

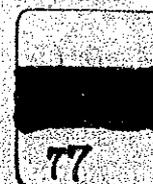
THE REPUBLIC OF COSTA RICA

REGIONAL STUDY OF
THE HINTERLAND OF CALDERA
AND PUNTARENAS PORTS

FINAL REPORT

NOVEMBER, 1977

JAPAN INTERNATIONAL COOPERATION AGENCY



ERRATA

<u>Page</u>	<u>Line</u>	<u>Errors</u>	<u>Corrected</u>
II-17	2	... <u>studies in comparative sectors</u> <u>sector by sector studies</u> ...
V-11	21	(See Figure 5.4)	This description should go to the last line of Page V-10.
VIII-46	(Table 8.13)	Total World Production 1959 1970	Total World Production 1959 1970 '70/'59
VIII-47	(Title)	Table 8.14 Several Basic Reference <u>Indeces</u>	Table 8.14 Several Basic Reference <u>Indices</u>
VIII-57	20	6) <u>Soldor</u>	6) <u>Solder</u>
IX-41	(Title)	Figure 9.16 <u>Law Class Commodities</u>	Figure 9.16 <u>Low Class Commodities</u>
IX-74	(Note)	... in <u>Figure C and D</u>	... in <u>Table D and E</u>

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PREFACE

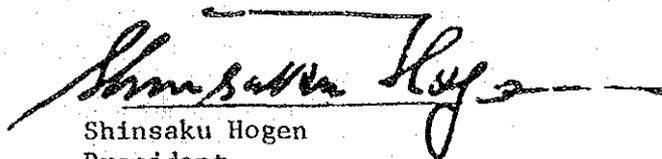
In response to the request by the Government of the Republic of Costa Rica, the Government of Japan decided to conduct a survey for the Regional Study of the Hinterland of Caldera and Puntarenas Ports through the Japan International Cooperation Agency (JICA). The Agency, after consultation with the ministries concerned, organized a survey team which comprised of ten (10) experts in various fields and headed by Mr. Jiro Kano, Managing Director of the International Development Center of Japan (IDCJ).

The objective of the survey was to find out development potentials in various sectors, taking into consideration the possible role of the new Caldera Port, and to work out the basic strategy of the regional development in the Hinterland of Caldera and Puntarenas Ports. The survey team carried out an intensive field survey from February to March, 1977, in collaboration with the Costa Rican Government's officials concerned, following the preliminary survey made in November, 1976. After the survey, detailed analysis was made in Japan by both the Japanese survey team members and the Costa Rican counterparts for this final report, taking into account the comments made by the Costa Rican Government.

It is my sincere hope that this report will prove helpful to the development of the Hinterland of Caldera and Puntarenas Ports of the Republic of Costa Rica in the future.

Finally, I wish to take this opportunity to express my gratitude to the officials of the Government of Costa Rica for their whole-hearted cooperation and supports extended to the team in the execution of the survey.

November, 1977



Shinsaku Hogen
President
Japan International Cooperation
Agency

LETTER OF TRANSMITTAL

Mr. Shinsaku Hogen
President
Japan International Cooperation Agency
Shinjuku Mitsui Bldg., Nishi-Shinjuku 2-1
Shinjuku-ku, Tokyo
Japan

Dear Mr. Hogen:

It is my pleasure to submit to you the final report entitled "Regional Study of the Hinterland of Caldera and Puntarenas Ports." This report has been prepared according to the contract signed on February 4, 1977 by the Japan International Cooperation Agency and the International Development Center of Japan.

The International Development Center of Japan undertook this study by use of a team of experts headed by Mr. Jiro Kano and the field survey was made from February 20 to March 28, 1977. The members of the field survey mission were:

- | | |
|--------------------------|-------------------------------------|
| 1. Mr. Jiro Kano | Project Director, Regional Planning |
| 2. Mr. Koichi Baba | Economic Planning |
| 3. Dr. Susumu Tsuji | Agro-Industry |
| 4. Dr. Mashio Yamaha | Environmental Affairs |
| 5. Mr. Toshio Asakura | Livestock |
| 6. Dr. Shohei Kawakatsu | Agricultural Economy |
| 7. Mr. Keisuke Suzuki | Transport Economy |
| 8. Dr. Hidehiko Tanimura | Urban Planning |
| 9. Mr. Jiro Watanabe | Industrial Park |
| 10. Mr. Noboru Takebe | Coordinator, Regional Economy |

The team was assisted in Costa Rica during the course of the study by a counterpart team comprising:

- | | |
|--------------------------------|---------|
| 1. Mr. Guillermo Alvarez | MOPT |
| 2. Mr. Luis A. Villalobos | MAG |
| 3. Mr. Ernesto Sanarrusia | MAG |
| 4. Mr. Olman Cordero | AyA |
| 5. Mr. Mario Bermúdez | IFAM |
| 6. Mr. Manuel Azofeifa | INCOP |
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| 11. Mr. Nizia Alvarenga | OFIPLAN |
| 12. Mr. Alfredo Del Campo | OFIPLAN |
| 13. Mr. Ruy Luis De Villalobos | OFIPLAN |
| 14. Mr. Jorge León Sáenz | OFIPLAN |

We are thankful to a number of persons of the Government of Costa Rica whose great efforts and hearty cooperation were very helpful and without which we could have never completed our study. Our appreciation goes especially to Dr. Fernando Zumbado, Minister and Mr. Claudio Soto Badilla, Vice-Minister, OFIPLAN who have arranged this study in the Government of Costa Rica.

We are also indebted to a number of persons in the Embassy of Japan in Costa Rica, and the Ministry of Foreign Affairs of Japan in Tokyo. Lastly but not the least, we acknowledge the tremendous efforts and hearty cooperation given to us from Japan International Cooperation Agency.

November, 1977

A handwritten signature in cursive script, reading "Saburo Kawai".

Saburo Kawai
President

International Development Center
of Japan

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SUMMARY OF FINDINGS AND RECOMMENDATIONS

S.1 On Certain Frameworks

1. The regional development strategy for the hinterland of Caldera and Puntarenas Ports, in this study's view, should most appropriately be conceived over a long-term perspective of about 20 years, ending around the year 2000.

2. This time reference would be most appropriate for the following reasons.

(a) The Government of Costa Rica has prepared an overall perspective of the country for the year 2000. For this purpose the government has prepared a set of basic data and projections of economic activities, population etc. Regional development study such as the integrated development of the hinterland of Caldera and Puntarenas Ports, should also be considered in the same framework.

