoted factories and \$13 million in the form of loans, primarily on machinery and equipment. The Government Development Bank does not restrict its lending to the promoted plants but will loan to a variety of industries, commercial establishments, etc., which, largely due to the length of repayment period find difficulties in utilizing the facilities of the commercial banking system. Of the \$29.0 million of industrial loans in the Bank's portfolio approximately \$11.8 million represented loans to the promoted plants.

Since the designation of Puerto Rico as a qualified area under Public Law 89-136 a total of \$.7 million in federal assistance has been approved.

This federal assistance has been \$.345 million in the way of grants to PRIDCO and \$47,000 for administrative assistance and one business loan of \$283,000.

The Puerto Rico Industrial Development Company owns three tourist hotels. Two are leased to and operated by well-known hotel operators, and the third is operated primarily as a training center for hotel service employees.

4. Financial Capabilities

As has been stated, of the over \$1,150 million invested in industrial projects promoted by the development agency \$1,066 million have been generated by the private sector which evidences the ability to use limited amounts of government resources to stimulate private initiative. On the other hand, the Puerto Rico Industrial Development Company has been financing a segment of its lending and industrial building programs through the sale of bonds in the open market. Its solid reputation and ability to obtain credit for development activities was demonstrated last year when it obtained a \$46 million loan in the form of long-term general purpose revenue bonds secured under a trust indenture entered into between PRIDCO and the First National City Bank of New York. The company is, nevertheless, hard pressed to provide the capital resources to handle the present and anticipated needs of the industrial program. To this effect a specific proposal for public works grants and loan assistance for the financing of the development facilities in the company's program has been made to the U.S. Department of Commerce Economic Development Administration.

In Tables 1 - 3 are given a summary of the financial resources of the development organizations. The Puerto Rico Economic Development Administration is not a public corporation, but receives appropriations annually from the Puerto Rican Legislature.

It is to be noted in Table 1 that the budget of the Economic Development Administration which is the planning, programming and promotional agency for industrial and tourism development in Puerto Rico, has increased from \$2.3 million to \$6.3 million in the 11 year period from fiscal 1955 to fiscal 1966. The number of employees increased from about 300 to 571 in the same period. During this fiscal year 1965-66 the budget was \$6,298,300.

It is also important to note that the Puerto Rican Economic Development Administration maintains seven offices in the United States to attract expanding industries to establish plants in Puerto Rico. Currently the budget for industrial development is about \$3,005,100 and \$914,300 for tourism.

With respect to the Puerto Rico Industrial Development Company (Table 2), total assets (at cost) have increased from \$27.7 million to \$151 million since 1951. Most of these assets are in the form of investment in land, buildings and equipment being utilized by manufacturing enterprises which have been promoted under the economic development program. The Company, in order to assist the industrial development of the Island, can take an equity position in an industrial corporation which may locate in Puerto Rico. For example, in 1966, the company owned \$6.2 million of common and preferred stock of various enterprises. In addition, it owned \$10.8 million of corporate bonds and mortgage loans as of June 30, 1966.

The resources of the Government Development Bank of Puerto Rico (Table 3) have grown since 1950 from total assets of \$54 million to

\$192 million in 1966. Loans to private enterprise have increased from \$18 million to \$65 million. In addition, the Government Development Bank for Puerto Rico holds a large amount of U.S. government securities which serve as a reserve.

B. Responsibility for Follow-Through and Program Progress Reporting

A planning grant approved by the U.S. Department of Commerce Economic Development Administration to provide for administrative assistance to the Puerto Rico Economic Development Administration allowed for the creation in June 1966 of an in house capacity consisting of a Program Coordinator, one Planner, one Economist and one Secretary. This full time staff has carried on the responsibility of revising this second publication of the O.E.D.P. and many coordination and program implementation functions.

The Office in close collaboration with other personnel from the Economic Development Administration and the Puerto Rico Industrial Development Company has been instrumental in the selection of public works projects and in the preparation of several applications to the Federal Government. Periodic reporting on O.E.D.P. activities as required by the grant funds was also effected.

Greater detail of the program implementation and evaluation functions is given under Chapter VI, Program Evaluation, page 179.

Table 1
EXPENDITURES, BUDGET AND EMPLOYMENT
OF THE ECONOMIC DEVELOPMENT ADMINISTRATION^{1/}

Fiscal Years	Total ^{3/}	Administration	Industrial Development	Tourism
<u>1954-55</u>				
Budget (in thousands of dollars)	\$2,266	\$1,022	\$ 905	\$308
Number of Employees ^{2/}				
San Juan Office - June 30, 1955	239	137	77	25
Continental Operations Branch - 6/30/66	66	19	40	7
<u>1959-60</u>				
Budget (in thousands of dollars)	\$3,983	\$1,619	\$1,726	\$560
Number of Employees ^{2/}				
San Juan Office - June 30, 1960	265	137	96	32
Continental Operations Branch - 6/30/60	99	28	57	14
<u>1964-65</u>				
Budget (in thousands of dollars)	\$6,190	\$2,290	\$2,706	\$836
Number of Employees ^{2/}				
San Juan Office - June 30, 1965	366	146	173	47
Continental Operations Branch - 6/30/65	86	30	42	14
<u>1965-66</u>				
Budget (in thousands of dollars)	\$6,298	\$2,279	\$3,005	\$914
Number of Employees ^{2/}				
San Juan Office - June 30, 1966	451	180	207	64
Continental Operations Branch - 6/30/66	120	32	70	18

Source: Commonwealth of Puerto Rico, Economic Development Administration.

^{1/} Rum Promotion Program figures are not included.

^{2/} Does not include contract employees.

^{3/} Includes \$300,000 for research on utilization of bagasse, 1964-65 miscellaneous special appropriations, and \$100,000 in 1965-66.

Table 2
PUERTO RICO INDUSTRIAL DEVELOPMENT COMPANY
FINANCIAL REVIEW
 (\$000)

<u>Year Ended June 30</u>	<u>1966</u>	<u>1965</u>	<u>1960</u>	<u>1955</u>	<u>1951</u>
Results for Year					
Operating Income	\$ 9,602	\$ 8,449	\$ 6,315	\$ 2,713	\$ 1,187
Operating Expenses	5,130	4,613	3,814	2,080	668
Interest Charges (Credits)	1,786	1,535	594	59	(134)
Net Income	2,686	2,301	1,907	692	385
Year End Position					
Current Assets	\$ 6,979	\$ 5,659	\$ 4,158	\$ 6,505	\$ 2,331
Current Liabilities	4,073	4,454	3,239	817	563
Working Capital	2,906	1,205	919	5,688	1,768
Total Assets	\$150,731	\$139,899	\$ 87,972	\$46,714	\$ 27,704
Net Investment in Land, Buildings and Equipment	\$115,236	\$107,939	\$ 74,160	\$37,912	\$ 11,540
Retained Earnings (Losses)	\$ 19,131	\$ 16,445	\$ 5,589	\$ 1,650	(\$ 902)

Source: Puerto Rico Industrial Development Company, Annual Reports 1960, 1965 and 1966.

Table 3
GOVERNMENT DEVELOPMENT BANK FOR PUERTO RICO
RESOURCES, 1966, 1965, 1960, 1955, 1950 (FISCAL YEARS)
(Millions of Dollars)

<u>Resources</u>	<u>1966</u>	<u>1965</u>	<u>1960</u>	<u>1955</u>	<u>1950</u>
Cash on Hand and Due from Banks	\$ 28.0	\$ 26.6	\$ 4.0	\$ 2.5	\$ 4.5
Investments in Government Securities	96.6	88.4	44.3	38.0	30.4
U.S. Government and Agencies	71.2	76.5	31.3	29.1	24.6
Commonwealth of Puerto Rico, its municipalities and authorities	25.4	11.9	13.0	8.9	5.8
Obligations of Private Enterprises ^{1/}	64.7	50.0	30.9	11.0	18.2
Other Resources	<u>3.0</u>	<u>2.7</u>	<u>1.8</u>	<u>4.3</u>	<u>.6</u>
Total Assets ^{2/}	<u>\$192.4</u>	<u>\$167.7</u>	<u>\$81.0</u>	<u>\$55.9</u>	<u>\$53.8</u>

Source: Annual Reports, Government Development Bank for Puerto Rico, 1966, 1965, 1960, 1955, 1950.

^{1/} Industrial loans totalled \$29.2 million in 1966.

^{2/} The sums do not add up to the totals due to rounding.

C. Advisory Committee

The advisory committee on the Overall Economic Development Program and the implementation of EDA projects under U.S. Public Law 89-136 appointed by the Administrator of the Puerto Rico Economic Development Administration continued with the same membership throughout the year.

The members are as follows:

- President:** Mr. Roberto Montalvo, Vice President and General Manager, Tropical Manufacturing Corporation, Urb. Industrial Tres Monjitas, Hato Rey, Puerto Rico (Industry, San Juan Metropolitan Area).
- Vice President:** Mr. Sergio Camero, Holsum Bakers of P.R., Inc., Urb. Minillas, Bloque #5, Bayamón, Puerto Rico (Industry, San Juan Metropolitan Area).
- Secretary:** Mr. Leandro Cabranes, Executive Director, Association of Mayors, 1510 Ponce de León Avenue, Edificio Alambón, Stop 22 1/2, Santurce, Puerto Rico (Municipal Governments).
- Members:** Mr. Roberto Bouret, Executive Director, P.R. Hotel Association, 1120 Ashford Avenue, Santurce, Puerto Rico (Tourism Industry).
- Mr. Hiram Cabassa, General Manager, Atlantic Industries, Mayaguez, Puerto Rico (Industry, Mayaguez Region).
- Mr. Luis Freire, Luis Freire, Inc., Stop 34, Muñoz Rivera Avenue, Hato Rey, Puerto Rico (Industry, San Juan Metropolitan Area).
- Mr. Pedro Purcell, President, Chamber of Commerce, 100 Tetuán Street, San Juan, Puerto Rico (Commerce).
- Mr. Rafael Rivera Biascochea, Agencias Rivera-Biascochea (Travel Bureau), Arecibo, Puerto Rico (Commerce, San Juan Region).
- Mr. Frank Rodríguez, Junior Chamber International, Aguadilla, Puerto Rico (Civic leader, Mayaguez Region).
- Honorable Justo Sánchez Pérez, Representante, Cámara de Representantes, San Juan, Puerto Rico (Legislator, Ponce Region).

