

BIOENVIRONMENTAL AND RADIOLOGICAL-SAFETY FEASIBILITY STUDIES
ATLANTIC-PACIFIC INTEROCEANIC CANAL

ECONOMIC AND SOCIOLOGICAL REVIEW
OF THE AZUERO PENINSULA, PANAMA

by

Alejandro Hernández

December 1, 1967

Prepared for Battelle Memorial Institute, Columbus Laboratories,
under the supervision of Dra. Reina Torres de Araúz, Consultant,
Human Ecology Studies, under U. S. Atomic Energy Commission
Contract No. AT(26-1)-171

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FOREWORD

The purpose for presenting this special report is to furnish, to the scientists and technicians planning a new interoceanic canal, socioeconomic data of the Peninsula of Azuero, an area which the undersigned considers of immediate concern. This report also can be considered as an introduction to more detailed studies that should be undertaken in this region very soon as a natural and logical supplement to the studies being done elsewhere in the geographic sector of Route 17. The Archipelago de Las Perlas, lying in the Golfo de Panama near the Southeastern coast of the Republic, also should be the object of an in-depth study.

The period during which these proposed investigations would be performed is important, and the studies ideally should be effected within a short time of each other so that a close relationship and equilibrium among the diverse data now being obtained might be secured.

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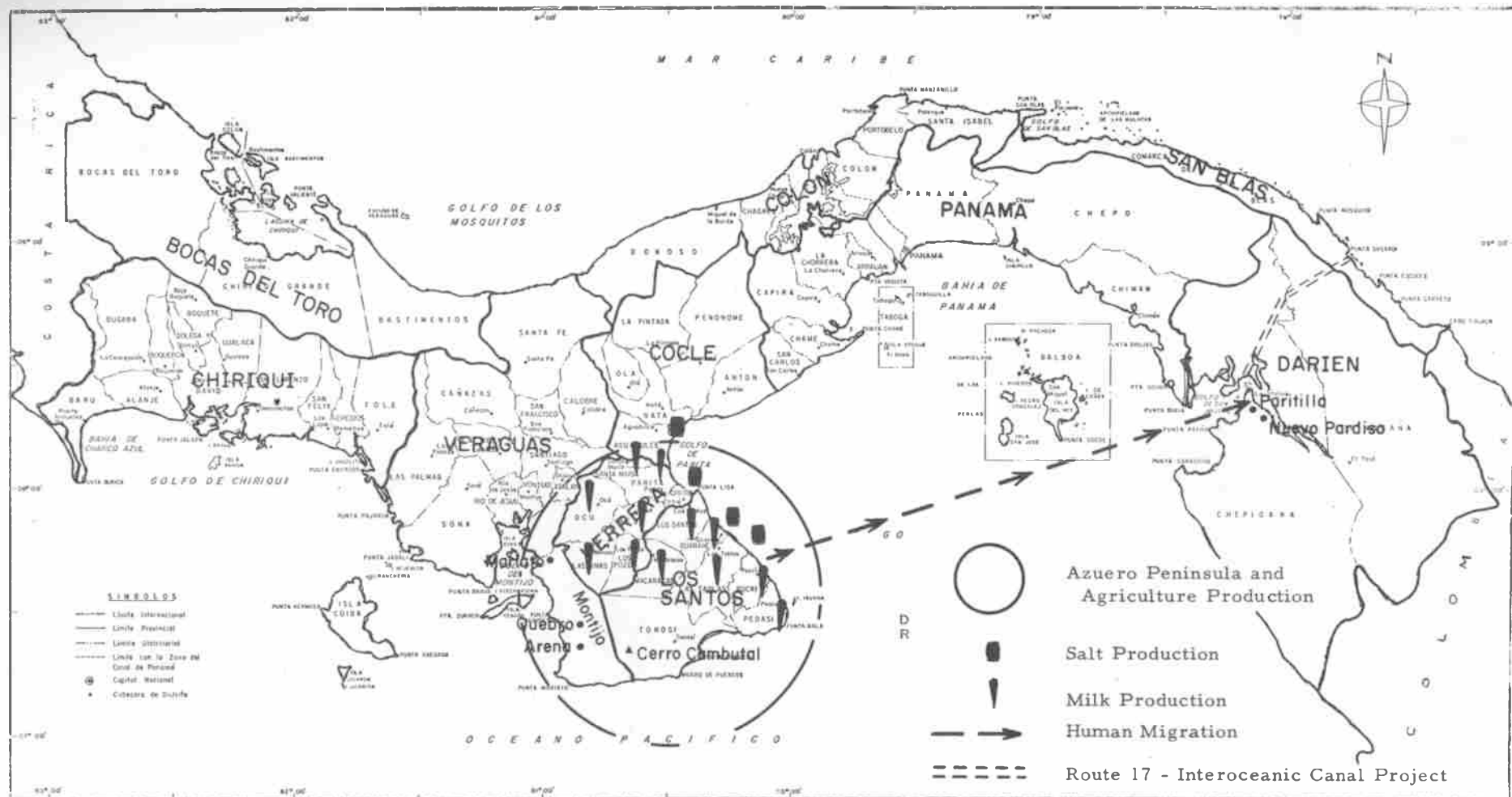


FIGURE 1. MAP SHOWING RELATIONSHIP OF THE AZUERO PENINSULA TO THE AREA OF ROUTE 17, PANAMA

ECONOMIC AND SOCIOLOGICAL REVIEW OF THE AZUERO PENINSULA, PANAMA

INTRODUCTION

The ecology of more than 130,000 people living in the Azuero Peninsula of Panama and those living in the Archipelago de Las Perlas has become important to the planning for construction of Route 17 of the proposed new Interoceanic Canal (see Figure 1), since meteorological studies have indicated that both locales lie downwind from proposed Route 17 and could possibly be affected by fallout of radioactive materials during levelling operations.

The age and civil status, by province, of the various segments of the population, their diets, and the economy of the region, including livestock production, fishing, farming, and industrial activities, are significant factors in the planning being done by scientists working on the project. Also of importance are the patterns of internal migration of the residents and the problems typical of their unique dwellings.