(b) Any economic and social development process takes time. In particular, a low pressure, open and democratic country like Costa Rica must take into account a considerable long-term future growth for justification of any new projects which relate to the development accompanying structural change in the country.

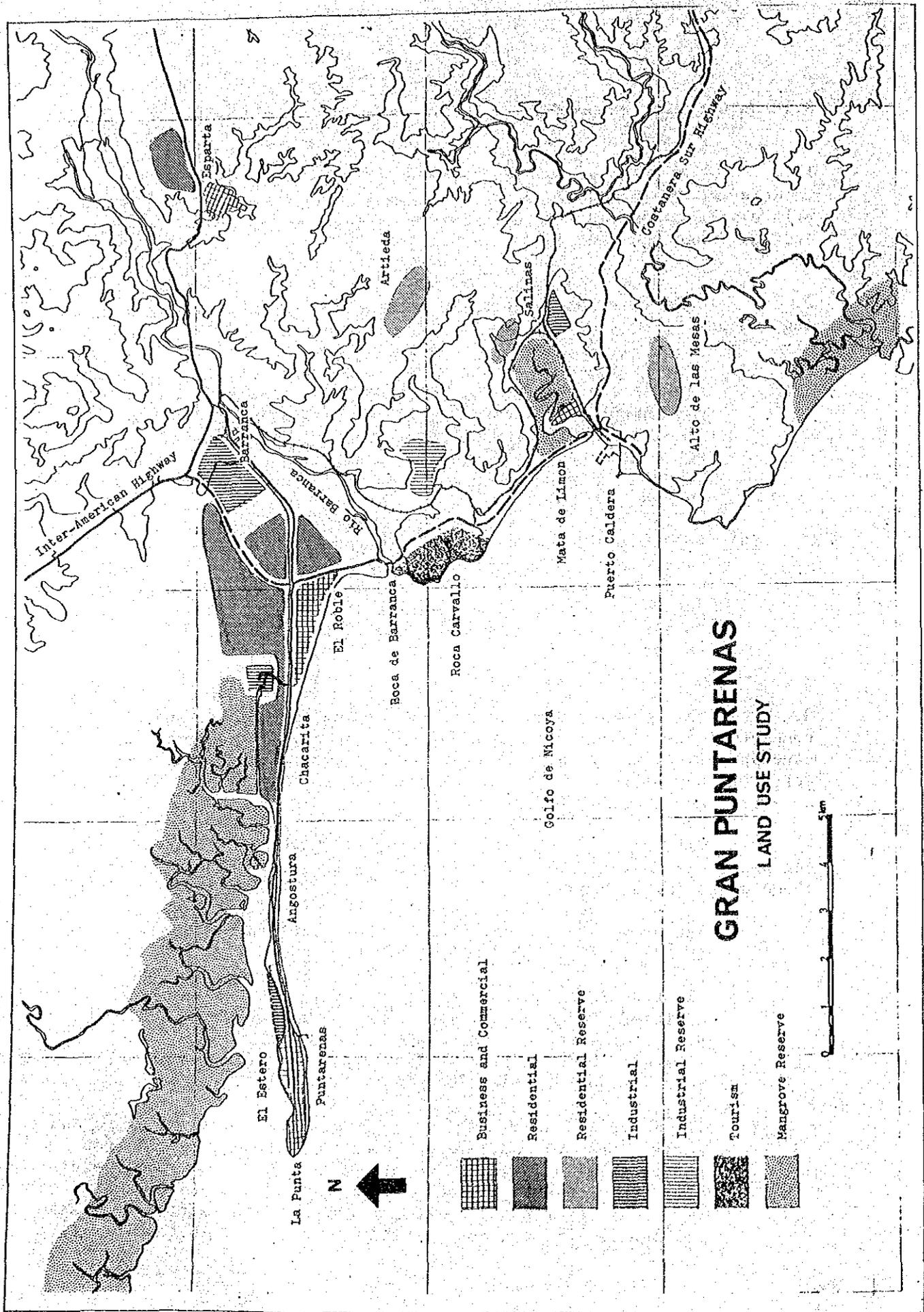
3. The concept of the hinterland of the ports is a kind of conceptual one relating to an extension of space. It can stretch conceptually as far as any economic and social influence which the ports may appear to extend. In other words, the hinterland is an area or space functionally related to the ports.

This study has taken a view that such areas of influence of the ports can conveniently be defined conceptually with the following three geographical phases.

(a) The area called Gran Puntarenas, as defined by INDECA report in 1975. (See Chapter I, Figure 1.1)

(b) The area delineated as Pacifico Central in the document entitled "Proyecciones Regionales de la Población de Costa Rica," prepared by IDESPO and OFIPLAN. This is a wider area including Gran Puntarenas itself and the area immediately adjacent to it. (See Chapter I, Figure 1.2)

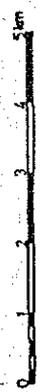
(c) The above two areas may not be self-contained in economic and social contexts nor have any complete autonomy, except for geographical continuity and affinity. This study considers that the economic and social variables of the hinterland region as demarcated in above (a) and (b) in fact very closely related, at present and possibly even more so in the future,



GRAN PUNTARENAS

LAND USE STUDY

-  Business and Commercial
-  Residential
-  Residential Reserve
-  Industrial
-  Industrial Reserve
-  Tourism
-  Mangrove Reserve



to all other regions in the country. Therefore, any other region is also considered capable of constituting a functional relations are concerned. In this sense Meseta Central, Alajuela through Quesada and Guanacaste including Nicoya Peninsula have special importance having close functional relationships to the hinterland.

S.2 General Characteristics of Hinterland

The hinterland - i.e., the area geographically identified with Gran Puntarenas and Pacifico Central which surrounds the former will be characterized by the following features:

1. The location of the hinterland, in fact, has a special feature, in that the area is located in between the two most important urban centers of the country. The metropolitan area of San Jose in the east and Puntarenas in its west. The distance between the two centers in within 90 Km and communication between only takes one and a half hours. Adding to this locational characteristic is the fact that the hinterland forms a cross road of communication between the north and the south of the country, particularly it will add the intensity of transportation and communication with the expected opening of a new road of Costanera Sur.
2. While Pacifico Central appears predominantly agricultural, the Gran Puntarenas is urban in character and higher concentration in manufacturing, commercial and other service industries.
3. Historically however, relatively high rate of emigration from the region has taken place, and consequently increase in population has relatively retarded as compared to the country as a whole. This feature particularly contrasts to the rate of concentration of population in the Meseta Central. Even so, however, the population density of the region is still the second highest in the country only superseded by Meseta Central.
4. Natural resource endowment of the region has a feature having faced to the Pacific Ocean which is potentially rich in marine resources and could be suitable for touristic and resort areas. However, the climate is typically tropical and this may not always advantageous as compared to more agreeable climate which Meseta Central enjoys.
5. Social overhead investment has been relatively high not only in population facilities but also social spheres and transportation will be further intensified in near future. Completions of the new port of Caldera, Caldera-San Jose Highway, highway connection between Caldera-El Roble-Inter American Highway, and Costanera Sur Road will serve for

human as well as commercial transportations not only between Pacifico Central and the metropolitan area, but also through this region to other countries in Central America as well as other countries of the world.

