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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

ECONOMIC DEVELOPMENT.

AND PROSPECTS OF

CENTRAL AMERICA

(in eight volumes)

VOLUME VI

TRANSPORTATION

June 5, 1967

Western Hemisphere Department

EQUIVALENTS

<u>Currencies</u>	=	1 Central American peso (a unit of account)
) =	1 Guatemalan quetzal
U. S. dollar 1) =	2.5 Salvadorean colones
) =	2.0 Honduran lempiras
	=	7.0 Nicaraguan cordobas
	=	6.62 Costa Rican colones

Weights and Measures

1 manzana	=	1.727 acres = 0.69 ha.
1 (60 kilo) coffee bag	=	132 pounds
16.6 coffee bags	=	1 metric ton
1 short ton	=	2000 pounds
1 quintal	=	approximately 101 pounds
Approximately 20 quintals	=	1 short ton (sugar)
1 banana box	=	42 pounds
1 banana stem	=	approximately 1.35 banana boxes
1 banana stem	=	approximately 57 pounds
1 (cotton) bale	=	480 lbs. net

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SUMMARY AND CONCLUSIONS

1. Transport has played an especially important role in the economic development of the five Central American countries because of their heavy reliance on exports, rising imports of raw materials and manufactured goods and the opening up of new lands for productive use. To the needs for transport facilities arising from these factors, the Common Market has created still another, the need to transport a rapidly rising volume of intra-regional traffic. To meet pressing transport requirements, the mission estimates that the transport sector will absorb almost 40 percent - some CA\$300 million - of all public investment by the five countries likely to take place during the period 1966 through 1969, varying from about one-quarter in El Salvador to almost one-half in Honduras. By far the major portion of the transport investment projected by the mission will be in roads, with ports being the next largest category.

	Realized 1965	Projected (million CA pesos)				
		1966	1967	1968	1969	Total
Roads	31.2	41.9	62.6	67.1	70.7	242.3
Ports	2.4	1.2	7.1	15.1	14.7	38.0
Air Transport	<u>1.9</u>	<u>3.0</u>	<u>3.8</u>	<u>3.8</u>	<u>2.8</u>	<u>13.4</u>
Total	35.5	46.1	73.5	85.9	88.2	293.7

Investment in air transport will be small, largely for improving airports, and there will be practically no public investment in railroads.

Roads

2. In the past decade, road investment expenditures increased the mileage of paved and all-weather roads by over 100 percent, reaching a total over 15,000 miles by 1965 in the five countries. These were financed with substantial assistance from external sources. The rate of road mileage construction varied widely among the countries, with Guatemala and Honduras lagging considerably behind that of the other three countries. Generally, except in El Salvador, less emphasis in past highway programs was given to penetration and feeder roads than to main roads as each of the countries attempted to create and fill out its basic network of main roads. The emphasis of road investment through 1969, largely from ongoing projects or those shortly to begin, will continue to be on main trunk routes. While building and improvement of these roads is needed, the mission recommends that in future programs much greater emphasis be placed on construction of penetration and feeder roads in areas of promising production potential, as well as roads to reach Atlantic ports. Such a shift in emphasis is particularly necessary if two of the most promising production possibilities in the region - livestock and timber products - are to be fully realized.

3. Until recently the transportation networks of each country were planned largely without reference to regional considerations. With the removal of almost all trade barriers among the five countries, regional links, especially for road and air transport, took on new importance. The volume of intra-regional trade among the five countries increased more than threefold in the three years 1962-1964 and amounted to more than 660,000 tons in 1964. This trade included 20 percent of the increase in total industrial output (value added) of the region since 1962.

4. Recognizing the importance of growing regional traffic, in 1963 the five countries approved a plan for a regional road network and the designation of 13 roads as "integration" roads (designated by a "CA" number). The Central American Bank for Economic Integration (CABEI) has already committed US\$30 million for the construction or major betterment of selected CA roads in all five countries. Of the more than 5,000 kilometers of integration roads, over half have already been constructed and somewhat less than a third are now under construction. Construction of integration roads will take about half of the amount which the mission estimates will be invested in roads between 1966 and 1969.