The area discussed in this paper includes only the Azuero Peninsula, which is located about 125 miles West-Southwest of the project area and separated from it by the Golfo de Panama; the islands of the Archipelago de Las Perlas lie in the Eastern one-third of this body of water. The Peninsula is made up of the provinces of Herrera and Los Santos and part of the province of Veraguas, all of which provide access to the Pacific Ocean via small ports suitable for fishing use by small-scale fishermen operating rowboats and "cayucos", the latter a notably seaworthy native dugout. The region is a part of the Pacific Plain, except for the mountainous spine of the Peninsula, which is terminated at its Southern end by Cerro Cambutal, the highest point (3,700 ft) in the area; several medium-size rivers originate from the numerous peaks of the vicinity.

The only two communities in the Peninsula that could be classified as urban centers are Chitre (1960 population, 9120), the administrative seat of the province of Herrera, and Las Tablas (1960 population, 3504), seat of the province of Los Santos; both provinces are divided into seven political districts. The best-known communities in the province of Veraguas on the Western coast of the Peninsula are Arenas and Mariato. The latter village name serves to identify the region, with no reference necessary other than "Mariato". This sector of the Peninsula is almost totally isolated from the rest of the country due to the geography of the area, with the province's district of Montijo lying on the West side of the mountain range that is the dominant feature of the region and south of an extensive swampland.

Administratively, this district belongs to Veraguas Province, with its seat at the "corregimiento" of Arenas. The population is rather scattered and its members' main activity is reduced to subsistence agriculture. Transportation is mostly by sporadic lightplane service and small-boat navigation. Elementary schools have recently been established, mainly in Quebro and Arenas.

Since the Montijo District is so isolated, of such relative unimportance to the economy of the Peninsula, and because complete records of the statistics of the region are practically nonexistent, most tables in this report refer only to Herrera and Los Santos provinces.

Most of the Peninsula's population resides along the Northeastern coast that is served by a modern paved highway connecting the localities, with numerous unpaved roads extending from the main route and one paved adjoining highway reaching halfway into the Peninsula midway down the East coast. A third paved route extends South from the Carretera Interamericana to serve the Northern one-third of the Peninsula and form a trunk connection for other unpaved roads in the Northeastern sector.

POPULATION AND DEMOGRAPHY

One of the principal characteristics of that portion of the Pacific Plain constituting the Azuero Peninsula, at least the latter's Eastern one-half, is its high population index relative to the rest of Panama. However, the population density of the region shows a dispersed habitat, especially if a count of dwellings is the basis for such a comparison of the provinces, which exhibit fundamental differences in that respect. While in Herrera Province the population density grew from 20.6 inhabitants per square kilometer in 1950 to 25.4 in 1960, it grew in Los Santos Province from 15.9 to 18.2 during the same period (see Table 1).

TABLE 1. POPULATION CHANGES IN THE AZUERO
PENINSULA, PANAMA

Political Subdivision	Density	
	1950	1960
<u>Herrera Province</u>	*20.6	*25.4
District:		
Chitre	122.0	154.0
Las Minas	11.0	13.2
Ocu	16.1	20.1
Parita	14.6	17.6
Pese	25.0	31.0
Los Pozos	16.9	20.3
Santa Maria	24.8	29.6
<u>Los Santos Province</u>	*15.9	*18.2
District:		
Guarare	32.2	34.4
Macaracas	18.6	21.4
Pedasi	11.9	13.5
Pocri	19.6	19.7
Los Santos	27.8	32.9
Las Tablas	27.1	27.7
Tonosi	3.1	6.0

* Average

The provinces of Herrera and Los Santos have shown marked variance in respect to their growth rate, caused by the differing natural factors found in the environment of each, including migration, epidemics, means of communication, employment possibilities, etc. Table 2 illustrates their respective rates of growth, based on data provided by the Statistics and Census Office.

TABLE 2. ANNUAL DEMOGRAPHIC RATE OF GROWTH PER THOUSAND INHABITANTS IN THE AZUERO PENINSULA

Province	Period				
	1911-1920	1921-1930	1931-1940	1941-1950	1951-1960
Herrera	26.0	16.7	19.9	27.0	21.0
Los Santos	15.8	17.6	17.8	21.0	14.0

Census information relative to population is expressed by "rate of growth per thousand inhabitants", referring to demographic growth. The rate is prepared for any region on the basis of in situ growth, total of births less deaths occurred, takes into consideration the phenomena of migration, and is expressed as analyzing a determined period.

The General Comptroller's Office, which compiles and records national statistics, has indicated an annual demographic rate of growth for the Republic of 29 per thousand inhabitants, but it does not indicate the figures per province or district, as would be desirable. If the fact is taken into account that each of the districts of the two provinces described has an abundant, stable population and that the annual demographic rate of growth is 29, it can be seen that Herrera Province is far below the national average.

One of the most significant facts of the population of the Azuero Peninsula is illustrated by Table 3, which shows the age structure of the population for the provinces of Herrera and Los Santos. The fact that the region's population is very young can be seen, a circumstance also generally true of the Republic as a whole. Were a population pyramid constructed, the maximum would be found between the ages of 15 and 24, with a dominance of the 15- to 19-year-old group, which consists essentially of consumers, not producers.

TABLE 3. AGE STRUCTURE OF THE POPULATION OF HERRERA AND LOS SANTOS PROVINCES

Age In Years	Herrera, group total	Los Santos, group total
10 - 14	1,173	1,028
15 - 19	3,243	3,519
20 - 24	3,012	3,236
25 - 29	2,479	2,571
30 - 34	2,162	2,302
35 - 39	1,777	1,987
40 - 44	1,575	1,641
45 - 49	1,377	1,583
50 - 54	1,033	1,228
55 - 59	793	966
60 - 64	731	863
65 - 69	443	498
70 - 74	252	410
75 and more	223	308

The total population of the province of Herrera presently is 61,672, according to statistics from the General Comptroller's Office. Of these, 31,540 are males and 30,132 are females, and there is an economically active population of 17,401 males and 2,872 females.