6. The region earns rather low level of income per capita and per family as compared to the national average, particularly compared to that in Meseta Central.

7. Gran Puntarenas, particularly urban Puntarenas seems to have some urgent need for provision of employment opportunity and urban renewal in connection with completion of the new port.

S.3 Regional Development Strategies

1. In expectation with both of future growth of the Costa Rican population, which is projected nearly to double in the year 2000, and of G.D.P. which would quadruple in real terms, considerable adjustments in the industrial structure of the country and its regional distribution should be expected. Accordingly, policies oriented to a suitable growth of the region must be established.

The role of the region in development strategy may be described as follows. Pacifico Central, being located in a strategic position, clearly must play a considerable role in the country's development. In order to orient the development in the right direction, any instruments available in the hand of the government should be assessed and utilized if applicable.

The proposed law of "Ley de Fomento a la Industria Rural" should possibly be one of such instruments and be used intensively. Appropriate areas in the region should be designated as "Rural Industrial Parks," to provide the necessary structure in both physical and institutional terms to promote new industries in the region, and also as "National Industrial Parks," as is relevant.

2. The overall strategy which should be adopted for the development of the region will be, in general, to guide the development of the region with intensified industrial, agricultural - in a wider sense including forestry and fishery - and recreational and tourist activities, including preservation of the environment. Advantages of the locational characteristic of the region should fully be taken into account and utilization of the existing resources must be made rather than conceiving wishful and unfeasible ideas. The region should thus help in alleviating possible excessive concentration of activities and population in the Meseta Central in the future.

3. Regional development should not, however, be independent of the general direction and the targets of the national development plan. In this regard, the new National Development Plan of Costa Rica 1978-1982 is oriented to the reduction of extreme poverty among the low income groups, and for this purpose various policies to sustain economic growth with equity are contemplated. The specified means of policy enumerated in the plan are indeed consistent and appropriate to the regional development included here in this study. In implementing the plan, of course, some of imminent problems such as the balance of payment difficulties should be solved by both import substitution and export promotion strategies. Regional implication of such strategy will contribute to the expansion of traditional agricultural exports and to the increase of manufactured products expected from newly introduced industries in the region. Attraction of tourists to the region should also be promoted for the same reason.

4. The government's fiscal budget has also been in deficit. This will probably continue in the future, until such time when tax revenue might increase together with increased national income.

Combined with an increased national revenue, the budget structure of the national government must be devised to increase public investment, particularly for the development of this region.

5. A public corporation, especially the National Production Council, should continually play a vital function in securing necessary food for the nation. In so doing, however, the deficit financing of its operation must be resolved. For this purpose, further investigation would be needed in demand and supply responses at some appropriate national institutions to such policies as pricing, marketing and credit.

6. In light of the above mentioned national situation, policies, plans etc., the region's development strategy should be established. The first priority for its regional development strategy consists of developing the Gran Puntarenas, the core area of the hinterland. Feasibility studies for constructing industrial parks at Barranca and El Cocal are recommended, as the key projects in developing Gran Puntarenas. Such industrial parks should be further studied in an inclusive context of urban development for all of Gran Puntarenas, including El Roble, Roca Carballo, Caldera-Salina, Esparza and urban renewal of old Puntarenas.

7. New industries to be introduced possibly in the industrial park should include such types of activities that utilize absolute and comparative advantages of the region. They include fishery, marine related, agro-based and agro-allied industries, as suggested in this report.

8. The feasibility of successfully establishing any industrial activities depends much upon various conditions including output and input markets in the future. It, therefore, is necessary to conduct intensive investigations of foreseeable future markets. Secondly, physical and financial conditions related to industrial park facilities and tax, subsidy and credit policies will have a great impact on feasibly establishing new industries. Depending of national needs policies in these instruments must be clearly established.

9. The overall goal of the policy for the development of the region could be formulated in terms of providing employment for the economically active population in the years to come. In 1973, the population of Gran Puntarenas was 43,279 and of Pacifico Central was 127,167 respectively. Out of these population, the economically active population for respective regions were 14,033 in Gran Puntarenas and 37,651 in Pacifico Central.

With the expectation of economic development in the region which is expected to such an extent comparable to the national perspective as prescribed by OFIPLAN industry by industry, foreseeable sizes of economically active population in the regions are estimated to be 37,060 in Gran Puntarenas and 83,585 in Pacifico Central in the year 2000. Labor participation ratios in respective region are also expected to increase. Thus the population itself will be 96,000 in Gran Puntarenas and 236,537 in Pacifico Central in the year 2000 respectively.

10. These estimates correspond more or less with the population projections of the medium level (hipotesis recomendada) provided in Evaluación del Censo de 1973 y Proyección de la Población por Sexo y Grupos de Edades 1950-2000, of Costa Rica, although the estimates remain at slightly lower side. Industrial composition of the expected economically active population is to absorb 8,100 in manufacturing industry implying an addition of 6,336 over the year ending 2000.

This size of employment, possibly larger could be materialized by the industrial projects presented in the report. The remaining additional labor force of 16,691 are expected to be absorbed by other economic activities.

11. Since these estimates are based on national projection, an equitable growth of various industrial activities in the hinterland should at least to be maintained to the national total growth as a target. In this perspective, annual growth rate in the economically active population in manufacturing industry will be 4.6%. Though the manufacturing industry appears a leading sector with the highest rate of growth, other industrial activities such as construction, transport and service etc. should be expected during some earlier years to grow at a somewhat higher rate than national average in view of the port related and highway related projects.

12. A higher labor participation of 38.6% in the year 2000 is expected for Gran Puntarenas and 35.3% in Pacific Central as a whole. This will lead to the entire population nearly one hundred thousand in Gran Puntarenas and urban plan for accommodating such size of population is presented with alternatives.