5. Total combined investment for the five countries projected by the mission for roads over the period 1966-1969 would increase at an annual average rate of about 23 percent over the four-year period. Even so, mission projections are almost CA\$100 million less than the road investments envisaged in the Governments' development plans. A large part of the financing would need to come from international lending agencies, but even with heavy reliance on international contractors and consultants, the projected investments can be achieved only if the countries make great efforts. The planning, administrative, and supervision capacities of the Road Departments in each of the countries will be subject to severe tests.

6. As a result of the work projected in the next few years, by the early 1970's the road network of roads would include a paved and relatively high-speed highway - the Interamerican Highway (CA-1) - running some 2,000 kilometers from the Mexican to the Panamanian border. The existing Pacific coastal highway in Guatemala and El Salvador will, through a new connection between Honduras and Nicaragua, provide an alternate route to the Interamerican Highway for most of the distance from the Mexican border to Nicaragua. Additional paved roads will fan out from the backbone of the network, linking CA-1 and its alternate with all of the present deep-water ports on the Atlantic coast as well as those on the Pacific. With this basic network completed (except for El Salvador with little new land available) the road programs of the 1970's should give greater emphasis to opening up new areas to expand agriculture, livestock and forest products production. But these penetration and feeder roads should be constructed only after appropriate soils and feasibility studies have been conducted to insure that the areas to be linked with the trunk network have sufficient production potential to justify the proposed roads.

7. Maintenance of roads has improved considerably over the past decade, organization has improved and more adequate equipment purchased and put to use. However, the maintenance effort is weak in a number of the countries and still requires considerable improvement. The budgets for maintenance of roads in all countries except Nicaragua are still inadequate. Moreover, the countries all need to institute or improve the enforcement of safety and load weight regulations, particularly to protect the investment in roads and to minimize maintenance costs. Despite considerable progress in the last two years in removing procedural barriers to transit across national boundaries, additional efforts are needed to permit the full benefits of free trade within the Common Market to be realized. Border delays are costly to shippers, the transport industry and to consumers.

8. Rough estimates made by the mission indicate that collections of revenue from intercity road users fall considerably short of covering the Governments' road costs; similar estimates on railroads and airports were not made, though undoubtedly there are elements of public subsidy to the users of these competing forms of transport. In none of the countries do estimated road user charges cover as much as half of estimated government road costs. The road user charges of each of the countries should be increased with a view to assuring sound allocation of resources over the long run; by how much would depend on a detailed study of costs and their proper apportionment among users in each country. In addition, given the growing inter-relationship of road transport with economic development of the region, such studies would best be made on a regional basis and in any event should take account of the regional aspects of transportation.

9. To summarize, the strategy of Common Market highway development has four interlocking objectives: (i) speed the integration of the five countries and serve expanding intra-regional trade and stimulate development; (ii) reduce transport costs and thus stimulate internal market growth; (iii) open up new promising areas selected on the basis of production potential; and, (iv) enable existing and new developing agricultural areas to market their products (including exports) and to obtain their inputs more quickly and cheaply. In the future, more emphasis should be placed on the latter two objectives than in the past.

Railroads

10. Railroads were a principal carrier of traffic in the Central American republics in the 19th and early 20th centuries. More recently their relative importance has declined and probably will continue to do so. All of the existing railroads in the region are narrow gauge, relatively short line and short haul carriers. Of the six railroads serving the general public, four are owned and operated by governments and only one serves more than one country. One railroad, privately-owned, appears to be making a fair profit, although the El Salvador Division of the other privately-owned railroad also shows a profit - in part from revenues earned from a captive port. Two of the publicly-owned railroads are just about breaking even or are showing slight

operating profits and the remaining two require support from the government budget. Total tonnage hauled by the six railroads declined by 18 percent from 1960 to 1965, despite the rapid expansion of production and of foreign and regional trade, to a level of 2.5 million metric tons. With few exceptions, the railroads are in poor physical condition although motive power is fairly modern for most of the railroads. The rehabilitation of these railroads would require heavy investment which appears difficult to justify on any economic basis. Neither public nor private owners have any plans for other than minor investments in these railroads. Transport service provided by trucks and buses is proving to be far more convenient to users than rail transport even where this exists. Because of relatively short hauls and type of commodities, carriage by road is fully as economic, or more so, than carriage by rail.