The total population of the province of Los Santos now is recorded at 70,554, of which 36,330 are males and 34,224 are females; the economically active population numbers 19,717 males and 2,423 females.

The province of Veraguas on the Peninsula's West side has a population of 4,886, as estimated by the Office of Statistics and Census. Due to its isolation, it has served many times as a refuge for social outcasts.

A detailed breakdown of the population distribution, by sex, in the "corregimientos" of each district of the provinces of Herrera and Los Santos is given in Table 4. The relative importance of each community in regard to population may be derived from a study of this table.

HOUSING

An analysis of the relative economic status of the average Panamanian may be made from the type of dwelling in which he lives; this basis also is valid for the individual residents of the Azuero Peninsula. In the province of Los Santos there is an abundance of straw houses with dirt floors, whereas in the province of Herrera, especially in Chitre, commercial and private buildings are to be found that can compete with the best in Panama City or any other municipality of the Republic. This phenomenon also reflects the relative economic status of the respective regions and indicates the mode of life of the residents of each; the colonists of Los Santos Province often emigrate to other places in the Republic, carrying their belongings with them.

However, the resultant frequent contact with people from other parts of the Republic, which is promoted by better roads and proximity of the region to Panama City, has brought about acculturation in respect to house types, with a greater diversity seen in the Peninsula in recent years.

Since the urban dwellings of the Peninsula correspond to those found elsewhere in the Republic, no description is made of them in this report. However, the rural dwellings merit a careful consideration, because houses of the same general type are found in areas near proposed Route 17 that have been colonized recently by people from the Azuero Peninsula.

The rural houses of the Azuero Peninsula are characterized by steep roof inclination, designed to provide maximum protection from frequent rains occurring in this region. They are usually built with straw or cane walls, and are generally square in form with a four-gabled roof and earth floor. These small houses are of two styles - with walls enclosed by leaves and without walls (hanging dwellings). Variations of roof structure also are common - in some instances, dry sugarcane leaves are used to thatch the roof, while in other instances, rice straw is used. The roof rests on round wooden poles laid across four corner supports.

TABLE 4. POPULATION OF DISTRICTS AND CORREGIMIENTOS

Districts and Corregimientos	Population		Total
	Male	Female	
<u>Los Santos Province</u>			
<u>Guarare</u>			
Guarare (capital)	1,394	1,394	2,788
El Espinal	498	439	937
Guarare Arriba	196	170	366
Llano	510	451	961
La Pasera	363	335	698
Las Trancas	933	890	1,823
Total	3,894	3,679	7,573
<u>Macaracas</u>			
Macaracas (capital)	587	596	1,183
Bahia Honda	433	412	845
Bajos de Guera	594	550	1,444
Corozal	449	394	843
Chupa	583	598	1,181
Espino Amarillo	261	266	527
Llano de Piedra	1,213	1,126	2,339
La Mesa	449	369	818
Mogollon	396	336	732
Las Palmas	454	376	830
Total	5,419	5,023	10,442
<u>Pedasi</u>			
Pedasi (capital)	737	686	1,423
Los Asientos	1,201	1,038	2,239
Mariabe	346	309	655
Purio	476	446	922
Total	2,760	2,479	5,239
<u>Pocri</u>			
Pocri (capital)	611	523	1,134
El Cañafistulo	445	440	885
Lajamina	736	672	1,408
Paraiso	390	373	763
Paritilla	778	831	1,609
Total	2,960	2,839	5,799
<u>Los Santos</u>			
Los Santos (capital)	3,141	3,114	6,255
La Colorada	529	472	1,001
Las Cruces	596	529	1,125
La Espigadilla	658	586	1,244
Las Guabas	831	745	1,576
Sabanagrande	871	822	1,693
Tres Quebradas	571	534	1,105
Total	7,197	6,802	13,999

TABLE 4. (Continued)

Districts and Corregimientos	Population		
	Male	Female	Total
<u>Tonosi</u>			
Tonosi (capital)	367	351	718
Altos de Guera	1,486	1,287	2,773
El Bebedero	553	489	1,042
El Cacao	257	265	522
Cañas	481	431	912
Flores	441	353	794
Guanico	746	672	1,418
Total	4,331	3,848	8,179
<u>Las Tablas</u>			
Las Tablas (capital)	1,665	1,889	3,554
Bajo Corral	493	485	978
Bayano	750	730	1,480
El Carate	271	227	498
El Cocal	506	541	1,047
Las Lajas	351	311	662
El Manantial	234	242	476
La Miel	208	197	405
El Muños	222	198	420
Nuario	261	197	458
La Palma	928	844	1,772
Palmira	142	122	264
Las Palmitas	212	226	438
El Pedregoso	301	292	593
Peña Blanca	283	261	544
Rio Hondo	291	241	532
San Jose	438	396	834
San Miguel	107	114	221
Sesteadero	438	409	847
Santo Domingo	696	650	1,346
Tablas Abajo	139	169	308
La Tiza	239	239	478
Valle Rico	303	294	597
Valle Riquito	291	280	571
Total	9,769	9,554	19,323
<u>Herrera Province</u>			
<u>Chitre</u>			
Chitre (capital)	4,369	4,929	9,298
La Arena	1,055	1,017	2,072
Monagrillo	1,609	1,656	3,265
Total	7,033	7,602	14,635

TABLE 4. (Continued)