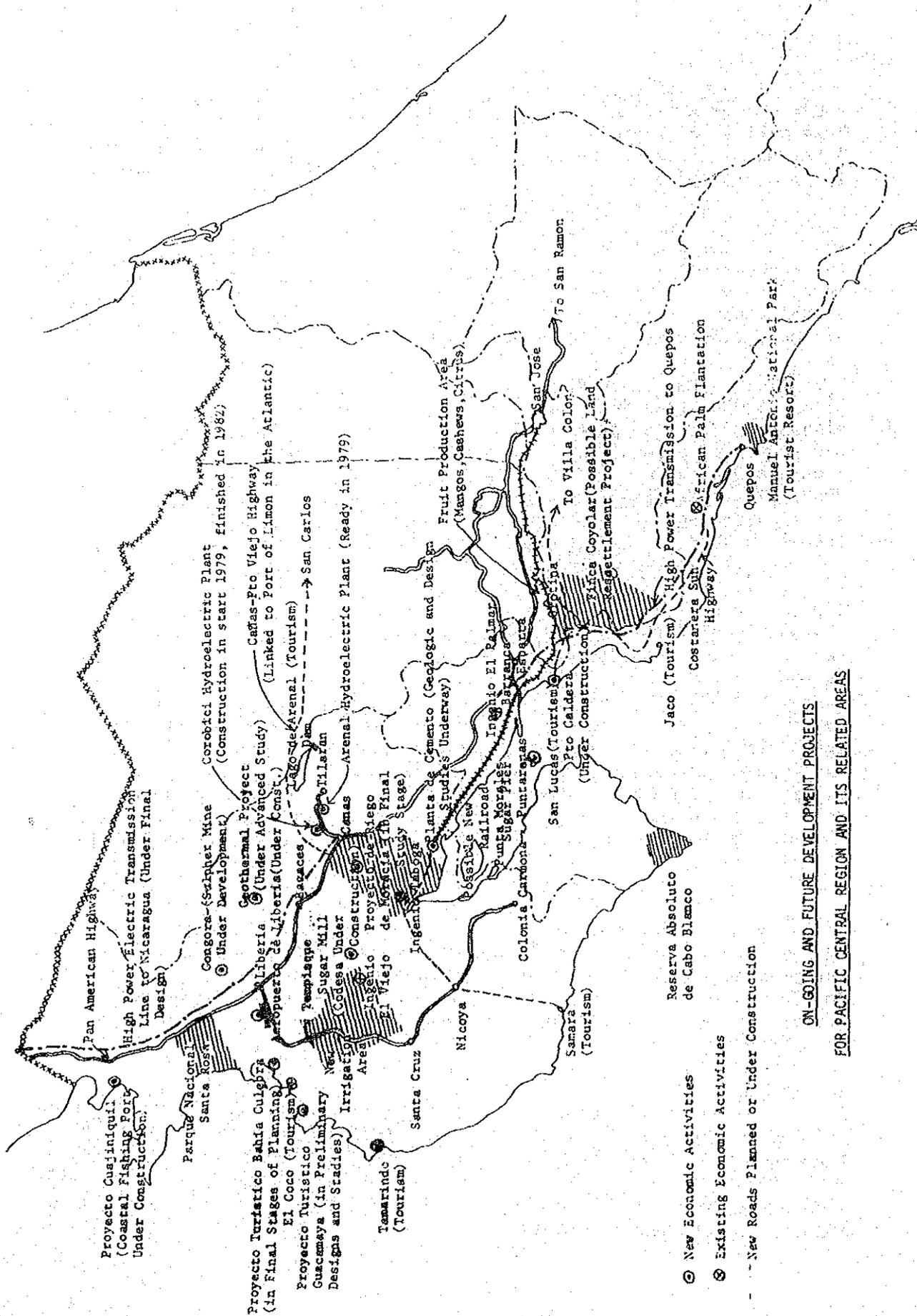
13. The above estimates are prepared only to give a framework for the economically active population in the hinterland. In fact the estimates are arrived at on the basis of past performances of the country as a whole, while actual historical performances of individual industries of the region concerned differ from the national figures.

14. Despite of the previous target of tentative nature, physical planning side of perspective may involve a more extensive development and growth of population. For example, the size included in the scenario 3 involving 150,000 population in Gran Puntarenas in the year 2000 may very well be taken also as a contingency plan lest among modifications should not be introduced with unnecessarily large additional cost on the way of implementing the actual development programme.

15. As to Pacifico Central as a whole, some two hundred and forty thousand population is expected in which agriculture as a dominant sector absorb some thirty thousand economically active population, which is about 35% of the total economically active population, though this sector is relatively declining. In fact, the economically active population in agriculture in this region has been on the decline recent years. This in fact, shows a promising tendency of the region for development through reduced importance of the primary industry in the society as any other developing experiences. It is important to note a role of agriculture in this regard as a buffer of absorbing population through its transformation into more remunerative urban oriented agriculture.

16. With the above mentioned prospects, concentrated efforts will be required to achieve the development of the region so as to balance the gravitational pull of the Meseta Central in future. At this stage more attention is given to the potential and less of it on the costs expected to advise the potentials thereby leaving such investigation as a future task.

17. Presently a number of developmental projects which are closely, related to the region's development have either been undertaken or been planned as indicated on the attached map. The strategy for this development, therefore, should be consistent to take advantage of these projects. (Figure: On-Going and Future Development Projects for Pacific Central Region and its Related Areas)



- ⊙ New Economic Activities
- ⊗ Existing Economic Activities
- - - New Roads Planned or Under Construction

ON-GOING AND FUTURE DEVELOPMENT PROJECTS
FOR PACIFIC CENTRAL REGION AND ITS RELATED AREAS

S.4 Urban Planning

1. Two major functions of urban planning for the development of Gran Puntarenas are (1) the coordination of public and private investment decisions in the area to optimize their impacts and (2) the creation of a living environment not only physically but socially attractive for people to settle down. Urban planning should be considered as an essential tool for the achievement of regional development policies.

2. Although provisions of the Urban Planning Law of 1968 are considered adequate in terms of regulatory measures, there is at present no central agency responsible for urban planning in the Gran Puntarenas area. The municipal governments of Puntarenas and Esparita, although they are legally responsible for urban planning in their jurisdictions, are not provided with necessary human and financial resources. It is recommended that a central planning agency be established for the purpose of formulating urban development plans. This agency may be a wing of a development corporation which has fund-raising and implementing capacity, as well as planning and coordinating functions. Local government representatives may be ex officio members of such a corporation or agency to ensure participation of local residents in the planning process.

3. The INDECA report provides a basic framework for the physical development of Gran Puntarenas. The feasibility of its recommendations should be evaluated in terms of industrial development potential and programs within the framework of the national policy on regionalization.