Mr. Enrique Sanz, Executive Vice-President, Banco Crédito y Ahorro Ponceño, Recinto Sur, San Juan, Puerto Rico (Banking, Ponce and San Juan Metropolitan Areas).

Honorable Osvaldo Torres Gómez, Representante, Cámara de Representantes, San Juan, Puerto Rico (Legislator, Mountainous Areas).

Mr. Francisco Verdiales, Vice President, Consolidated Cigar Corporation, Cayey, Puerto Rico (Industry, Mountainous Areas).

Meetings were held several times for the initial guidance and advise during the preparation of the Overall Economic Development Plan. The advise of members was sought for this revised O.E.D.P. with no major changes suggested.

II. THE REDEVELOPMENT AREA AND ITS ECONOMY

"The environment of one generation can produce a lasting result, because it can affect the environment of future generations. Environments, in short, as well as people, have children."

A. C. Pigou
Economics of Welfare

A. GENERAL DESCRIPTION OF THE AREA AND ITS NATURAL RESOURCES

1. Physical Characteristics of Puerto Rico

Puerto Rico, located 18° north latitude is within the tropics and forms a part of the chain of islands in the Greater Antilles which divides the Atlantic Ocean from the Caribbean Sea. As can be seen in Map 1, Puerto Rico is 1,600 miles from New York, 1,000 miles from Miami, the closest seaport, and only 540 miles from Venezuela.

Probably the most important natural characteristic of Puerto Rico from the standpoint of past and future economic development is the climate which permits the development of an ever-growing tourist industry. Being within the belt of the trade winds, which blow steadily from the northeast, Puerto Rico has a mild climate throughout the year with minimal seasonal variation. The average mean temperature for the north coastal area varies from 74° to 81° and for a typical mountain area from 70° to 76°F.

The land area of Puerto Rico, if the islands of Vieques, Culebra on the east coast, and Mona on the west coast are included, is equal to about 3,400 square miles,^{1/} roughly a rectangle, 35 miles wide north to south and 100 miles long (east to west). The island is divided from

^{1/} A measure of land area frequently used in Latin America is the cuerda, the equivalent of 3,930 square meters. The cuerda is slightly less than an acre in area. In terms of cuerdas, the area of Puerto Rico is equal to 2,255,000 cuerdas.

Map 1

LOCATION OF PUERTO RICO



LONDON
4400 MILES VIA BERMUDA - 8 1/2 HOURS

MADRID
4000 MILES VIA BERMUDA - 8 HOURS

RIO DE JANEIRO
3200 MILES VIA CARACAS 8 HOURS

CHICAGO
2200 MILES - 4 1/2 HOURS

NEW YORK
1600 MILES - 3 1/2 HOURS

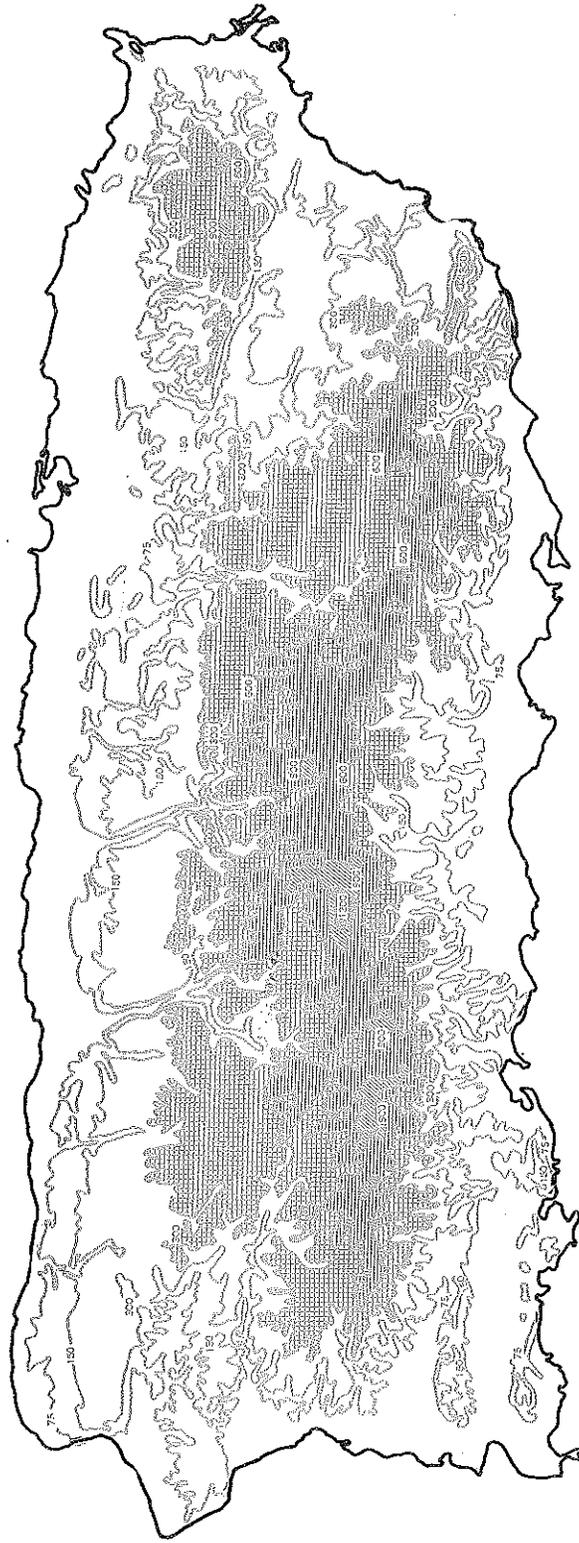
MIAMI
1080 MILES - 2 1/2 HOURS

MEXICO CITY
2250 MILES VIA MIAMI - 4 1/2 HOURS

CARACAS
550 MILES - 1 HOUR

Map 2

TOPOGRAPHY OF PUERTO RICO



KEY

- 0 - 300 METERS
- ▨ 300 - 600 METERS
- ▤ 600 - 900 METERS
- ▥ 900 - 1,200 METERS
- ▧ 1,200 METERS AND OVER

through the use of hand-cultivation techniques, while the remainder of the land, not devoted to non-agricultural activities, must remain under permanent cover crops, such as forest and hilly pastures.^{1/}

Slope is not the only feature which is important from the standpoint of the potential use of the land for agriculture. The quality of the soils is of great importance in judging the economic use of an area for agriculture. There tends to be a strong correlation between the quality of soils and the topography of an area as well as the climate and vegetation.^{2/} For example, a rugged terrain subjected to torrential rains easily loses its topsoil. In addition, long intensive cultivation without the benefits of the practices of conservation tends to deplete the soils of their natural nutrients and permits increased erosion.^{3/} Tropical temperatures tend to increase salinity of soils due to rapid evaporation of water.

It is estimated that no more than 609,000 cuerdas or 28 per cent of the area of the island can be classified as soils in groups one to five. The remaining 72 per cent of the area is clearly of poor grade soils and carry the classification six to ten.^{4/}

Studies carried out by the Federal Soil Conservation Service revealed that no more than 850,000 cuerdas or 40 per cent of the total area contains soils which are suitable for cultivation, much of which would

^{1/} Scott Keyes, An Agricultural Development Model for Puerto Rico, P. R. Planning Board, San Juan, P.R., August, 1956.

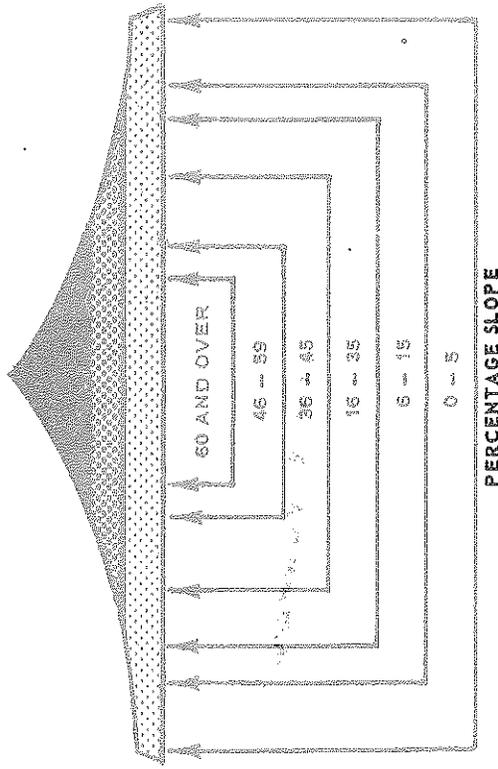
^{2/} As the result of the central range of mountains against which the moisture-laden northeasterly tradewinds blow, after crossing several thousand miles of ocean, rainfall in the island varies a great deal. Average annual rainfall is 69 inches, with a high of 210 inches in the Luquillo Rain Forest and a low of 25 inches in the southwest corner of the Island.

^{3/} Picó, Op. Cit., p. 103.

^{4/} Ibid, p. 103, the most productive soils classified as type 1 cover about 1% of Puerto Rico's land area.