Districts and Corregimientos	Population		
	Male	Female	Total
<u>Las Minas</u>			
Las Minas (capital)	729	752	1,481
Chepo	322	284	606
Chumical	331	304	635
Leones	621	552	1,173
Quebrada Rosario	1,043	919	1,962
El Toro	480	435	915
Total	3,526	3,246	6,772
<u>Ocu</u>			
Ocu (capital)	2,198	2,077	4,275
Cero Largo	1,240	1,128	2,368
Los Llanos	1,632	1,487	3,119
Llano Grande	614	573	1,187
Peñas Chatas	976	867	1,843
Total	6,660	6,132	12,792
<u>Parita</u>			
Parita (capital)	1,172	1,074	2,246
Cabuya	511	435	946
Los Castillos	273	232	505
Llano de la Cruz	174	157	331
Paris	511	435	946
Portobelillo	383	344	727
Potuga	447	406	853
Total	3,471	3,083	6,554
<u>Pese</u>			
Pese (capital)	794	854	1,648
Este	520	450	970
Norte	962	883	1,845
Oeste	1,045	926	1,971
Sur	1,219	1,105	2,324
Total	4,540	4,218	8,758
<u>Santa Maria</u>			
Santa Maria (capital)	1,276	1,139	2,415
Chupampa	1,092	998	2,090
Total	2,368	2,137	4,505
<u>Los Pozos</u>			
Los Pozos (capital)	855	884	1,739
La Arena	259	227	486
El Calabacito	398	367	765
El Cedro (Capuri)	489	448	937
Los Cerritos	507	533	1,040
Los Cerros de Paja	647	614	1,261
La Pitaloza	787	641	1,428
Total	3,942	3,714	7,656

Some residents build their homes of mud and clay, others use mud and straw, and those living under better economic conditions build dwellings of mud or wood and adobe, with galvanized iron roofs; but one-half the residences lack sanitary facilities, running water, and other modern conveniences, and most of them generally are overcrowded. A rare few are connected to sewage systems existing in nearby towns.

Some types of houses have an internal division characteristic of the local culture, with very special functions separated by partitions, while many one-room dwellings that are used for shelter, kitchen, domestic workshop*(for rice crushing), and elementary stable are prevalent. The dwellings with separated functions generally have special sleeping quarters and a "joron" (attic space used for grain deposit), to which access is gained through coarse stairways carved from a thick piece of tree trunk.

In these more complex house arrangements, the dormitory or sleeping area contains beds built from bamboo cane, poles, vines, thin canes (carricillos), and, on occasion, purchased furniture that was manufactured in other regions; however, many Azuero dwellers sleep on livestock hides thrown onto the earthen floor. The kitchen of such a dwelling usually has a "fogon" (high and low), or cooking facility, which consists of several big stones that support two kettles or pans for preparing meals; the eating table is usually a box or simply two pieces of wood to which supports have been added.

The type of dwelling preferred in most of the Peninsula can thus be seen to be this "rancho", which is ideally adapted to an economy of nomadic tropical farming and is readily transferrable for use elsewhere by the population, which, because of its mestizo ethnic character and high degree of "guaymi" cultural influence, takes advantage of building materials provided by the immediate environment in constructing living abodes.

INTERNAL MIGRATION

A net migrating movement from the provinces of Herrera and Los Santos for the 10-year period between the 1950 and 1960 Federal Censuses amounted to 4,557 emigrants from Herrera and 15,857 from Los Santos, based on official figures. This net differential takes into account both emigrants from and immigrants to each of the two main provinces of the Peninsula.

These facts could serve as starting points for a study in greater depth that would define more clearly the factors contributing to Los Santos' higher number of migrants. During the 1960 census study, 12,676 persons from the province of Herrera and 28,390 from Los Santos were counted in other provinces, while in 1950 there were 7,384 from Herrera and 12,348 from Los Santos, indicating that 5,292 more inhabitants from Herrera and 16,042 more from Los Santos were counted in other provinces in 1960 than in 1950.

Simultaneously, 3,996 persons who had arrived from elsewhere were counted in Herrera Province, while in Los Santos Province 2,382 persons were counted who were strangers; in 1950, there were 3,261 strangers registered in Herrera and 2,197 in Los Santos.

Internal migration has been defined as "movement of the population brought about by the transfer of persons from an inhabited place to another inhabited place in the

country"; these movements constitute a very important element of this report from the economic and social point of view and have followed several courses that have been caused by different motives: (a) the desire to settle in the terminal cities of Panama and Colon in order to benefit from the economic activity that is a result of the Panama Canal, or, on other occasions, (b) the manifest desire to own a piece of land for the economic welfare of the family. Both cases are typical reasons for the man from Herrera, Los Santos, Veraguas, or Chiriqui (western Panama) provinces to transfer to other areas.

Investigation of these migration currents was begun through the 1950 Census on Population Dwelling; it became possible at that time to record the place of birth and residence of many citizens. Since then, serious studies on migration have been conducted and detailed information continues to be searched for in this respect.

Despite efforts made in 1950 through the Statistics and Census office, the most serious attempt to analyze migration was made in 1960, when it became possible to include the Republic as a whole in the study.

In Panama, as well as in other underdeveloped countries of Latin America, there is an internal migration from the country to the city that is present parallel to the process of urban and commercial development, which is a fundamental reason why the Republic faces a series of internal socioeconomic problems that become more serious as time goes by. The internal movement from one rural environment to another is well understood and occurs only if the migrant is either certain of being able to obtain a productive land area that will satisfy aspirations he has always entertained (a case typical of the migrant who has arrived in highly favored Darien Province in eastern Panama from Los Santos, Herrera, or Chiriqui), or perhaps if he has the opportunity of settling in areas that are more productive and have better commercial possibilities than his own (a case typical of the migrant who settles in the highlands of Chiriqui Province).

The National Government, working through different institutions, presently is trying to learn in greater detail the intensity of the overall internal migration problem, but is very far from getting a perspective of the national reality in this respect. The Republic's geographical position has increased the exodus of the rural population to the urban centers, and planned, continuous studies are required to attain the objectives outlined.