4. According to a population redistribution policy of the OFIPLAN, Gran Puntarenas is expected to grow to a metropolitan community with a population of 150,000 by the year 2000. This target may be realized if the net out-migration of residents from the Pacific Central Region to the rest of the country is halted. It is recommended that this target population be adopted for the purpose of urban land use planning, although actual staging for implementation should be adjusted to the growth of industrial employment.

5. In order to sustain the population of 150,000 in Gran Puntarenas some 10,000 new jobs must be created in the basic sector of the economy by the year 2000. In view of the past trends, this target cannot be achieved without concerted and integrated efforts of various branches of government and public authorities. Costs and benefits of such efforts should be evaluated in terms of their national implications.

6. To complement the policy on industrial development, a policy on urban development to provide an attractive living environment should be established. Consideration should be given for developing the urban milieu competitive with major urban centers of the Meseta Central Region. The availability of educational and social services also bears an

important role. The protection of the environment cannot be overemphasized because a greater part of the attraction of Gran Puntarenas is derived from its natural beauty and easy access to sea-oriented recreation.

7. Existing and expected industrial potentials are tentatively identified and some promotional measures, including the development of a marine product industrial estate and an industrial park for agro-industry, are suggested for further study elsewhere in the report.

Urban development plans should be coordinated with such an industrial development policy, if future studies indeed indicate their feasibility.

8. Some suggestions on urban development in Gran Puntarenas are summarized as follows:

(a) Puntarenas Sandbar

Because of its beautiful beach and unique geographic setting, old Puntarenas on the sandbar has a big potential as a tourist and recreation center for the domestic market.

The Estero side of old Puntarenas could be developed for fishery port and fishery-related industry. With proper precaution and improvement of wastewater control, this development may not be detrimental but rather complementary to the tourist development.

A proposal to reclaim the indented part of the Estero side of Pueblo Nuevo by dredging came to the attention of the consulting team during its field study. The project could provide some 20-25 hectares of much needed land along the waterfront. It can be envisaged as a site for an integrated fishing port/fish processing complex. It may also provide enough space for a ferry/bus terminal and also for a sewer treatment plant. A review of the old feasibility study prepared some years ago is recommended.

The stability of a sandbar is based on the balance of sand movement. As any development project, which would influence the movement of sand along the coast between Boca de Barranca and Punta, might endanger the stability of the sandbar, a careful analysis of sand movement in the water should be conducted, before any such project is implemented.

(b) El Roble-Barranca

This area can be envisaged as the future secondary center of Gran Puntarenas. It already has a hospital and a training school. At present, however, there is no coherent system of urban development, such as the grid layout of old cities, nor any visual focal point of activities.

The existing Fertica plant should be contained by a buffer green belt.

It is suggested that a major bulk of the future population - in the order of 70,000 persons - are to be housed in the El Roble/ Barranca area to avoid costly scattering of settlements. Residential areas could be developed as a cluster of neighborhood units as suggested by the INDECA Report.

In the area near Barranca, to the north of existing CNP Plant, a development of an agro-industrial park is recommended for consideration. This area is located at the strategic hub in terms of the regional highway network. In addition to agro-industry, and assortment of light to medium industrial activities may be located in this industrial park. The provision of a planned industrial park may be publicly promoted as an incentive for industrial development.

It is recommended to undertake an engineering study on the drainage problem prior to the finalization of development plan for the El Roble area.

(c) Caldera

Available flat land is scattered in small parcels at Salinas, Alto de las Mesas and Altieda. Each of the three zones may not be able to hold more than 10,000 people. It is suggested here that no intensive urban development should be initially allowed in the Caldera area except for some commercial development in Mata de Limon and transport-oriented installations (e.g. warehousing and trucking) in Salinas.

A proposal to change the level of tide water at Mata de Limon should be evaluated in terms of its potential impacts on mangrove trees.

Tourist development proposals in the area between Boca de Barranca and Roca Carvallo should be promoted to meet the rising domestic demand for recreation.

(d) Esparta

Although the settlement of Esparta is not included for study in the INDECA Report, a further investigation is suggested to evaluate possible benefits and costs of developing it into a satellite community.

9. One of the essential requirements for the implementation of a coordinated urban planning policy in Gran Puntarenas is the creation of a workable institutional framework. Present municipal governments in the area are, however, not adequately equipped with necessary human and financial resources to undertake urban development envisaged in Gran Puntarenas.

The INDECA Report suggests the following five possible alternatives for the establishment of a responsible implementing agency for the development of Gran Puntarenas.

- (a) Local Development Corporation
- (b) Regional Development Board
- (c) Municipal Federation
- (d) Development Council
- (e) Executive Commission

To plan and implement a set of regional planning policies for a region as large as the Pacifico Central Region, a coordination among various public agencies is essential in a country like Costa Rica with a tradition of diversified autonomous public institutions.

At the regional scale, therefore, it is recommended to establish a regional development council for the entire Pacifico Central Region as the coordinating agency for various public authorities.

On the other hand, the implementation of urban development proposals could be effectively carried out by a single-purpose corporation with broad executive powers.

S.5 Industrial Park

1. The industrial park or industrial estate is one of the essential components of an integrated regional development plan of Gran Puntarenas. Although the necessity of an industrial park is admitted a priori, it would be more realistic to view it from the standpoint of its purpose and relationship with the whole country, i.e., evaluating it through the influence which industries located in the metropolitan area have on the whole country. Needless to say, it should also positively affect the region. It will be necessary, then, to draw a regional pattern of industrial structure.

The clarification of planning principles of industrial location will indicate the roles and characteristics of industrial parks. In the case of Gran Puntarenas, the establishment of a self-contained community should be utilized as a guide.

2. For the purpose mentioned above, the compilation of basic data is required. These basic data should include information on the production and location of each factory. This will be utilized to perceive new trends of situating industries.

3. The goals of the industrial sector in Gran Puntarenas will be approached in the following ways.

- (a) Abatement of over-population in the metropolitan area while stimulating urban functions in Gran Puntarenas.
- (b) In regard to land utilization, lessening the progress of urban sprawl in the metropolitan area.
- (c) Infrastructure development in Gran Puntarenas and abatement of the inflow of rural population.
- (d) Preservation of environment and the raising of development potential.

A kind of regional complex which consists both of agro-industry sector, of industries based upon urban agglomeration and of construction industries should be recommended.

4. An industrial park is regarded as one of the tools of industrialization and a kind of urban facility as well. Its utilization should be ruthlessly pursued. An industrial park is classified, according to its character, as follows:

- (a) coastal or inland,
- (b) large-scale or small-scale, and
- (c) urban or rural.