Chart 4

PUERTO RICO SCHEMATIC ARRANGEMENT OF LAND CAPABILITY GROUPS



KEY

- PERMANENT PROTECTIVE COVER
- INTERMEDIATE ZONE
- MECHANIZED CLEAN CULTIVATION

Table 5

Land Utilization, Puerto Rico and Adjacent Islands
1950 and 1964

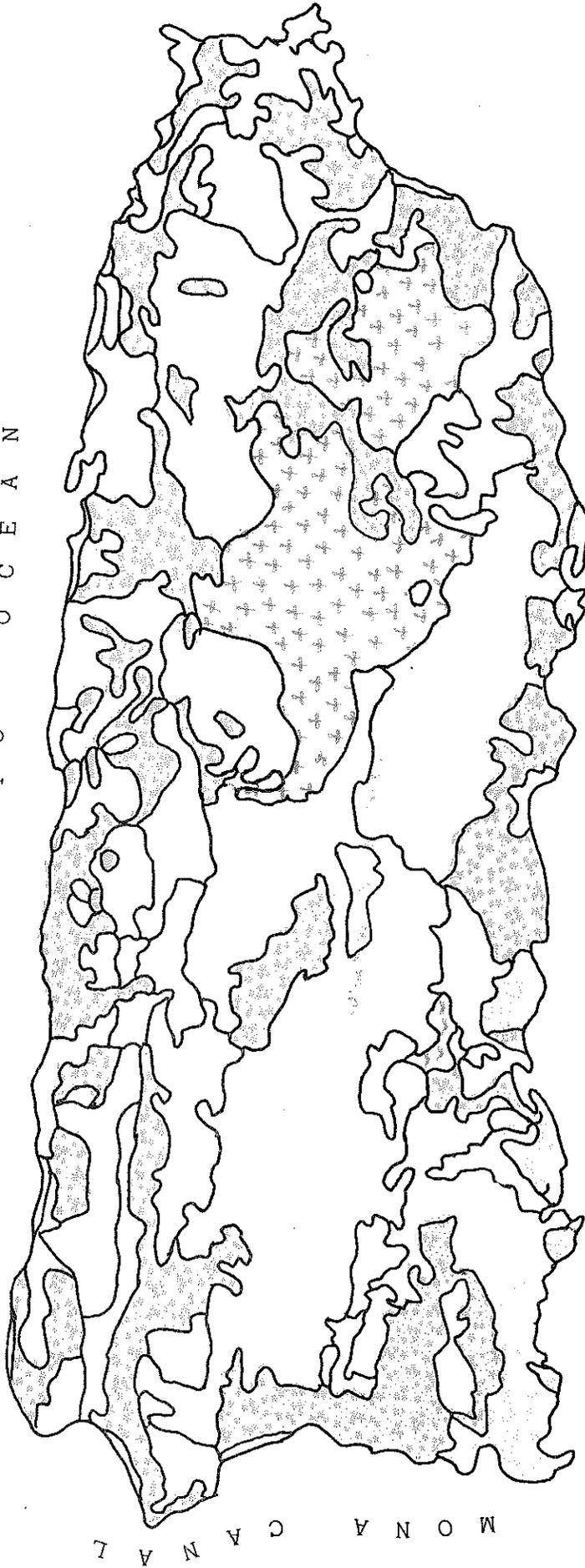
	<u>Thousands of Cuerdas</u>		<u>Per Cent Distribution</u>	
	<u>1950</u>	<u>1964</u>	<u>1950</u>	<u>1964</u>
Total Area	2,255	2,255	100.0	100.0
Non-Agricultural Land	141	405	6.3	18.0
Total Agricultural Land	2,114 ^{1/}	1,850	93.7	82.0
Cropland	811	690	36.0	30.6
Sugar Cane	380	331	16.4	14.7
Coffee	196	198	8.7	8.8
Tobacco	33	28	1.4	1.2
Vegetables	176	110	7.8	4.9
Fruits	24	20	1.1	0.9
Other Products	2	3	0.1	0.1
Pasture and range	843	800	37.4	35.4
Forest and woodland	387	300	17.1	13.3
Non-productive land (Buildings, roads, etc.)	73	60	3.2	2.7

^{1/} Does not include Vieques (34,000 cuerdas), Culebra (7,000 cuerdas), and Mona (14,000 cuerdas)

Source: Inventory of Land Use, Department of Agriculture and Commerce, 1950 Facts and Figures on Puerto Rico's Agriculture, 1965, Bureau of Agricultural Statistics, Puerto Rico Department of Agriculture.

AGRICULTURAL LAND USE IN PUERTO RICO-1958

A T L A N T I C O C E A N



M O N A C A N A L

C A R I B B E A N S E A

KEY

- | | | | | | | | | | |
|--|------------|--|-----------|--|-------------|--|---------------------|--|-------------------------|
| | FOREST | | PASTURE | | COFFEE | | COCONUT | | TOBACCO AND OTHER FRUIT |
| | SUGAR CANE | | PINEAPPLE | | OTHER FRUIT | | TOBACCO AND PASTURE | | |

DEPARTMENT OF AGRICULTURE
COMMONWEALTH OF PUERTO RICO

have to be subjected to intensive conservation methods if erosion were to be prevented^{1/}.

A picture of agricultural land use is given in Map 3. It is to be noted that sugar is grown on the coastal plains in all the regions^{2/}, coffee crops are limited to the western half of the central mountainous area which forms part of the three regions but mainly in the Ponce and Mayaguez regions, forest land is scattered throughout, tobacco is grown on the south-eastern part of the San Juan region; pineapples on the northern coastal plain; coconuts are grown in various coastal sections of each region; miscellaneous fruits are grown mainly in the San Juan region. As the map shows, large areas of land unsuited for other purposes are devoted to pasture land in all regions.

The poor soil and terrain conditions cited above, together with rapid urban growth, are now being translated into a rapid reduction in land currently devoted to the development of crops such as sugar, vegetables and even pastures and forest through the expansion of non-agricultural land uses as shown in Table 5, which shows the shifts in land utilization between 1950 and 1964 in terms of thousands of cuerdas. From 1950 to 1965 a reduction of more than 79,000 cuerdas in farm land has occurred.

2. Mineral Resources

Mineral resources in Puerto Rico are insufficient to meet domestic needs although, through processing of such imported raw and semi-finished

^{1/} Ibid., page 103.

^{2/} See Map 10 for regional boundaries.

materials, considerable production of processed mineral commodities are used locally. The remaining production is shipped to the U.S. or foreign countries.

The mineral resources of Puerto Rico used for industrial purposes have traditionally been the non-metallic minerals: cement, clay, lime, salt, sand and gravel, and stone. The value of the production of these minerals was \$45 million in 1964, about twice the value of mineral production in 1955 as shown in Table 6.

Cement accounted for one-half of the value of production in 1964 and gravel for over one-fourth of the mineral production, almost 80 per cent. A breakdown of the quantity and value of the 1964 mineral production is shown in Table 7.

The San Juan region produced over half of the total value of production (\$23.5 million), the Ponce region 39 per cent (\$17.3 million), and the Mayaguez region only 9 per cent (\$4 million). See Map 10 for the location of the regions.

Metallic minerals are not at the present time being mined commercially in Puerto Rico except for small quantities of iron ore. Copper ore deposits have been under recent exploration and consideration is being given to mining, concentrating and smelting of Puerto Rican copper ores. Over six million dollars has been spent on the exploration of copper reserves in recent years. It has been estimated on the basis of this continued exploration that a production of 70,000 tons annually might be feasible for a period of possibly more than thirty years. ^{1/}

^{1/} Carlos Vincenty, "Perspectivas de la Explotación Minera en Puerto Rico", Conferencia en el Colegio de Ingenieros, Arquitectos y Agrimensores de Puerto Rico en la noche del 25 de junio de 1965.

Table 6

Puerto Rico: Value of Mineral Production
(In Millions of Constant 1957-59 Dollars)

<u>Year</u>	<u>Value</u>
1955	\$17
1956	17
1957	22
1958	19
1959	21
1960	31
1961	35
1962	39
1963	42
1964	45

Source: "The Mineral Industry of Puerto Rico, the Panama Canal Zone,"
The Virgin Islands and Pacific Island Possessions. (Reprint
from Bureau of Mines, Minerals Yearbook, 1964)

Table 7

Puerto Rico: Mineral Production, 1964

<u>Mineral</u>	<u>Quantity</u> Thousands of short Tons <u>1/</u>	<u>Value</u> (Thousands of Dollars)
Cement (376 pound barrels)	7,926 <u>1/</u>	\$23,879
Clays	341	271
Lime	18	574
Salt	5	74
Sand and Gravel	7,816	11,492
Stone	5,504	<u>8,586</u>
TOTAL		\$44,876

1/ Except cement, which is thousands of barrels weighing 376 pounds.

Source: U. S. Department of Interior, Bureau of Mines, Area Report IV-193, The Mineral Industry of Puerto Rico, the Panama Canal Zone, and the Virgin Islands in 1965, Table 1.

If the price per pound remains at 36 cents, annual production would be valued at \$50 million. Negotiations are underway between the Commonwealth Government and several mining companies with regard to mining and processing operations.

There are several by-products that are generated in the process of converting the copper ore to a product suitable for industrial use. Sulphuric acid is one such product that might be produced at the second stage of copper production. Where gold is associated with copper, it can be obtained in the final stage of copper refining.

Gold is found in various parts of Puerto Rico but quantities are small and the cost is prohibitive, although gold was mined by the Spaniards in the 16th. century. However, there is the possibility that gold may be extracted as a by-product in copper refining.

There are also small deposits of cobalt associated with nickel as well as iron ore associated with magnite. Continued investigations are being made as to commercial use of these deposits.

Imported crude oils are refined in two oil refineries, one in the San Juan Metropolitan Area and the other in the Ponce region. Petrochemical production was initiated in 1959 in the Ponce region. Construction of a new core petrochemical plant was started during the year in the Guayama region. It is expected that the construction of this core plant will be completed during the early part of 1967. Also a nylon resin plant is under construction in this same area with a target for commencement of operations early in 1967. In effect a variety of synthetic raw materials are being developed in Puerto Rico.

3. Timber

Puerto Rico's present forests have been characterized as follows:

"(1) not enough land is in forests; (2) the land that is in forests is

growing only a fraction of its capacity; (3) of the trees that are growing, only a few species are actually in demand for lumber or other wood products in today's market; (4) most of the wood that could be utilized is wasted through primitive methods of logging, sawing, milling, etc."^{1/}

It is estimated that the island of Puerto Rico was an immense forest of more than two million cuerdas with some seven billion cubic feet of wood in the forest when discovered by Columbus. By 1898 only 22 per cent of the island was covered by forest, leaving only 500,000 cuerdas of timberland. In 1950 when an inventory was made of agricultural land, there were about 390 thousand cuerdas of forest and woodland while it is now estimated that not more than 300,000 cuerdas remained in forest and woodland in 1964. Some 90,000 cuerdas are in public and private forests divided as follows: (1) the national forest of Luquillo which covers 28,600 cuerdas, and (2) forest preserves of the Commonwealth Government containing 60,603 cuerdas.

Of the forest reserve of one hundred million cubic feet of wood, which has been maintained by governmental programs during the past two decades, only 30 per cent could be utilized economically due to the steepness of slopes and inaccessibility of the remaining preserves.