Official sources are not up to date; for instance, they indicate the following information: "Persons from other provinces counted in the census in the province of Darien: in 1950. . . . Herrera 1, Los Santos 28; in 1960. . . . Herrera 6, Los Santos 73". During the preparation of this report, an investigation was conducted of the Nuevo Paraiso and Nuevo Paritilla communities of Darien Province (both considered typical of villages in which former residents of Los Santos now live), and it was learned that the population included the following emigrants from that province of the Azuero Peninsula:

<u>Community</u>	<u>Men</u>	<u>Women</u>	<u>Children</u>	<u>Total</u>
Nuevo Paraiso	22	26	41	89
Nuevo Paritilla	15	17	43	75
Total	37	43	84	164
Total Adults	80			

ECONOMY OF THE REGION

It is difficult to describe the economy of the Azuero Peninsula in one aspect only, since it is divided into different sectors. The principal factors are:

- (1) Farming production, or land use. This activity is well developed, but uses methods that are uneconomical if evaluated in respect to the effort put forth and the results obtained. One of the types of farm operations most important nationally is commercial dairying.
- (2) Livestock and poultry production, which is important, especially in the province of Los Santos.
- (3) Industrial production, in which the geographical position of the Peninsula has made it possible for trade to progress in direct relation with that of the terminal cities of Panama and Colon.
- (4) Fishing activity, in which the presence of some small but good harbors has aided a considerable number of persons to make their living in this manner. Small boats, such as "cayucos" and rowboats, are used. Sometimes fishing is done with nets and at other times with lines and hooks.
- (5) Mining activity - this phase of the Peninsula's economy is still in the developmental stage, with a project presently being conducted in co-operation with United Nations technicians to survey the mining potential of indicated mineral deposits in the Southwestern portion of Herrera Province.

In the Peninsula there is an enormous assortment of trees that produce lumber for use in houses and furniture; limber mills exist that have made considerable profit for their owners, but cutting operations have depleted some of the forestry wealth. The heavy rain forest in the Peninsula provides a rich source of construction lumber also in the Montijo district of Veraguas Province, but there are only a few small entrepreneurs extracting this resource. In the past, a large American firm unsuccessfully urged the planting of African Palm in this area to produce edible oils.

The fauna of the region has been steadily depleted; however, species such as squirrels (Sciurus, sp), paca or striped rabbit (Cuniculus paca ssp), deer (Mazama americana), iguanas, etc., remain abundant.

The inhabitants of Herrera and Los Santos Provinces have taken advantage of their proximity to the sea and have built evaporation pits to produce salt that provides them with income for their daily living.

In general terms, it may be asserted that the greater wealth of the Azuero Peninsula is constituted by the land; however, this has been exploited by such poor cultivation methods that its soil horizon or arable layer is steadily being depleted. This is basically caused by the tropical environment, in which heavy rainfall for eons of time have leached chemical elements from the subsoil as it has become weathered and thus prevented the formation of a thick soil horizon rich in the basic soil minerals of nitrogen, phosphorous, and potassium (NPK).

The farm producers work a piece of land for a year and the next are forced to move to more virgin areas in order to obtain land with some mineral content. In many tropical areas, residents burn the vegetation periodically in partially effective attempt to return to the soil what few minerals have been taken up by the plants. The basic soil elements have become so depleted in many areas that nutritional deficiencies are suffered by residents because of the lack of minerals in their crops.

Farm Production

The Azuero Peninsula bases its farm economy on the production of several crops such as rice, corn, tobacco, sugarcane, "truck-farm" vegetables (lettuce, sweet pepper, cabbage, tomatoes, etc.), yam, guandu (pigeonpea), coffee, beans, and the raising of livestock and poultry. The farming methods used are not modern or efficient and may be described as affording subsistence-level living only for practitioners of these methods.

Analysis of the economic pursuits of the populace of the Peninsula reveals the fact that at least two-thirds of the residents are dependent on agriculture for a livelihood (see Table 5).

TABLE 5. DEPENDENCE UPON AGRICULTURE IN THE AZUERO PENINSULA

Province	Economically Active	Dependent Population		Total Dependents	Total Population
		Economically Inactive			
		Over 15 Years Old	Under 15 Years Old		
Herrera	14,184	9,992	17,299	41,475	61,672
Los Santos	17,151	12,143	22,718	52,012	70,554
Total	31,335	22,135	40,017	93,487	132,226

The Azuero Peninsula is characterized by well-divided farm property and can be described as "minifundio" (consisting of small holdings). The per capita production suffers from the lack of scientific cultivation as well as from erosion of thin tropical soil horizons by excessive rainfall. The overall production of corn in both provinces appears to be diminishing despite an increase in surface area planted. In Herrera, the greatest land surface was planted in 1963-1964, but the greatest production occurred in 1962-1963, with the lowest yield in the last year recorded so far, 1965-1966 (see Table 6).

TABLE 6. CORN PRODUCTION IN HERRERA PROVINCE, 1961-1966

Period	Hectares Planted	Production in Quintals
1961-1962	8,400	176,800
1962-1963	8,000	198,500
1963-1964	9,100	174,500
1964-1965	8,700	191,200
1965-1966	8,800	169,800

The occurrence of production drops in certain crops of the area - for example, the decline in corn yield per area planted - is remarkable in view of the gigantic effort made

by different state institutions dealing with farm development in the Peninsula. These several agencies have been working in the Republic since January, 1953, and have devoted considerable attention in their program for developing growth of national farming to policies favoring the Peninsula farmers' attempts to increase effective yield.

The corn-production trend described for the province of Herrera was not matched by that for the province of Los Santos, where the greatest land surface was planted in 1965-1966, resulting in the greatest overall production of corn (see Table 7). This fact might be attributable to less-used soils in the more virgin lands of Los Santos Province, although the basic reason for the variance might go deeper than as to type of land available; a study in depth would help pinpoint the factors that cause a significant effect in yield. A possible explanation is provided by the fact that the Southern province has more highland area due to its greater proximity to mountains in the region; this would lead to an expectation of different soil types and different climatic conditions and amounts of rainfall than in the generally lower lands of Herrera Province to the North.

TABLE 7. CORN PRODUCTION IN LOS SANTOS PROVINCE, 1961-1966

Period	Hectares Planted	Production in Quintals
1961-1962	17,100	305,600
1962-1963	17,200	351,000
1963-1964	17,200	311,000
1964-1965	17,400	355,800
1965-1966	19,600	366,200

Diet in the Azuero Peninsula relies heavily on rice consumption, and this reliance is the reason why rice production is important and the effort made in each region to increase crop yields is considerable. Herrera Province experienced a trend in rice production distinctly unlike that of corn (see Table 8).