Combinations of some of the above items are also considered. The proposed Concept Plan I (See Chapter VI, pages VI-34, VI-35) is an inland and small-scale park which serve as a core for long-term, spatial development needs of Gran Puntarenas. The proposed Concept Plan II (See Chapter VI, page VI-37) is a coastal, urban and small-scale park which serves the redevelopment of Puntarenas City.

5. Industrial locations over the long-term - their purpose and characteristics, expected effects, number of employees, initial industries expected and time of completions - are recommended in Chapter VI, page VI-33. As the agro-industry has future growth potential vis-à-vis this area, priority is placed on industrial parks for this industry.

6. Related projects are considered as follows.

- (a) Facilities for training human resources. These facilities should be utilized not only by the industrial sector but also by the transport and tourist sectors as well.
- (b) Facilities for the research of construction materials and the research of environmental pollution should also be constructed.

- (c) Buffer green belts which include several large-scale sports fields, with the purpose of dividing the land use and environmental protection of a residential zone.

S.6 Agro-Industry and Other Manufacturing Industry

1. In spite of a general high productivity of agriculture and cattle raising, the agro-industry has not yet fully developed in the study area.

2. Difficulties of developing these industries are attributed to the following reasons:

- (a) Scarcity of raw materials in local production, except for marine products.
- (b) Hot climate which is not adequate to process and preserve fresh agro-products.
- (c) Shortages of high quality labor force.
- (d) Insufficient consumer population for the final products.
- (e) Unsatisfactory infrastructure for developing this industry.

3. Therefore, the industries adopted in this area should be selected, taking into consideration the following conditions.

- (a) The main source of supply of raw materials should be sought from other regions, except for marine products.
- (b) The types of industries chosen should be such that the temperature itself does not bear a major influence.
- (c) The main market for the products should be sought outside the region.
- (d) In order to encourage a clean and cheerful environment and to cultivate sound industries, the establishment of industrial parks is recommended.
- (e) The success of agro- or agro-allied industry depends basically on whether agricultural products are supplied with high productivity, i.e. with low cost, in large quantity having good and uniform quality, constant supply and so on.

4. Taking into consideration all the conditions mentioned above, the following industries are chosen as candidates suitable for introducing into this area.

(a) Marine Products Processing Factories

- Refrigerated shrimp factory
- Sardine canning factory
- Tuna canning factory
- Fish meal factory

(b) Animal Husbandry and Processing Factories of Farm Products

- Canning factory for sliced beef
- Tanning factory
- Gelatine factory
- Rendering factory
- Mixed livestock feed factory
- Factory for processing fruits and vegetables
- Factory for wood products

(c) Agro-Allied Industries

- Factories constructing fishing boats
- Ice factories
- Insecticide and pesticide factories
- Lime factory

5. Approximate unit scales of the above mentioned industries are shown in the Table 5.2 in Chapter V, page V-17. It is recommended that these units should be multiple or be enlarged to a large scale, keeping pace with the development of industry.

S.7 Agricultural Development

1. For the development of the Pacifico Central region as a wider region of the hinterland of the ports Puntarenas and Caldera, the appropriate areas of the rural districts in the region should be designated as Zonas de Desarrollo Rural; and the areas where industrialization is planned must also be designated as the Parque Industrial Rural to provide all possible facilities for an accelerated development keeping a harmony among three main industrial activities of manufacturing industry, agriculture and turistic and recreational activities.

2. An integrated definition for a region needs to be established. Presently, the Pacifico Central, as designated by OFIPLAN, seems to have been used for such purposes as population projections. On the other hand, agricultural typology and census purposes, another type of

regioning has been adopted. It is therefore recommendable to establish a unified regioning specially designated for the development of the hinterland, including all aspects of developmentally related activities.

3. In the Pacifico Central region, an urban-oriented agriculture should be promoted in addition to the traditional types of agriculture, to which this region seems to have enjoyed its comparative advantages over other regions. Urban-oriented agriculture might best be introduced and developed by diversifying activities on farms into such lines of production of fresh and high quality vegetables and fruits.

4. The types of vegetables and fruits to be introduced for supply to urban consumers need to be identified. For this purpose, the farm management type of survey should be taken on a continuing basis, on the one hand, and, on the other, agricultural experimental stations must investigate the technical feasibility of the production and its profitability.

5. Consumption forecasts should be made to establish feasible size, types and seasons of the demand for various vegetables and fruits. On such basis, the feasibility of producing such products and suitable managerial techniques should then be established. Urban families' demand elasticities for fresh vegetable and fruits are usually positive, and as the data of Honduras, which is a neighboring country in Central America, shows, the income elasticity of demand for such products should be around 0.8 to 1.0 in Costa Rica. In other words, every percentage rise in income would increase the demand for these by about the same percentage. Assuming a six percent rise in income annually, some five to six percent increase in supply of these products may appear adequate.

6. Traditional agricultural products, at the same time, should also be increased in the region. Two commodities may be especially mentioned. One is rice and the other is sugarcane. The former, as past statistics indicate appear to enjoy some comparative advantages in production in this region at going prices. Sugarcane may be promoted not only for domestic supply but for export, as long as it can compete with other sugar producing countries. Alcohol which could be produced from sugar should also be considered as a potential source of energy to supplement or supplant petroleum.

7. As already touched upon earlier, more basic data on farm management become necessary for establishing and implementing adequate price policies for agricultural products. This will become rather important, in view of the accumulated deficit financing arising from the operation of National Council of Production. In this connection, basic studies required for establishing more rational price policies of the country for the basic grains are urgently recommended.

8. During the annual dry season, in a large portion of the region, not much vegetation is maintained. A continuing supply of water throughout the year may be a key factor to maintain a high level of active employment, and raise productivity and, therefore, income of the rural residents. Two things are recommended. Planting trees on ranches and afforestation, as well as reforestation, should be promoted. Then, underground water utilization should be promoted. Continuous supply of fresh vegetables require irrigation by pumping and sprinklers, if gravity irrigation cannot be utilized.

9. Because of the geographical nearness to an urban areas, there could be a possibility for farmers and their family members to augment income through employment in non-agricultural activities. Farm household economy surveys when introduced should show the seasonality of employment and income and should indicate possibilities of introducing non-farm activities.

10. The long pacific coastal line and Nicoyan Bay, should be exploited systematically for development of fishery activities. First, the domestic market should be exploited with the supply of fish for food. Then, export-oriented fishing industries should be introduced. For this purpose, surveys on presently available fish resources with the country's exclusive access to coastal waters and adjacent high seas should be conducted to establish a feasible scope of ocean fishing.