In the 1961 Puerto Rico Soil and Water Needs Inventory, an estimate of the need for conservation treatment on expected acreage of forest and woodland for Puerto Rico in 1975 indicated that of approximately 463 thousand cuerdas of forest and woodland (which includes coffee plantations and fruit trees) about 57 thousand cuerdas would require improvement

^{1/} Keyes, Scott, Master Plan for Agricultural Development - The Development Model 1. Protection Areas, December 1955, Puerto Rico Planning Board.

of timber stand and about 132 thousand cuerdas would require protection from domestic animals.^{1/}

The local production of lumber and wood products in 1963 amounted to a little over \$5.5 million in terms of value of shipments, having increased from \$3.3 million in 1958 according to the 1963 Puerto Rico Census of Manufactures. This production is relatively small compared with requirements, for the forests in Puerto Rico provide less than 25 per cent of the wood used in Puerto Rico. The rest of the lumber required for domestic use is imported from the United States, Canada, Central and South America. Employment increased from 466 in 1958 to 607 in 1963 in the industry.

4. Water

The source of fresh water in Puerto Rico is rainfall. Average annual rainfall is 69 inches. The distribution of the rainfall in terms of land area is as shown in Table 8.

The small adjacent island, Mona, depends on rain catchment for its water supply. Wells are used in Vieques and Culebra. Water use in Puerto Rico depends primarily on streams for its supply. Table 9 shows the daily use of fresh water in Puerto Rico in 1960 which totaled about 1,075 mgd. (million gallons daily). Of this amount 818 mgd. was obtained from surface water and 257 mgd. from wells and springs.

Storage of water in reservoirs for water supply, irrigation, and electric power is commonly practiced in Puerto Rico.

The distribution of water and sewerage systems throughout Puerto

^{1/} Puerto Rico Soil and Water Needs Inventory, The Puerto Rico Conservation Needs Committee, 1961, p. 56, Table 12.

Table 8

Distribution of Average Rainfall
Puerto Rico and Adjacent Islands

<u>Average Annual Rainfall, Inches</u>	<u>Area Square Miles</u>	<u>Per Cent of Island Area</u>
30	130	3.8
40	258	7.6
50	195	5.7
60	396	11.6
70	923	27.0
80	765	22.4
90	453	13.2
100	179	5.2
Over 100	<u>121</u>	<u>3.5</u>
Total	3,420	100.0

Source: Puerto Rico Water Resources Authority, Water Resources of Puerto Rico, Water Resources Bulletin No. 4, U. S. Geological Survey in Cooperation with Commonwealth of Puerto Rico, p. 68.

Rico may be seen on Map 4, which also shows the principal rivers. Sugar mills were formerly the chief industrial users of water. The establishment of petroleum, chemical and other industries and plans for the establishment of additional heavy industries is creating additional demand for new larger water supplies in specific locations.

Table 9
Average Daily Use of Fresh Water in Puerto Rico
1960
(Millions of Gallons)

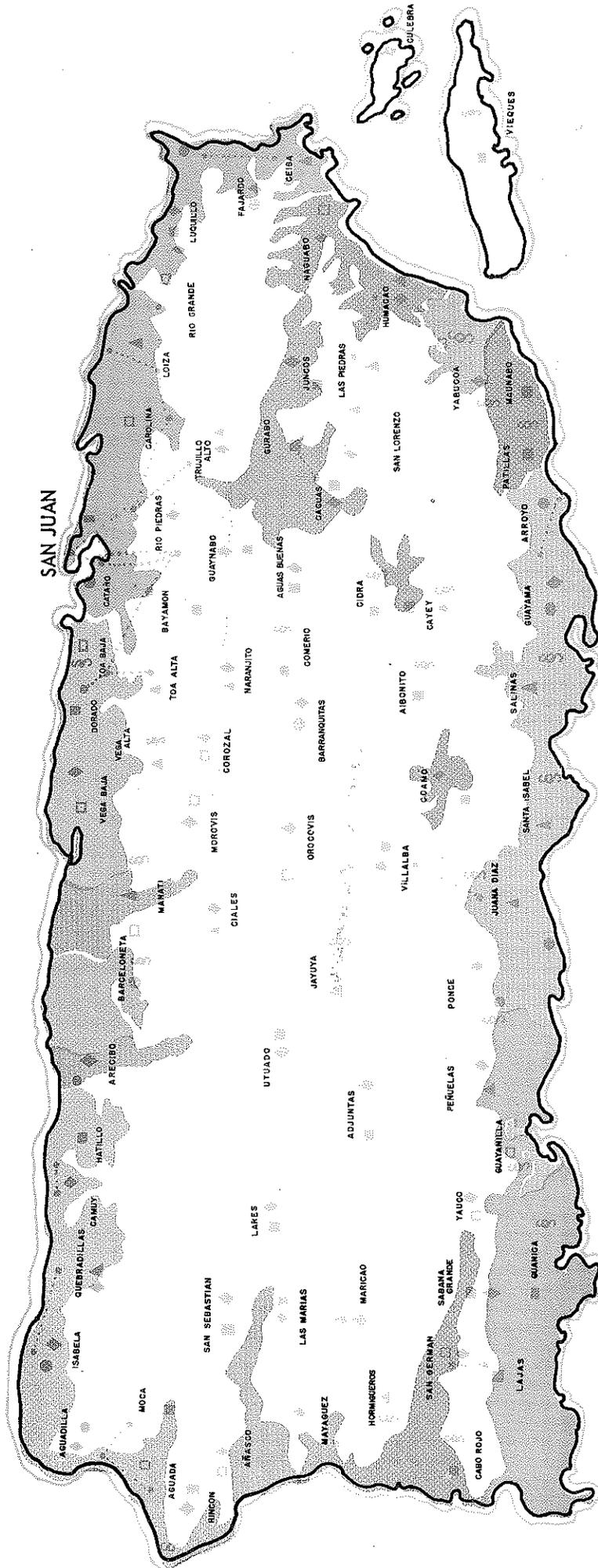
	<u>Ground Water</u>	<u>Surface Water</u>	<u>Total</u>
Public Supply	10	88	98
Industry	36	128	164
Irrigation	210	175	385
Electric Power	<u>---</u>	<u>428</u>	<u>428</u>
Total	257	818	1,075

Source: Water Resources of Puerto Rico, Water Resources Bulletin No. 4 prepared by the U. S. Geological Survey in cooperation with the Commonwealth of Puerto Rico, pp. 63-65.

The ground water resources for industrial and agricultural purposes are also shown on Map 4. There is a relatively small supply of ground water in the southeast coastal area and the northeastern corner of Puerto Rico.

Water systems used for irrigation vary from the simple diversion of streams to the use of complex systems of networks of canals. There are three government irrigation systems, in the northwest, south central

PUERTO RICO: WATER AND SEWERAGE SYSTEMS



KEY

- ◆ FILTRATION PLANT
- ◆ DEEP WELLS-CHLORINATION
- ◆ INTERCONNECTED SYSTEMS
- TREATMENT PLANT
- ▲ IMHOFF TANK
- SEPTIC TANK
- RAW DISCHARGE INTO THE OCEAN
- SYSTEM UNDER CONSTRUCTION
- ▨ GROUND WATER RESERVES FOR INDUSTRIAL PURPOSES
- ▨ LARGE SUPPLY
- ▨ MODERATE SUPPLY
- ▨ SMALL SUPPLY

and southwest section of Puerto Rico containing 12 major reservoirs. Ground water is used for irrigation from wells in the Patillas-Ponce area in the south coast section. Over half of the total of 385 mgd. used for irrigation is from these wells.

Data on water availability in Puerto Rico is incomplete according to the U. S. Geological Survey Report, but it appears that Puerto Rico has overall sufficient water resources to meet commercial, residential and industrial needs. However, there are various sections of the island where water resources are in short supply thus requiring the movement of water from areas of greater supply.

In the 1961 report, Puerto Rico, Soil and Water Needs Inventory, a description of conditions in Puerto Rico with regard to water resources stated the following:

"The major water resources of Puerto Rico have already been developed to the point where there is now a limited number of sites for future development. With the increased competition for water (both in quality and quantity) between urban, industrial, and agricultural users, it is imperative that a comprehensive water conservation program be developed. This need is particularly vital in the watersheds above the existing reservoirs. Puerto Rico cannot afford to allow its water storage capacity to be jeopardized by sedimentation and poor water management." 1/

5. Fishing Resources

As has been stated earlier, the primary resources in Puerto Rico are land and water. Fishing should provide an abundant source of food, but up to the present, commercial fishing has not been developed to a great extent. The waters off the north coast of Puerto Rico are not suitable for commercial fishing due to the great depth of the ocean

1/ The Puerto Rico Conservation Needs Committee, Puerto Rico Soil and Water Conservation Needs Inventory, op. cit., p. 4.

floor^{1/}. However, the continental shelf off the east, west, and south coasts is shallower and there the ocean bottom may provide a potential source for commercial fishing.

While there are about 3,000 fishermen in fishing villages dotting the coast line of Puerto Rico, the chief impediments to the development of commercial fishing on a larger scale are the lack of equipment, training in its use, and marketing outlets. In an effort to overcome some of these difficulties, the Government of the Commonwealth of Puerto Rico, through its Department of Agriculture, which has the responsibility for overseeing the fishing industry, and the Government Development Bank, has been assisting the fishermen by providing small loans to individual fishermen to buy equipment for their boats. However, this has provided only for motors for small craft. Even then, the result has been encouraging, for in the past five years the catch has more than doubled, increasing from about five million pounds to 11 million pounds. This represents only a small proportion of the annual consumption of fish in Puerto Rico which amounts to about 30 million pounds.

With the realization that the small boats presently used by the fishermen are not suitable for fishing on the scale required, a pilot project is being developed in the Patillas-Arroyo-Guayama area in the form of a cooperative, with the assistance of the Departments of Agriculture and Commerce and the Cooperative Development Administration to provide for housing, frozen storage facilities, training, and the purchasing of a large boat. In June 1966, three boats were purchased and a cooperative was formed by the fishermen in this area. It is anticipated that during the first year of operations one million pounds of fish will be sold.

^{1/} The deepest part of the Atlantic Ocean known as the Atlantic Trench is only 100 miles north of Puerto Rico.

In recent years, Puerto Rico has begun to play a leading role in the tuna industry. However, strictly speaking Puerto Rico's role is almost exclusively in canning and very little, if any, of the Island's financial and human resources are engaged in the fishing phase of the tuna industry.

B. THE STATUS OF THE INFRA-STRUCTURE

1. Transportation

a. Highways

In Map 5 the existing highway system comprising primary and secondary highways built and maintained by the Commonwealth Government, and the highways under the jurisdiction of the municipal governments, is shown. Projected highways are shown on the map with different colors indicating the completion date by fiscal years from 1967 to 1970.