TABLE 8. RICE PRODUCTION IN HERRERA PROVINCE, 1961-1966

Period	Hectares Planted	Production in Quintals
1961-1962	8,400	206,300
1962-1963	8,600	250,800
1963-1964	9,400	266,400
1964-1965	13,000	357,400
1965-1966	12,700	360,100

The production of rice increased at a steady rate during the period reported to approximately 75 percent more in the last year than in the first, while the production of corn fluctuated from year to year, finally showing a decrease in total quintals produced. Los Santos Province showed a slight increase in rice production until the last year of the period, when a drastic reduction occurred; the area experienced less marked change than did Herrera, and production was characterized by considerable fluctuation during the period (see Table 9), while this Southern province of the Peninsula showed an overall increase in corn production marked by minor fluctuations.

TABLE 9. RICE PRODUCTION IN LOS SANTOS PROVINCE, 1961-1966

Period	Hectares Planted	Production in Quintals
1961-1962	12,500	325,900
1962-1963	12,800	313,600
1963-1964	14,800	338,900
1964-1965	15,300	394,500
1965-1966	14,900	265,700

Beans are the other important crop in the diet of the Peninsula's inhabitants, especially the variety known as "chiricano", which owes its name to the fact that it first was planted in Chiriqui Province in Western Panama. Bean production has remained roughly constant, considering the production from both Herrera and Los Santos provinces, but has been marked by a reversal in trend in each area during the period reported, with the top hectareage and highest production occurring in 1962-1963. Production in Herrera Province has declined steadily as area of planting has increased, while Los Santos Province production has increased slightly parallel with an increase in planted area. Comparative yield-per-hectare figures between the two provinces show that the Southern highland province of Los Santos has a definite advantage over its northern neighbor of Herrera in effective yield. This circumstance is probably not due to different methods of cultivation so much as it is due to effect of landforms upon climate and soil types (see Table 10).

TABLE 10. BEAN PRODUCTION IN THE AZUERO PENINSULA, 1961-1966

Period	Province			
	Herrera		Los Santos	
	Hectares Planted	Production in Quintals	Hectares Planted	Production In Quintals
1961-1962	1,600	12,200	1,200	11,400
1962-1963	2,300	14,500	1,400	12,900
1963-1964	1,300	6,100	1,600	13,500
1964-1965	1,300	8,400	1,300	7,600
1965-1966	1,800	9,800	1,700	15,300

Farmers of this region of the Peninsula also cultivate cash crops such as coffee, tobacco, and sugarcane for the commercial market, and there are a number of large-scale producers of these commodities (see Tables 11, 12, and 13).

Table 12 indicates that the Province of Los Santos has highly favorable soil for growing of tobacco that is used for making cigars; the type of tobacco cultivated in the general Azuero Peninsula area is destined for the manufacture of cigars (puros); it is not used in the manufacture of cigarettes, as this is not the variety used for this purpose. It is rather difficult to classify the varieties, as the producers generally classify them as "criollos", not knowing the real name. It is assumed there is a great possibility that the varieties are crossbred and consequently have produced a certain amount of degeneration in several instances; there are cases, however, in which producers have called this "Virginia tobacco". The scant production figures of Herrera Province give no hint of the enormous effort that has been made by producers to obtain at least some cash return from their plantings. Again, the effect of local landforms upon the soils and climate of

the province of Los Santos probably exerts an influence conducive to the production there of high-grade tobacco. A potential rise in the economy of this facet of the area's agriculture might be realized by expanding such operations.

TABLE 11. COFFEE PRODUCTION IN THE AZUERO PENINSULA, 1961-1966

Period	Province			
	Herrera		Los Santos	
	Hectares Planted	Production in Quintals	Hectares Planted	Production in Quintals
1961-1962	4,200	10,700	3,100	6,500
1962-1963	4,000	12,300	2,600	5,600
1963-1964	4,000	6,100	2,300	6,100
1964-1965	3,400	5,500	2,600	5,900
1965-1966	4,000	5,700	3,200	6,300

TABLE 12. TOBACCO PRODUCTION IN THE AZUERO PENINSULA, 1961-1966

Period	Province			
	Herrera		Los Santos	
	Hectares Planted	Production in Quintals	Hectares Planted	Production in Quintals
1961-1962	20	60	70	730
1962-1963	--	--	210	2,800
1963-1964	20	90	70	760
1964-1965	10	160	100	1,200
1965-1966	10	100	80	1,000

TABLE 13. SUGARCANE PRODUCTION IN THE AZUERO PENINSULA, 1961-1966

Period	Province			
	Herrera		Los Santos	
	Hectares Planted	Production in Tons	Hectares Planted	Production in Tons
1961-1962	2,310	77,500	2,060	56,500
1962-1963	2,910	92,400	1,740	36,700
1963-1964	3,150	113,000	1,950	73,300
1964-1965	3,530	135,200	2,030	83,300
1965-1966	--	--	--	--

The data of Table 13 show that sugarcane cultivation is more widespread in Herrera than in Los Santos, with production nearly doubled during the period reported while surface area planted increased only 50 percent. Production changes correspond roughly to profit margins the producers have derived each year, but do not correspond necessarily to the effort expended during the period by Governmental agencies. The largest proportion of sugar production is located in Herrera, precisely near the sugar mills in the district of Aguadulce (the largest portion of sugarcane cultivation is done in the district

of Santa Maria, the northernmost district of Herrera Province near the mills). Production of sugarcane in Los Santos Province has been successfully expanded, also, with approximately a 50 percent increase in total yield as hectareage planted has remained constant.