11. Tuna and deepsea shrimp are expected to be harvested with appropriate fishing technology. Boats of adequate size fishing gear must be introduced as of a priority concern. Puntarenas could be the most appropriate fishing base for landing, processing and distribution.

12. Fish culture, particularly shrimp and eel could have further potential for development. Adequate and efficient marketing system and facilities should be developed for this purpose.

S.8 Livestock Development

1. Breeds of both beef and milk cattle must be improved. Breed lines may be improved by importing bulls or diffusion of artificial insemination. It would not be impossible, therefore, to double the current production of beef and milk.

Regarding milk cows, the Holstein-Friesian species show no problem in present Costa Rican dairy farming. For the lowlands and Pacific coastal area, the introduction of the Brown-Swiss and Simmental or Indian milking cows is recommended.

Regarding beef cattle, the present species have several drawbacks, including slow growth and a low carcass yield. In order to eliminate these drawbacks, it is recommended to introduce Aberdeen Angus etc. Although great care must be exercised in breeding, it is also recommended to introduce Charolais etc.

2. Central and most effective method in improving the performance of dairy cattle in Costa Rica is to adopt a system of artificial insemination. In dairy cattle breeding, cross-breeding between different breeds should never be practiced, but "pure-breeding" should be the rule; "up-grading" should be used only in improving conventional dairy cattle. The grade-breeding is a way of inserting into conventional livestock blood lines of livestock having an excellent genetic character of improved breed bulls.

The egg-transfer is the best way of effectively utilizing heritable characters or genetic performances of excellent female animals of cattle and sheep. Therefore, it is recommended the study on technics and practices of not only artificial insemination but also egg-transfer or fertilized egg transplantation in ruminant animals should be promoted.

3. There is need to challenge the difficulties of animal production in droughty regions along the Pacific coast of the country, regardless of whether the irrigation project is completed or not.

Sheep farming is generally a popular and successful form of animal production in any drought ridden areas or deserts throughout the world. In Costa Rica, sheep farming should be set up for the purpose of producing both mutton and lamb skin, rather than wool.

4. Not only must breed lines be improved, but care must be taken in breed management and feed.

In addition to pasturage, stable feeding year round is also important. For this end, development and effective utilization of feeds is needed, for instance, making use of non-utilized resources, such as sugarcane tops, rice straw, molasses which can be immediately used, as well as tankage from both animals and fish.

In order to supplement feed shortages in the dry season, silos should be constructed for storing rice straw, sugarcane tops, and molasses. Especially in the Pacific coastal area, their construction and use are desired.

5. In Costa Rica there are several cattle diseases, which demand preventive measures. When the cattle are pastured, it seems that they are often bothered by insects. Since this detracts from the profit of the leather industry, preventive measures must be taken to exterminate insects as early as possible.

S.9 Transportation

1. The quantities of passengers and goods transported and the number of vehicles are strongly related to G.D.P. The relationships between the quantities T and G.D.P. or Y are expressed simply by a linear formula:

$$T = a + bY,$$

where a and b are parameters. In the future, when G.D.P. becomes larger, the quantities will also be larger.

The future quantity of the flow of goods caused by foreign trade will increase steadily as the level of economic activities becomes higher.

With the socio-economic development of the Region Central and Pacifico Central, the quantities of passengers and goods transported and the number of trips made between these regions will also become larger.

Based on these quantitative analyses which were made using statistical data, recommendations for the transportation system were derived.

2. When these recommendations are proposed, the following three points should be considered:

- (a) Proposals which advocate difficult activities to be undertaken must be avoided.
- (b) For example, a plan for shortening a winding railroad by constructing tunnels was avoided, even if this plan would be the ideal for the railroad.
- (c) In this study, we could not perform any refined feasibility study for one road or a part of a highway or railroad. Therefore, clear cut outlines of planning must be proposed.

3. In the year 2000, we calculate that the number of passengers travelling between Pacifico Central and the metropolitan area will double and the quantity of goods transported will quintuple those respective figures for 1973 because of the increase of population and per capita income. Therefore, the amount of traffic will also increase as much as the number of persons and the quantity of goods transported. This can really be said because the size of vehicles will not significantly be changed. The installed transportation facilities must be sufficiently supplied in order to meet the increase of the traffic mentioned above.

4. In the future, complete equipment for the existing highways between San Jose and Caldera - Route No.3, No.1 and No.17 - and the new highway under construction, namely and San Jose-Caldera Highway, should be effectively utilized for traffic generated between San Jose and Caldera.

5. The construction of the Costanera Sur Road plays an important role in the development strategy of the region. This highway serves the transport flow of agricultural products between the southern part of the Pacific coast and Caldera-San Jose, and thus promotes the integration of the region. This highway also serves people in the metropolitan area when they travel to recreational places such as Joco, Esterillos, and Quepos on the Pacific coast.

Moreover, when recreational places on the Pacific coast are developed, shorter routes to their locations from the metropolitan area will be necessary. At that time, the Carretera Valle Central - Litoral Pacifico route, connecting San Jose and Parrita, should be utilized as a shorter route.

6. In Gran Puntarenas, terminals for trucks and passengers should be built. One of them should be built in the vicinity of El Roble, which is the junction of roads from San Jose, Guanacaste, Puntarenas, Caldera and the southern part of the Pacific coast. The other one should be built in an adequate spot in the vicinity of Caldera. If an industrial park is constructed at Barranca, a terminal also will be needed for transportation of goods.

7. The function of the railroad will remain important in the future for handling bulky cargo. The rectification of alignment of the railroad between San Jose and Puntarenas is recommended. A marshalling yard should be recommended to be placed at El Roble, because, in the future, if the railway is lengthened to connect the regions in the vicinity of Colorado and Caldera, this spot is a very important place for marshalling trains.

8. As the number of trips on national highways or regional and local roads increases in the future, the statistical data, like that written in the traffic (origin-destination) table for the main roads, will be needed for scientific planning of constructing networks of transportation, although we can find some partial traffic surveys in this country.

9. The bus services for commuters generating in the Gran Puntarenas region must be supplied in consideration of the frequency, speed, and safety of buses.

10. Not only for economic activity but also for tourism, road signs as guide posts must be prepared.

11. At intersections of local roads in urban areas, traffic signals should be sufficiently supplied, as the amount of traffic on these roads will increase more.

S.10 Environmental Affairs

1. The environmental pollution abatement programme should be started from a stage, at which a series of data both on the present state of water pollution and on the effects of both sewage and industrial wastewater are obtained.

(a) As for sewage water, a hydraulic or hydrological survey of several important rivers should be undertaken along with both a sanitary engineering and ecological survey regarding pollution and the natural purification of drained sewage water in the rivers. It seems very important to have surveys of this kind in regards to the Rio Grande de Tarcoles and the Rio Barranca.