There are 7,446 kilometers (about 4,700 miles) of highways in Puerto Rico of which 826 kilometers are in the primary system, 1,905 are in the secondary system and 4,716 kilometers are in municipal systems.

The surfaces of 79.7 per cent of the highways are paved, with 28 per cent using concrete and 76.9 per cent using asphalt. The surfaces of 20.3 per cent of the highways are unpaved. About six per cent of the unpaved highways are covered with stone or gravel. For details on the types of the highways in Puerto Rico see Table 10.

One of the internal transportation problems arises out of the very rapid growth in the number of vehicles on the highway and the expansion of urban areas into suburbs which are not adequately served by mass transportation services. Motor vehicle registration increased from a total

Map 5

PUERTO RICO HIGHWAY SYSTEM PRIMARY AND SECONDARY CONSTRUCTION PROGRAM

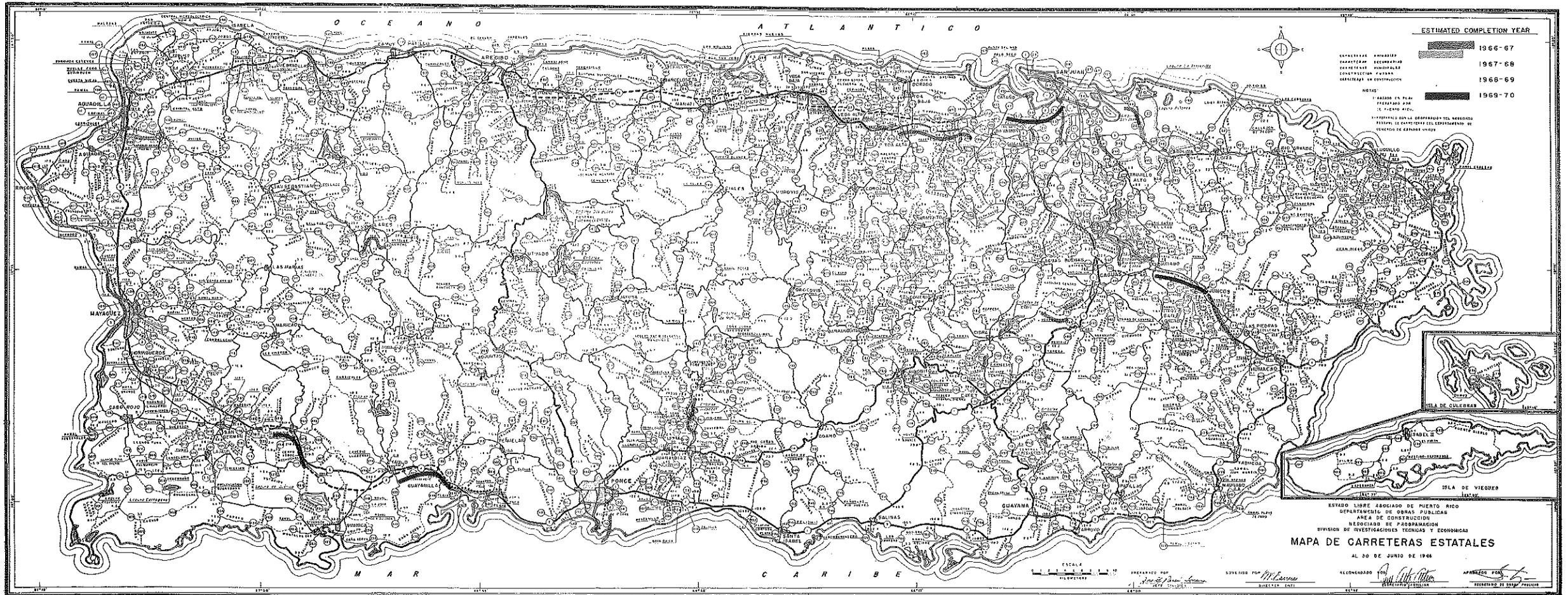


Table 10

Highways in Puerto Rico by System and Type of Surface
(In Kilometers)
June 30, 1966

	<u>Highway Systems</u>			<u>Other Roads</u>	<u>Total Kilometers</u>	<u>Per Cent</u>
	<u>Primary</u>	<u>Secondary</u>	<u>Municipal^{1/}</u>			
Total	825.7	1,904.8	3,319.8	1,396.1	7,446.4	100.0
Unpaved	1.8	32.7	406.4	1,065.9	1,506.8	20.3
Primitive	---	---	7.3	26.2	33.5	0.5
Unimproved	0.8	5.0	181.6	744.0	931.4	12.5
Earth	---	20.0	35.7	55.9	111.6	1.5
Gravel (or stone)	1.0	7.7	181.8	239.8	430.3	5.8
Paved	823.9	1,872.1	2,913.4	330.2	5,939.6	79.7
Asphalt (low type bituminous)	60.7	1,313.5	2,109.4	243.8	3,727.4	50.0
Asphalt (high type bituminous)	628.1	545.0	745.9	86.4	2,005.4	26.9
Concrete	135.1	13.6	58.1	---	206.8	2.8

^{1/} Includes streets in public housing developments totaling 152.9 kilometers of which 41.4 kilometers are unpaved and 111.5 kilometers are paved.

Source: Department of Public Works, Commonwealth of Puerto Rico.

of 26.8 thousand vehicles in 1940 to 179.7 thousand in 1960 and to 318.8 thousand in 1966. The annual rate of increase was 12.2 per cent during the last five years, with no indication of a slowdown in sight, in contrast to an annual increase during the 1960's of four per cent in the United States. The number of vehicles registered, by type of vehicle, is shown in Table 11.

In addition to the need to expand and improve the existing highway system to serve the rapidly increasing traffic flow of passenger cars and industrial and commercial vehicles, there is a great need for access roads for developing industrial projects and improved transportation of agricultural commodities, as many communities and farms are relatively isolated from adequate highways due to the rugged terrain. In Chapter IV the master plan for the development of an efficient highway system, a program which calls for an investment of \$600 million on the part of the Government of the Commonwealth during the next ten years, will be discussed.

Table 11

Motor Vehicle Registration as of June 30
(Thousands of Vehicles)

<u>Type and Use</u>	<u>1940</u>	<u>1950</u>	<u>1955</u>	<u>1960</u>	<u>1965</u>	<u>1966</u>
Total*	26.8	60.6	105.4	179.7	318.8	367.2
Passenger cars	20.0	36.4	74.4	133.5	252.6	293.0
Trucks and trailers	6.5	19.4	25.9	38.0	55.5	63.0
Tractors	---	.7	1.3	1.1	1.3	1.2
Motorcycles	.3	2.5	2.1	4.6	5.8	6.8
Government vehicles	---	1.5	1.7	2.5	3.5	3.2

*Totals may not equal the sum due to rounding.

Source: Department of Public Works, Commonwealth of Puerto Rico.

b. Ports and Ocean Transportation

The sites of commercial and industrial seaports and potential sites for additional port facilities are shown in Map 6. Commercial seaports are presently located in the San Juan Bay at San Juan and Puerto Nuevo, in Mayaguez and Ponce. Industrial ports are located at other areas as shown on the map. Potential sites for additional seaports will be developed in other coastal areas as shown on Map 6 to meet industrial requirements when it is economically feasible. Industrial port facilities at Guayama are now under study in connection with the new petrochemical complex being developed. Not shown on the map are docking facilities at the Islands of Culebra and Vieques where merchandise is transported in small vessels.

There are 27 berthing spaces in the San Juan Bay ports of which six are in the new market area (Puerto Nuevo) and 21 in old San Juan. Of these there are two berths devoted exclusively to tourist vessels and 19 commercial berths. At Ponce there is a finger pier accommodating two vessels and a marginal wharf in the four additional berthing spaces. The Port at Mayaguez has two berthing spaces.

Shipping service is provided in Puerto Rico to and from the United States Atlantic Coast, Gulf of Mexico and West Coast, the Caribbean Area, Central and South America, Europe and Asia by the thirty-one ocean liners. Nine vessel operators provide some 80 scheduled sailings to the United States per month with an average sailing time of three to four days. Four United States lines provide regular containerized service between Puerto Rico and the rest of the world.