If data on corn, rice, and bean production in Herrera and Los Santos provinces are studied, a variance between the figures of the provinces becomes apparent for each crop. This phenomenon is due to the effect of many technical and natural factors present in each area; continuing study would reveal a more clear understanding of these factors pertaining to the agricultural economy of the region. Technical factors contributing to variance include some of the following:

- (1) Producers are ignorant of science advances, and therefore their time is devoted to monoculture.
- (2) The soil does not render full production, due to ignorance of the use of fertilizers in the required quantities and varieties.
- (3) Cultivation is done mainly for subsistence; in other words, excess production is sold in order to purchase or secure what is not produced.

Among the natural factors are the geographic conformation in itself of each of the provinces, the better means of communications existing in Herrera than in Los Santos, the nearness of the agricultural-product consumers' markets, and the fact that Los Santos is a province dedicated to cattle raising (it must be taken into consideration that there is more land space there and that cattle raising in the Peninsula requires approximately one hectare per head). Another factor that might affect the comparative productions of the two provinces is transportation. Los Santos Province has perhaps less farmland that is readily accessible by roads than does Herrera Province; this could be a detrimental factor on production of certain cash crops produced in the area that would require transport to centrally located markets. The yield per hectare in both provinces for corn during the period reported is shown in Table 14.

TABLE 14. CORN PRODUCTION PER HECTARE IN THE
AZUERO PENINSULA, 1961-1966 (TONS)

Province	Period				
	1961-1962	1962-1963	1963-1964	1964-1965	1965-1966
Herrera	21.0	24.8	19.2	22.0	19.3
Los Santos	17.9	20.4	18.0	20.4	18.7

Table 14 indicates that the greatest corn production per land area planted was in the 1962-1963 year; this fact also is evident in Table 15, which shows the rice production per land area for both provinces.

TABLE 15. RICE PRODUCTION PER HECTARE IN THE AZUERO PENINSULA, 1961-1966 (TONS)

Province	Period				
	1961-1962	1962-1963	1963-1964	1964-1965	1965-1966
Herrera	24.6	29.2	28.3	27.5	28.4
Los Santos	26.3	24.5	22.9	25.8	17.8

However, bean production reached its maximum yield in Los Santos Province in 1965-1966 and in Herrera Province in 1961-1962 (see Table 16).

TABLE 16. BEAN PRODUCTION PER HECTARE IN THE AZUERO PENINSULA, 1961-1966 (TONS)

Province	Period				
	1961-1962	1962-1963	1963-1964	1964-1965	1965-1966
Herrera	7.5	6.3	4.7	6.5	5.4
Los Santos	8.7	7.6	8.4	5.8	9.0

Small quantities of lettuce, sweet pepper, cabbage, tomato, guandu, yuca, sesame (oily grain), and yam crops are produced for the commercial market, since the food habits of Azuero residents do not involve consumption of many of these types of "truck-farm" vegetables. Two hundred sixty-one individual crops of lettuce, peppers, cabbages, and tomatoes were produced from 170 hectares in Herrera in 1965-1966, while 153 such crops were grown on 95 hectares in Los Santos. Yuca, yams, and guandu crops numbered 1,372 from 998 hectares in Herrera, while 551 hectares in Los Santos produced 14,210 of these crops in the same year.

Livestock Production

Livestock slaughtering figures in the provinces of Herrera and Los Santos, although not constituting as high a rate per capita as is preferred by officials of the Republic, nevertheless are some of the highest in comparison to other rural areas of the country. In 1966, cattle slaughtered numbered 5,138 in Herrera Province and 4,445 in Los Santos Province, with butchering operations concentrated in the chief administrative cities. Hogs slaughtered totalled 2,093 in Herrera Province and 2,495 in Los Santos Province during the same period. Meat products were shipped to markets in Panama and Colon in addition to their being sold in local markets of the Peninsula. Tables 17, 18, and 19 show the populations of cattle, hogs, and chickens from 1961, and Table 20 shows the amount of land in use as pasturage during 1960.

TABLE 17. HEADS OF CATTLE IN THE AZUERO PENINSULA

Province	1961	1962	1963	1964	1965	1966
Herrera	90,236	101,300	98,500	106,000	123,500	128,000
Los Santos	158,963	169,200	176,200	198,300	216,400	224,000
Total	249,199	270,500	274,700	304,300	339,900	352,000

TABLE 18. HEADS OF HOGS IN THE AZUERO PENINSULA

Province	1961	1962	1963	1964	1965	1966
Herrera	24,220	24,700	19,200	15,400	15,500	--
Los Santos	46,120	44,900	37,600	33,600	34,200	--
Total	70,340	69,600	56,800	49,000	49,700	

TABLE 19. NUMBERS OF POULTRY (CHICKENS) IN THE AZUERO PENINSULA

Province	1961	1962	1963	1964	1965	1966
Herrera	252,777	261,100	238,100	204,400	270,100	--
Los Santos	442,822	414,100	383,800	365,300	368,100	--
Total	695,599	675,200	621,900	569,700	638,200	

TABLE 20. PASTURAGE AREA IN THE AZUERO PENINSULA (1960 Census)

Province	Natural Pasture		Cultivated Pasture		Total Fields (Area)	
	Number Of Fields Utilized	Area, Hectares	Number Of Fields Utilized	Area, Hectares		
Herrera	1,562	11,976	4,115	72,371	5,677	(84,347)
Los Santos	1,544	8,350	1,524	128,894	3,068	(137,244)
Total	3,106	20,326	5,639	201,265	8,745	(221,591)

The cattle populations of both provinces are seen to be steadily increasing despite relatively constant rates of slaughter, whereas hog population in both provinces shows a decline.

Milk Production

The livestock wealth most important to the Peninsula is the dairy population, which constitutes one of the major sources of milk products for the Republic. About 75 percent of the commercial sales of the dairy production from the Peninsula is sold to the Panamanian Milk Foods Company (Compañía Panameña de Alimentos Lacteos), which provides a main source of employment for many inhabitants of the region, constitutes one of the prime industries of the area, and provides the principal market of the region.

The production sold to this firm, which has its main office in Nata, province of Coclé north of Herrera Province, is utilized to process condensed, powdered, and evaporated milk (its main product) in addition to pasteurized milk. The percentage of commercial milk production from the Peninsula not purchased by the Nata firm is consumed in various other parts of the Republic. Production has varied through the years, directly influenced by rainfall, type of livestock, and other factors. Table 21 lists the annual milk production of the provinces of Herrera and Los Santos from 1960 through 1966.