(b) As to the industrial wastewater, more than 100 factories in the central area are probably discharging wastewater into rivers without any treatment.

The present state of the wastewater must be surveyed in advance to determine its relationship to the respective conditions of each factory, before a wastewater pollution control standard can be officially established.

2. In the course of establishing environmental pollution control standards and a control system, it is very important to begin first to regulate unlawful discharge of toxic substances harmful to human health.

3. The training of environmental engineers is urgently required in order to supply experts who can monitor and survey pollution abatement. For this purpose it is necessary to secure an adequate number of competent experts.

4. Recently Guanacaste and Nicoya Peninsula are experiencing drought; moreover, trees have been cut almost to the top of hills. It is necessary, therefore, to restore suitable and stable vegetation in order to retain the subsoil moisture and thereby assure sufficient subterranean water for the area.

While this is long-term ecological planning, a survey of real and potential vegetation must precede a new overall vegetation plan. A preliminary survey can be accomplished in one month by three to five foreign experts in cooperation with Costa Rican experts.

5. Sewage treatment by the use of soil has been developed successfully in Japan; it seems quite suitable on a comparatively small scale especially in rural areas having a population of 2,000 or less. A survey plan and experimentation at a pilot plant in some rural area are recommended, especially establishing a demonstration plant of practical scale.

6. Listed below are some recommendations for Gran Puntarenas:

- (a) The selection and planning of a site for a primary sewage treatment plant, which has a pumping station for intaking and discharging effluent, is urgently required.
- (b) It is necessary to establish adequate measures in the city to prevent pollution from industrial wastewater, in which wastes from marine products are discharged.
- (c) The land proposed for reclamation is on the north side of Pueblo Nuevo; it may be used for disposing various kinds of residuals.

7. In order to assure a good and sufficient water supply to meet future needs in the Gran Puntarenas area, more studies should be made on the present state of and future possibility for developing water resources and services.

S.11 Tourism and Recreation Development

1. The direction of tourism and recreational development are considered from the following two perspectives.

- (a) Domestic tourism and recreational development for Costa Ricans.
- (b) International tourism development to attract foreign tourists.

In regard to the first aspect, the welfare of Costa Ricans should receive first priority. For this purpose, provision of the proper wherewithal for Costa Ricans to enjoy domestic tourism and recreation will be of vital importance.

The people in Meseta Central generally imagine the Central Pacific and Guanacaste as like sunny and close-by.

Therefore, we think it appropriate to development domestic tourism and recreational facilities in the Central Pacific region with its center in Gran Puntarenas, utilizing to the full extent natural and human resources of this region.

2. In order to implement tourism development programs or projects, the existence of a governmental organization which integrate all tourist activities of other public or private organizations, is a prerequisite.

One important aspect regarding institutional problems is the management of tourist locations.

Therefore, the building up of a management system of tourist locations is urgently required, for the efficient tourism development of the region.

3. Among the environmental preservation problems of tourist sites, one of the most important in this sector is the system of trash disposal. One successful example of Japan is a regional system of trash disposal as explained in 10.4.3 in Chapter X.

4. For the region of Pacifico Central, some facilities for providing cheaper hotel rooms should be constructed with the help of the Municipality and the Government of Costa Rica. In case of Japan, Kokumin-Shukusha (National Hostel) and others are operated as one of the cores of national tourist movement.

5. In order to develop Gran Puntarenas as one of the tourism as well as recreational centers of this country, it would be advisable to develop facilities, for example, toward the following items.

- botanical gardens
- aquariums
- parks
- marine land
- sport fishing
- orienteering
- sports facilities - leisure land
- camping
- yaching and marinas
- cycling

6. It is also advisable that the idea of an international tourist circuit be taken into consideration in the following way.

(a) First Circuit

Mexico - Guatemala < Honduras
El Salvador > Nicaragua - Costa Rica

(b) Second Circuit

Caribbean - Costa Rica < Venezuela
Colombia

As to the first circuit, international tourism should be studied in the framework of the Central American Common Market; land transport would be mainly utilized for this circuit. As to the second circuit, cooperation with the caribbean countries should be sought.

S.12 A List of Proposed Projects and Studies

<u>Proposed Projects & Studies</u>	<u>Chapters to be referred</u>
<u>I. Gran Puntarenas</u>	
1. El Roble-Barranca Urban Development	VII
2. Puntarenas Sandbar Preservations and Urban Renewal	VII
3. Port Area Development near Caldera	VII
4. Industrial Areas for Planning	VI
1) Barranca (Socorrito)	
2) Puntarenas (Cocal)	
3) Caldera (Salinas)	
4) Near Cabezas	
5) In urban areas or along road side	
5. Projects Related with Industrial Areas	VI
1) Human resources training facilities	
2) Construction materials research facilities	
3) Buffer green belts	
6. The Agro- and Agro-Allied Industries to be Recommended in This Area	V
1) Marine Products Processing Factories	
2) Animal Husbandry and Processing Factories of Farm Products	
3) Agro-Allied Industries	
7. Water Supply in Municipal and Industrial Use . . .	VIII
8. Transport Development	IX
1) Terminals for truck and passengers	
2) Rectification of Alignment of the Railroad and a Marshalling Yard	
3) Rationalization of Bus Services	
4) Preparation of Road Signs and Traffic Signals	
9. Primary Sewage Treatment Plant	VIII
10. Prevention of Pollution from Marine Product Waste Water	VIII
11. Development of a Recreational Center	X

II. Pacifico Central

1. A Further Study on Overall Regional Economic Development
2. Promotion of an Urban Oriented Agriculture III
3. Systematic Development of Fishery Activities III
4. Water Resource Development III & VIII
5. Introduction of Farm Household Economy Surveys III
6. Environmental Pollution Abatement Programme VIII
7. Sewage Treatment by Use of Soil VIII

III. Guanacaste

1. Survey of Real and Potential Vegetation III
2. Study on Alternative Run-of-River or Underground Water Utilization VIII
3. Livestock Development IV
 - 1) Artificial breeding and insemination
 - 2) Sheep farming
 - 3) Improvement of grassland or pasture

* Related Project:

1. Survey of Possibilities of Irrigation Development

IV. Costa Rica

1. Future Market Study on Demand of Vegetables and Fruits III
2. Increase in Traditional Agricultural Production III
3. Basic Studies for Rational Price Policies for the Basic Grains III
4. Training of Environmental Engineers VIII
5. Preparation of Statistical Data for Scientific Planning of Transport IX