Map 6

PUERTO RICO: SEAPORTS AND AIRPORTS EXISTING AND POTENTIAL

APRIL 1966

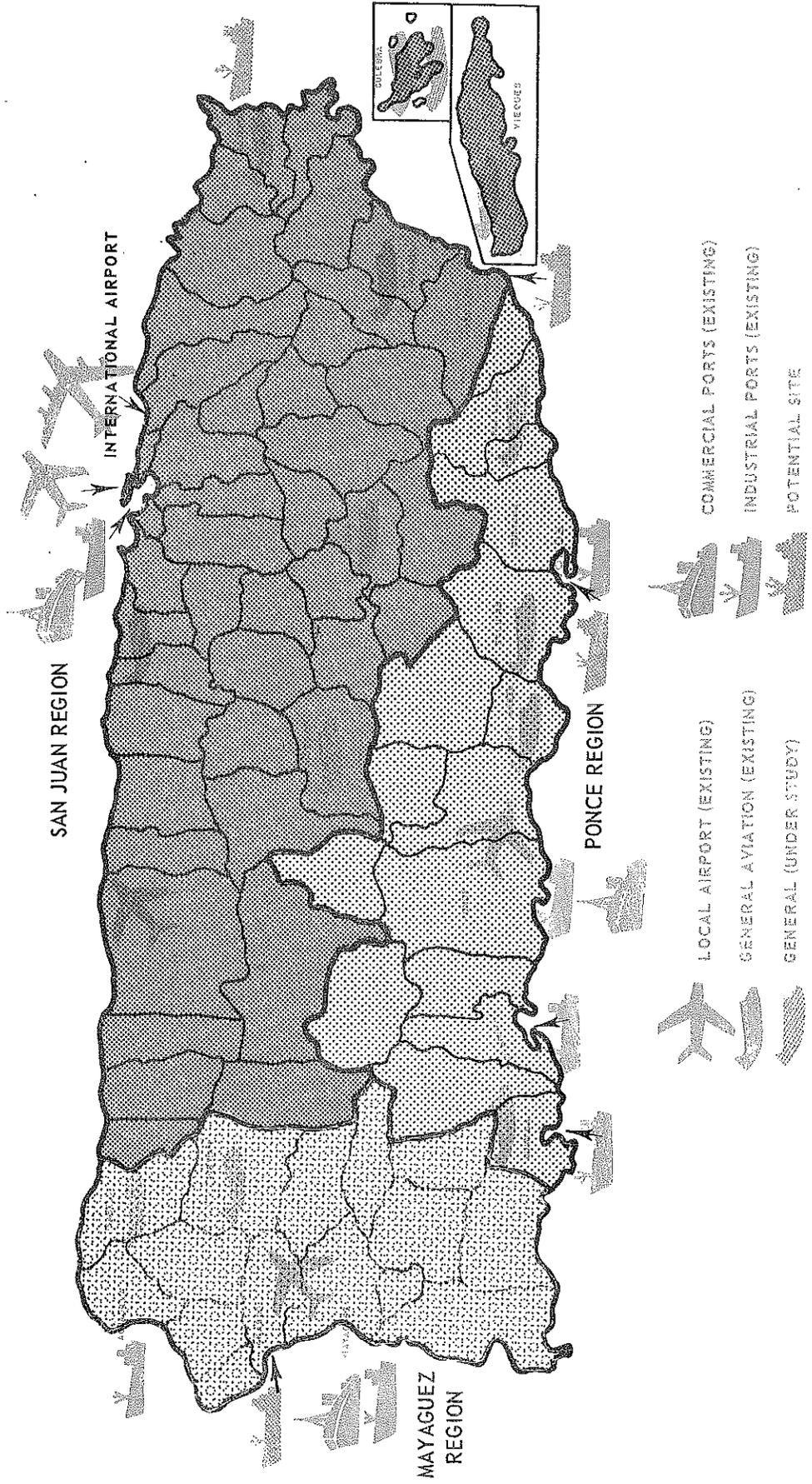


Table 12

Dry Cargo Movement at Piers at San Juan, Ponce, and Mayaguez
1950 - 1964
(Thousands of Short Tons)

	<u>Total</u>	<u>San Juan</u>	<u>Ponce</u>	<u>Mayaguez</u>	<u>Other</u> ^{1/}
1950	2,959	1,303	551	335	265
1955	3,415	1,967	577	314	557
1960	3,790	2,254	655	195	646
1962	4,494	2,736	676	162	920
1963	4,389	2,638	732	172	847
1964	5,013	3,092	716	273	932
1965	n.a.	3,024	n.a.	230	n.a.

Sources: Ports Authority and The Corps of Engineers, U. S. Army: Waterborne Commerce of the United States.

^{1/} Ports included in "other" are: Fajardo, Guayanes, Arecibo, Guayanilla, Jobos, Humacao, Vieques, Culebra.

Table 13

Passenger Movement at the International Airport
(In Thousands)

	<u>Total</u> ^{1/}	<u>Inbound</u>	<u>Outbound</u>	<u>In Transit</u>
1950-51	365	149	193	23
1951-52	486	199	264	23
1952-53	567	236	311	21
1953-54	605	267	313	25
1954-55	653	296	328	28
1955-56	753	330	392	31
1956-57	910	406	464	39
1957-58	998	462	495	42
1958-59	1,172	548	586	37
1959-60	1,416	678	699	39
1960-61	1,473	707	720	46
1961-62	1,736	841	854	41
1962-63	2,020	980	988	52
1963-64	2,383	1,149	1,159	75
1964-65	2,809	1,350	1,368	91
1965-66	3,253	1,564	1,602	92

Source: Puerto Rico Ports Authority, Economics and Research Office.

^{1/} May not add to totals due to rounding up.

Table 14

Cargo Movement at the International Airport
(Thousands of Short Tons)

	<u>Total</u> ^{1/}	<u>Inbound</u>	<u>Outbound</u>	<u>In Transit</u>
1950-51	8	6	1	.5
1951-52	7	4	2	1
1952-53	9	6	2	1
1953-54	12	7	4	1
1954-55	16	9	5	2
1955-56	15	7	6	3
1956-57	19	9	8	3
1957-58	21	10	9	2
1958-59	20	11	8	2
1959-60	25	14	9	2
1960-61	24	15	8	1
1961-62	31	18	12	2
1962-63	40	22	16	2
1963-64	42	22	18	2
1964-65	60	33	24	3
1965-66	61	33	24	4

Source: Puerto Rico Ports Authority, Economics and Research Office.

^{1/} May not add to totals due to rounding.

Expansion of facilities urgently required to handle increased movement of passengers and cargo is currently underway.

During 1966, there were 3,258 ships using the port facilities operated by the Ports Authority at the Port of San Juan of which 226 were tourist ships.

Cargo movements at the ports of San Juan, Ponce and Mayaguez are shown in Table 12.

c. Airports and Air Transportation

Map 6 indicates existing airports and potential airport sites. The Ports Authority operates International Airport at San Juan and 10 additional airports as shown on the map. Additional regional airports and landing strips are being planned for.

Total aircraft movements at International Airport increased from 80 thousand in 1960 to over 142 thousand in 1966. Movement of passengers at International Airport at San Juan totaled 3,258,124 in 1965-66. The rapid growth of passenger movement since 1951 is shown in Table 13.

Cargo movement at International Airport has increased from 8,000 short tons in 1951 to almost 61 thousand short tons in fiscal 1966. Table 14 presents the annual data on cargo movement from 1951 to 1965.

2. Energy

All energy for sale is produced by a government-owned corporation known as the Puerto Rico Water Resources Authority. The producing facilities of the entire island are connected through a single power grid, with a name plate rated installed capacity of 956,380 KW as of June 30, 1966. The capacity provided sufficient margin over the maximum peaking requirements which reached 737,000 KW during the previous 12 months. This is in contrast to the mid-1950's when it was necessary to obtain the facilities of a power generating ship owned by U. S. Navy to supplement the power generated by the Authority.

Despite its name, the generating capacity of the Authority is predominantly thermal today, although originally the Authority was created around several multi-purpose hydro-units. During the fiscal year ending June 30, 1966, thermal capacity accounted for 91.8 per cent of the energy produced in the Island, while the hydro-electric stations accounted for only 5.3 per cent. The remaining 2.90 per cent was purchased either from the sugar mills or from the Bonus Nuclear Electric Station with a rated capacity of 16,500 KW, which is owned jointly by the Authority and the Atomic Energy Commission and start up and testing of new generating units. When power generation was initiated in Bonus on August 15, 1964, it was the first time that nuclear means were utilized in Latin America!

Just over a year ago, specifications for a 200 MW thermonuclear power station were sent out to bid. However, the bids from leading manufacturers indicated that conventional thermoelectric power was cheaper.

Electric power consumption has been growing very rapidly in Puerto Rico. For example, during the decade of the 1950's electric power consumption increased by 15 per cent per year. During the first five years of this decade the rate of growth in consumption has been 13.8 per cent. In Table 15 it will be seen that revenues per kilowatt hour have continually declined, primarily as the result of larger levels of consumption by individual customers.

It can be seen from the same table that the rate structure is designed so as to pass on the savings resulting from the production and distribution of large blocks of power to the industrial consumer. Thus, the industrial consumer pays, on the average, about 50 per cent of the rate charged to the residential consumer. Cost of power to similar consumers is approximately the same as in the New England States and less than in many parts of the United States.

Because the level of power generation has been growing so rapidly, it has been possible for the Authority to continuously install larger units and thereby benefit from the lower capital costs per KW and lower operating costs with regard to fuel consumption. For example, the last two units of a battery of 8 in the San Juan Steam plant which are currently being installed rated at 100,000 KW, whereas in the late 1950's the units installed in the San Juan plant had a rated capacity of 60,000 KW. The unit to be installed in 1969 to 1970 will have a rated capacity of 200,000 KW. In regard to lower operating cost, it is only necessary to report the recent history with regard to the ratio of fuel impact to KWH output. The rate of fuel consumption per KWH has declined continuously. The efficiency in the use of fuel has increased continuously. For example, the number of KWH generated per gallon fuel oil used has increased from 13.85 to 14.77 or 1.8 per cent per year in the four years from 1960-61 to 1964-65. In its interest to supply electric energy at the lowest cost, the Authority is investigating alternative types of generating plants. To mention one, an investigation is in progress to determine the economic feasibility on harnessing the enormous amount of energy available from the difference in temperature between surface waters and deep waters in the ocean that occur in the proximity of Puerto Rico.

3. Communications

Telephone service is provided throughout the Island by a private telephone company and in a few sections local service is provided by the Communications Authority of the Commonwealth Government which provides all local telegraphic service. Long distance telephone service and overseas cables are provided via underwater cable direct to the United States mainland and to foreign areas via the U.S. system. Wireless is also used.

There were 211,913 telephones in service in Puerto Rico as of

Table 15

Electric Energy
Customers, Sales and Revenues
1949-50 to 1964-65

	<u>Customers</u> <u>June 30</u>	<u>KWH Sales</u> <u>(Millions</u> <u>of KWH)</u>	<u>Revenue</u> <u>(Millions</u> <u>of Dollars)</u>	<u>Cents</u> <u>Per</u> <u>KWH</u>
<u>1949-50</u>				
Class of Service				
Residential	146,546	116.9	4.1	3.54
Commercial	26,507	94.4	3.5	3.65
Industrial	3,319	132.2	2.6	1.93
Others	270	68.2	1.0	1.53
Total	<u>176,642</u>	<u>411.7</u>	<u>11.2</u>	<u>2.71</u>
<u>1954-55</u>				
Class of Service				
Residential	208,130	252.7	8.0	3.18
Commercial	33,771	182.3	6.2	3.41
Industrial	2,700	225.5	3.9	1.74
Others	457	114.4	1.7	1.43
Total	<u>245,058</u>	<u>774.9</u>	<u>19.8</u>	<u>2.55</u>
<u>1959-60</u>				
Class of Service				
Residential	355,998	587.1	17.0	2.90
Commercial	48,427	402.4	12.7	3.15
Industrial	3,107	568.9	8.7	1.53
Others	1,139	109.0	2.0	1.84
Total	<u>408,671</u>	<u>1,667.4</u>	<u>40.4</u>	<u>2.43</u>
<u>1964-65</u>				
Class of Service				
Residential	485,140	1,193.2	30.8	2.58
Commercial	59,524	824.0	24.0	2.92
Industrial	3,948	922.9	13.9	1.50
Others	3,499	246.2	4.3	1.74
Total	<u>552,111</u>	<u>3,186.3</u>	<u>73.0</u>	<u>2.29</u>

Source: Puerto Rico Water Resources Authority, Annual Reports 1949-50, 1954-55, 1959-60 and 1964-65.