TABLE 21. MILK PRODUCTION IN LITERS OF THE
AZUERO PENINSULA, 1960-1966

Year	Province	
	Herrera	Los Santos
1960	3,560,402	5,218,539
1961	3,984,011	5,412,710
1962	4,105,127	6,523,271
1963	4,592,004	6,453,617
1964	4,460,293	6,378,783
1965	3,903,468	6,265,507
1966	5,456,271	7,013,157

Industrial Activities

Industries in the Azuero Peninsula include salt production (refining), alcohol production (distilling of industrial alcohol and palatable liquors), and small-home manufacturing (garments, shoes, furniture, and hats), but the economy in this region is primarily agricultural, with emphasis upon dairy products.

The province of Herrera produced 405,602 quarts of alcohol during the 1960-1965 period while Los Santos produced 135,335 quarts in a like period (distillation mills are required to pay taxes on their production); milk production for the period was 5,456,271 liters in Herrera and 7,013,157 liters in Los Santos (see Table 21). Salt production per district in 1966 in those that possessed salt-refining facilities was 20,566 quintals in Guarare (Los Santos), 3,607 in Las Tablas (Los Santos), 87,886 in Los Santos (Los Santos), and 7,535 in Chitre (Herrera). Tables 22, 23, and 24 show the production figures for the salt-producing districts, with data taken from the Publication on Industries, 1966, edited by the Bureau of Statistics and Census, Series F, No. 1. The production from the region of Aguadulce in the province of Coclé, which, together with the provinces of the Azuero Peninsula, furnishes all the salt used by the Republic, is listed in Table 24.

TABLE 22. SALT PRODUCTION IN QUINTALS PER DISTRICT FOR LOS SANTOS AND HERRERA PROVINCES, 1960-1966

Year	Province					Total
	Los Santos				Herrera	
	Guarare	Las Tablas	Los Santos	Pocri	Chitre	
1960	15,083	1,916	68,318	1,258	4,526	91,083
1961	16,817	2,021	83,279	1,431	5,560	109,108
1962	26,467	2,493	108,977	1,765	7,280	146,982
1963	27,992	7,286	118,885	1,607	8,978	164,748
1964	25,614	3,760	113,606	2,100	6,131	151,211
1965	26,009	4,793	119,818	2,254	9,360	162,234
1966	20,566	3,607	87,886	1,692	7,535	121,286

TABLE 23. SALT PRODUCTION IN QUINTALS FOR LOS SANTOS PROVINCE, 1967

District	Month			Total
	February	March	April	
Los Santos	920	29,968	42,844	73,732
Las Tablas	849	9,812	11,902	22,563
Guarare	605	8,019	13,307	21,931
Total	2,374	47,799	68,053	118,226

Note: Production figures during these months of 1967 for Pocri (Los Santos Province) and Chitre (Herrera Province) were unavailable.

TABLE 24. SALT PRODUCTION IN QUINTALS FOR THE REGION OF AGUADULCE, COCLE PROVINCE, 1960-1967

Year	Amount	Year	Amount
1960	52,300	1964	91,738
1961	61,250	1965	90,866
1962	100,610	1966	72,576
1963	57,526	1967	85,804

Fishing Activities

In the Azuero Peninsula there are small harbors that have been used advantageously, due to local community interest. A significant segment of the population, not yet determined, derives its living from fishing activities in this region. The harbors provide access to the Pacific Ocean and afford the opportunity of obtaining varied fish while permitting the production of salt from surface drying pits.

Among the fish to be found in this region are the following:

<u>Local Name</u>	<u>Scientific Name</u>	<u>Family</u>
Robalo (Snook)	<u>Centropomus undecimalis</u>	Centropomidae
Pargo (Snapper)	<u>Lutjanus guttatus</u>	Lutjanidae
Lisa (White Mullet)	<u>Mugil thoburni</u>	Mugilidae
Jurel (Jack Crevalle)	<u>Vomer declivitrans</u>	Carangidae
Corvina	<u>Cynoscion reticulatus</u>	Sciaenidae
Mero	<u>Rypticus migripinnis</u>	Serranidae
Bagre	<u>Felichyths panamensis</u>	Ariidae

Fishing is done with small boats ("cayucos" and small rowboats) and by placing corals near the beach for entrapment of catch; boat fishermen use hooks and bait (dead or alive) consisting of insects or small fish. Those who fish in deep water usually go out as much as 3 miles from the coast; this fishing is done at a water depth of 12 fathoms (about 65 feet).

The fishing season preferred by local inhabitants is during winter (November - April), since the strong summer (April - November) breezes off the coast make fishing dangerous at that time. According to reports from fishermen, an average of 150 pounds of fish may be caught by one fisherman each day during the winter, while during the dry season only about 70 pounds are caught daily.

The product from fishing is distributed in the neighboring towns as well as in the local community. The market for these fishermen is usually made up of hotels and private homes.

Prospects of Mining

Through special agreement between the National Government and the United Nations, there is a mining project in operation to learn the mining potential of Panama; through this project, Panama should know in the near future its various possibilities for production of commercial ores.

The "Azuerio Mining Project" is underway and technicians at present are gathering technical data and obtaining samples of different rocks in the field in order to draw up geological maps; this work should permit them to locate more closely the sites where commercial deposits of minerals are present and to determine the types of deposits.

There are no final reports yet of any of the regions under study by this project; the work is in its developmental stages and it is probable that in early 1968 there will be definitive reports; there are, however, early indications of a possibility in Azuerio (in the districts of Pese and Las Minas) of a valuable mineral deposit of a type not yet announced.

Engaged in this field work are both native and foreign technicians; they are all United Nation employees and will report their final findings to that organization. Some information will be provided in detail, however, to the Ministry of Agriculture, Commerce, and Industries of Panama when the Ministry requests this information.

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