June 30, 1965. Table 16 below gives the number of telephones per 1,000 population for selected years from 1940 to 1965 in Puerto Rico and the United States.

Table 16

Number of Telephones per 1,000 Population, 1940-1965
Puerto Rico and the United States

	<u>No. of Phones in Service as of June 30</u>	<u>Puerto Rico No. of Phones per 1,000 Population</u>	<u>United States No. of Phones per 1,000 Population</u>
1940	17,382	9.3	164.9
1950	34,509	15.6	280.8
1955	52,166	23.1	336.9
1960	82,537	35.1	407.7
1965	194,707	74.1	478.1 ^{1/}
1966	211,913	79.6	n.a.

Source: Statistical Abstract of the United States, 1966 and Economic Indices, 1965-66, Puerto Rico Planning Board.

^{1/} Not available for 1966.

The Commonwealth Government operates an educational radio and television station in San Juan, commercial television stations broadcast from San Juan, Ponce and Mayaguez, and radio stations broadcast from these cities and a number of other towns in the island. A large proportion of the population have radio and television sets.

Postal service is part of the federal postal system.

4. Industrial and Commercial Facilities

a. Industrial Buildings

It is estimated that only about 50 per cent of the new industrial units established under the industrialization program are housed in buildings owned or constructed by private owners, either for their own use or for lease. Unfortunately, private investors have been concerned with constructing factory buildings primarily in the San Juan Metropolitan Area and, in a few instances, in Ponce and Mayaguez.

A limited number of firms are using converted old warehouses or buildings previously used by declining industries such as tobacco stemming and drying. As a whole these buildings are inadequate, are located in non-conforming zoning areas and do not possess parking facilities. The government has encouraged the construction of industrial facilities by the private sector by extending the industrial incentive law so as to provide tax exemption on rental income received from industrial tenants who have been granted tax exemption by the Commonwealth Government.

At an early stage of the industrialization program it was found that a large number of promotions failed to materialize into the actual establishment of factories because there was a shortage of vacant industrial buildings. Generally the time required to construct a factory building was too long for the manufacturer, so he located elsewhere. After considerable study the Puerto Rico Industrial Development Company launched an industrial building program in 1950 designed to create an inventory of vacant industrial buildings.

Since 1950 and up to December 1966, the Puerto Rico Industrial Development Company had erected 580 industrial buildings with a total area of 11.0 million square feet at a cost, including land, of \$943 million. Of these, 113 have been sold to private entrepreneurs. PRIDCO still holds 467

buildings with a total area of 8 million square feet valued at \$61 million. Table 17 shows factory space either completed or under construction available from PRIDCO or from private owners as of January 31, 1966.

Three types of industrial buildings erected in anticipation of demand, are provided by PRIDCO.

- (a) Multifactory buildings with an area which varies from 12,000 to 20,000 square feet which may be subdivided in 4,000 square feet units.
- (b) Individual buildings with an area of 11,500 square feet.
- (c) Individual buildings with an area of 23,000 square feet.

In addition, special buildings designed and constructed to meet the specific needs of the tenant are erected upon demand. The Company provides adequate land to accommodate future expansion and stands ready to construct them as the need arises.

Table 17

Private and PRIDCO Factory Buildings Finished
or Under Construction Available by Region/
as of January 31, 1967

	<u>Area in Thousands of Square Feet</u>
Puerto Rico	956.2
San Juan Region	667.0
San Juan Metropolitan Area	438.3
Rest of San Juan Area	228.7
Ponce Region	129.9
Mayaguez Region	159.3

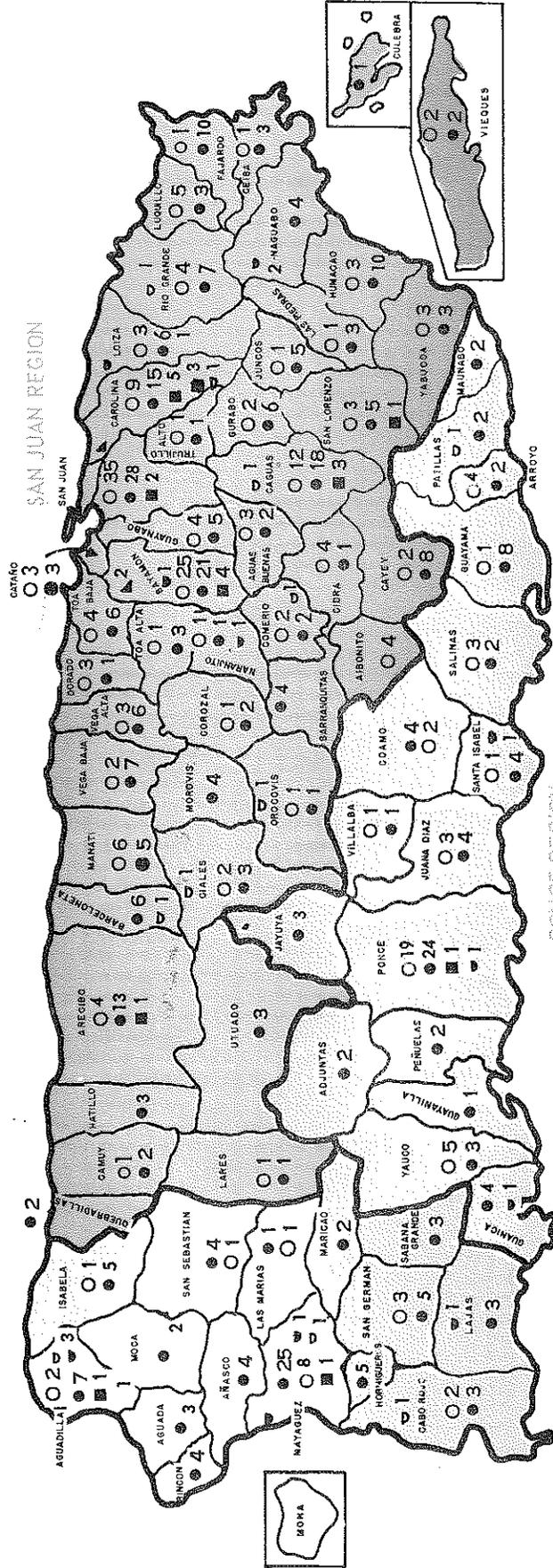
Source: Puerto Rico Industrial Development Company (Planning Office and Office of the Treasurer).

1/ See Map 10 for location of the regions.

Map 8

PUERTO RICO PRIDCO SPECIAL, STANDARD AND MULTIFACTORY BUILDINGS PROGRAM

AS OF FEBRUARY 1967



	Special	Standard	Multifactory	TOTAL
CONSTRUCTED	220	390	629	629
UNDER CONSTRUCTION	12	15	31	31

Puerto Rico Industrial Development Company

All the buildings are single story units of reinforced concrete, provided with ample parking space and loading and unloading facilities. The tenant provides necessary partitions according to his specific needs. These buildings are erected to satisfy the demands of any light or semi-heavy industry which represent the bulk of the industrial establishments located in Puerto Rico.

On the average, PRIDCO constructs 35 typical buildings, 15 special buildings, and 30 expansions to existing structures per year. This schedule of construction provides a continuous vacant inventory of from 40 to 50 units which would normally provide space for 50 to 60 industrial concerns.^{1/}

As a matter of public policy, the balanced development of the whole island is stimulated through the dispersion of new manufacturing units. As an incentive to achieve this end, PRIDCO has divided the island into five rental areas based on the estimated employment needs of the municipalities which compose them, charging less for buildings erected in areas of substantial unemployment and more in more developed areas.^{2/}

Rental zones and rates per square feet for PRIDCO buildings follow.

Table 18

Rental Rates for PRIDCO Standard and Multifactory Buildings

	<u>Standard</u>	<u>Multifactory</u>
Zone I	\$0.95	\$0.95
Zone II	0.85	0.85
Zone III	0.70	0.80
Zone IV	0.60	0.70
Zone V	0.50	0.60

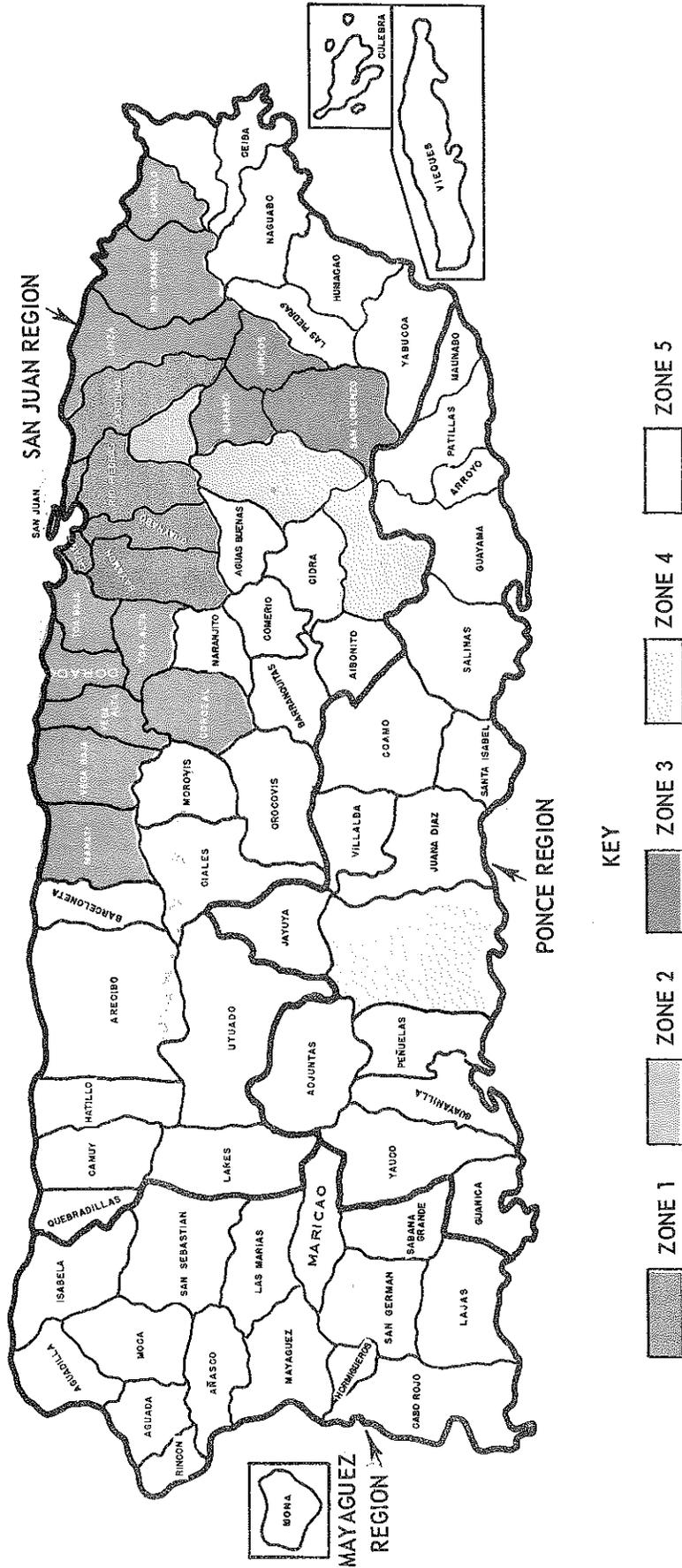
Source: Puerto Rico Industrial Development Company

^{1/} See Map 8
^{2/} See Map 9

Map 9

PUERTO RICO: RENTAL ZONES FOR STANDARD AND MULTIFACTORY PRIDCO BUILDINGS

EFFECTIVE JULY 1, 1964



PUERTO RICO INDUSTRIAL DEVELOPMENT COMPANY

It must be stressed that new privately-owned industrial buildings are non-existent outside of the San Juan Metropolitan Area, with a few exceptions in Ponce and Mayaguez. PRIDCO is filling an important gap in providing industrial buildings outside of the San Juan Metropolitan Area because of the insufficient rates of return for the private investor from factory facilities constructed in areas of substantial and persistent unemployment. In fact, the rates of return to PRIDCO from the facilities in these areas do not even cover costs. Thus the decentralization policy requires a rent subsidy on the part of the Company. It has been noted that where private industrial buildings do exist, rental rates charged by the private investor are consistently higher than those received by PRIDCO for similar facilities. No revenue is expected from the rental of PRIDCO industrial buildings. The rental produces only about 7 per cent of the cost of the building which is barely enough to pay interest (4%), depreciation (2%), and maintenance (1%).

In Table 19 the increase in the number of new factory buildings is shown for the years 1954-55 to 1966-67 with projections for 1967-68 to 1970-71 classified by public or private ownership. It has been estimated that over 820 buildings will be required during the four-year period ending in fiscal 1970-71. This is nearly 300 more than were required during the previous four years. The private sector is expected to construct almost 520 buildings and PRIDCO the remainder. This represents a decrease in the relative role of PRIDCO construction of plants to house non-locally owned manufacturing enterprises, by an increase in the proportion of PRIDCO built facilities to be used by locally owned companies.

In Table 20 the industrial sites available for new industrial

Table 19

Net Annual Increase in Factory Buildings in Operation

Fiscal Year	PRIVATE			PRIDCO			LOCAL			NON-LOCAL		
	Total	Number	Per Cent	Total	Number	Per Cent	Total	Number	Per Cent	Total	Number	Per Cent
1954-55	29	9	77	2	2	33	20	10	50	10	10	50
1955-56	69	23	82	4	4	18	46	24	52	22	22	48
1956-57	61	17	94	1	1	6	44	21	48	23	23	52
1957-58	51	12	83	2	2	17	39	8	20	31	31	80
1958-59	66	19	94	1	1	6	47	19	41	28	28	59
1959-60	71	12	108	-1	-1	-8	59	24	40	35	35	60
1960-61	59	7	57	3	3	43	52	17	33	35	35	67
1961-62	92	34	82	6	6	18	58	30	52	28	28	48
1962-63	87	25	84	4	4	16	62	19	31	43	43	69
1963-64	72	31	87	4	4	13	41	21	51	20	20	49
1964-65	109	26	54	12	12	46	83	37	45	46	46	55
1965-66	137	66	62	25	25	38	71	42	60	29	29	40
1966-67	190	93	73	25	25	27	97	45	46	52	52	54
<u>Projections 1967-68 to 1970-71</u>												
1967-68	195	106	76	30	30	28	89	43	48	46	46	52
1968-69	200	125	90	35	35	28	75	37	49	38	38	51
1969-70	210	140	98	42	42	30	70	36	52	34	34	48
1970-71	215	155	109	46	46	30	60	31	52	29	29	48
TOTAL	820	526	373	153	153	29	294	147	50	147	147	50

Source: Four-Year Financial Program - PRIDCO, 1968-1971.

Table 20

Private and PRIDCO Land Available
for Industrial Projects
as of January 15, 1967-^{1/}

	<u>Area in Thousands of Square Meters</u>
Puerto Rico	23,095
San Juan Region	14,342
San Juan Metropolitan Area	2,245
Rest of San Juan Region	12,097
Ponce Region	7,015
Mayaguez Region	1,738

Source: Puerto Rico Industrial Development Company
(Planning Office and Office of the Treasurer).

^{1/} See Map 10 for location of the regions.

projects are given by region for land owned by PRIDCO or by private investors. It is estimated that about 18.7 million square meters of industrial land is available for future construction. The location of most of the land is within the San Juan Planning Region but outside of the Metropolitan Area of San Juan.

b. Commercial Facilities

Shopping centers are a relatively new concept in Puerto Rico. They began to appear about the same time as supermarkets, around 1955. By and large, shopping centers are of the 80,000 to 125,000 square foot strip type centers. Not even the San Juan Metropolitan Area has a regional shopping center at the present time, though one covered small type with 1,100,000 square foot area is contemplated. At the present time store and office occupancy in all shopping centers is 100 per cent except in the recently built centers which is 80%. The Commonwealth Government Department of Commerce, and the Commercial Development Corporation provide technical and financial assistance to local merchants and opportunities for their participation in shopping center developments.

As the suburbs grow further and further from the center of the city, additional shopping areas will have to be developed to alleviate the traffic congestion in the downtown areas. The excessive cost of developed land applies to commercial as well as residential land in Puerto Rico. The typical shopping center site will cost from \$40,000 to \$80,000 per acre. Due to the relatively high cost of land, minimum rentals are considerably higher than on the mainland. However, construction costs are about the same, as savings in labor costs are offset by the additional costs of shipping many of the building and hardware items to Puerto Rico. Rental rates average about \$2.25 per square foot for national tenants. Rates for the small local tenants average between \$2.75 and \$5.00 depending on the size and type of the store to be operated.

Until recently, shopping center financing, which is exclusively conventional money, has been very difficult to obtain. For the most part the shopping centers that have been financed are on the basis of 50 per cent to 60 per cent of the appraised value. Most of the financing has been done on the basis of straight mortgage lending with rates averaging 7% depending on the risk and the financial stability of the developer.

Puerto Rico has lagged significantly in the development and building of first class office space. One of the primary causes for this lack has been the unavailability of mortgage money for long-term financing. Rental rates in the new office buildings range from \$4.00 to \$5.25 per square foot. At these rates the tenant pays for his own cleaning, electrical power for air conditioning, and all other utilities. The rent for some offices including utilities, air conditioning and cleaning services is even higher, from \$5.25 to \$6.00 per square foot. Other buildings, because of lower rentals, have always been at about 95 per cent occupancy. For the most part, these tenants have limited or sub-standard space.

Construction costs for first class office buildings are about equal to those prevailing in the southeastern part of the United States.

A new program to provide up-to-date warehousing to assist in the development of a more efficient distribution system was initiated after the establishment of the Commercial Development Company, a public corporation whose president is the Secretary of the Department of Commerce of Puerto Rico. In addition to providing warehousing in the new central market area in Puerto Nuevo, small local retailers and wholesalers are being assisted in developing warehousing facilities. There are no public warehousing facilities except those used for distribution of food to welfare recipients. Three commercial centers have been built by the C.D.C. in Humacao, Arecibo and Río Piedras. Others are in the planning stages for Cayey, Isabela. Others are under study.

Another type of commercial facility recently developed in Puerto Rico is the parking garage of which there are two in the San Juan Metropolitan Area to accommodate the growing number of cars. The parking garage in Old San Juan was built on municipally-owned land and designed to blend with the architecture of the old city.

5. Recreation and Historic Sites

Puerto Rico has been developing an extensive tourism industry based on its mild climate and natural assets such as coral reef formations, offshore and inland fishing, protected beaches for swimming, waterskiing, and boating, etc. Sites for further development of recreation and tourist facilities are primarily in the northeast, southwest and the San Juan Metropolitan Area. Preservation of the natural beauty of the Island for recreation and tourism is becoming of great current interest, and further study of underwater conservation areas, sites for marinas and launching ramps and small craft service facilities is needed.

Recreational use of Puerto Rico by residents on the Mainland has been facilitated by the favorable rate structure for air travel from the Mainland. An impetus for promotion of Puerto Rico as a vacation spot for visitors from abroad and the Mainland has been provided by the program of the United States Travel Service in connection with the balance of payments problem. The growth in the number of visitors to Puerto Rico by country of origin is shown in Table 20-A which also includes the use of hotel facilities by Puerto Rican residents.

a. Hotels^{1/}

As of June 1966, there were 5,733 tourist hotel rooms in Puerto Rico of which 4,543 were located within the San Juan Metropolitan Area and 1,190 dispersed throughout the Island. The tourist hotels offer a great variety of entertainment facilities such as restaurants and coffee shops, night clubs which feature local and international entertainers, swimming pools, beach areas, tennis and golf courts, shopping facilities and gambling casinos under the supervision of the Government of Puerto Rico. Arrangements are made to offer the guests facilities for all types of water sports. Tourist hotels are conveniently located and may be easily reached by either taxi or public transportation.

In addition, there were, as of June 1966, 1,250 commercial hotel rooms of which 962 were within the boundaries of San Juan. There were also 311 rooms in government-approved guest houses of which 255 were in San Juan. These last tend to limit their services to sleeping accommodations and restaurant service.

^{1/} Tourism as an economic activity is discussed in Section H, Principal Economic Activities.