11. In these circumstances, it seems likely that consideration should be given to abandonment of at least three of the railroads over the next five years or so, and possibly to abandonment of all but one (or at the most two) eventually. The timing for discontinuing operations will need to be worked out on a case by case basis and with due regard for the retraining or pensioning of the workers and for the capacity of road transport to absorb the traffic still moving by rail.

Ports

12. Growth of foreign trade has resulted almost everywhere in port congestion, which is a serious hindrance to economic development. Each of the five countries has plans, in various stages of study or preparation, for the construction or major expansion of one or more deepwater ports. Investment projected for seven deepwater port projects totals almost CA\$50 million for the five-year period 1966-1970 and would, when completed, alleviate port congestion as well as provide for possible further growth of traffic. In the past, port planning has been based mainly on national considerations, but the removal of internal tariff barriers, and the adoption of a uniform external tariff makes it necessary to formulate further plans on the basis of providing efficient service to the region. The ports of Cutuco (El Salvador) and Corinto (Nicaragua) now serve the general area of the Gulf of Fonseca and Honduras plans to investigate the economic feasibility of constructing a new port on the Gulf to replace its inefficient lighterage port at Amapala. Consequently the regional aspect will need careful consideration in such a study. Regional considerations should also be considered in the still tentative plans for a new deepwater project on the Pacific coast of Guatemala; preliminary indications are that the prospective traffic may not be sufficient to warrant the large investment required, and the needs for such expansion should be reviewed in the light of capacity now being expanded at the Salvadorean port of Acajutla, not far away, and the overland transportation costs to Guatemala's principal urban centers. The Atlantic ports of Matias de Galvez (Guatemala) and Puerto Cortes (Honduras) are now being expanded; while each now serves a separate and distinct hinterland, connecting roads between them would widen the service areas of these ports (and the Guatemalan port of Barrios) and provide opportunities to plan jointly for the most efficient use of major Atlantic ports in both countries.

Air Transport

13. Domestic air transport in all of the countries, except El Salvador where such service does not exist, has been important in linking to the economy many remote areas not otherwise reached by surface transportation. Traffic (in passenger miles) increased by about 15 percent in 1960-1965, but the air freight volume remained fairly constant as the highway network expanded. Air-strips in remote areas are not surfaced and are poorly maintained; they need improvement and better maintenance, since, even with expansion of the road network, air service to many points will continue to be an important part of the transport network. The CA\$13 million projected for investment in air transport in the 1966-1969 period is intended to improve these outlying air-strips, as well as to improve the principal airports for large aircraft.

14. International passenger mile traffic of the six air carriers based in the region almost doubled between 1960 and 1965. Freight traffic on international flights also grew rapidly. Continued strong demand for regional and international air services is expected. In each country there is one airport large enough to accommodate big jets, although additional investment for improvement is required for some of these. Additional investment also could make another airport in Honduras suitable for regular service by large jets. None of these six airfields is equipped for night flying. Excellent regional cooperation in air service communications is provided by the Corporation for Air Navigation Services (COCESNA), a joint regional organization established and owned by the airlines. Regional air links are now inadequate to meet the rising demand for regional air travel stimulated by the Common Market. This deficiency should be overcome as jet aircraft now on order are put into operation. However, while international air traffic is expected to increase sharply, it will be insufficient in volume to permit the continued profitable operation of all six Central American carriers with jet aircraft on order; hence excess capacity is most likely to result. An alternative would be a regionally integrated air transport operation through the pooling of services and equipment, arranged through a consortium or merger. The airlines have been exploring these possible avenues to cooperation since 1960 but thus far no agreement has been reached on a course of action that would result in a combined regional service. The six airlines should renew their efforts to organize a regionally integrated operation. In the absence of such an operation, it may well prove necessary for the public authorities to seek a regional solution to assure adequate, efficient and profitable regional air services.

VOLUME VI

TRANSPORTATION

INTRODUCTION

1. Transport has played an especially important role in the economic development of the five Central American countries because of the heavy reliance of their economies on export crops, rising imports of basic raw materials and manufactured goods and the opening up of new lands for productive use. The characteristics of the transport systems of these countries have been influenced to a large degree by the rugged terrain of the region which has added substantially to the costs of the surface networks. Until quite recently, each country network - first the railroads and later the highways - developed almost entirely along national lines. Generally their role was to link the production and population concentrations on the Pacific slopes of the highlands with ports providing outlets to international markets for agricultural exports. Established in the 19th and early 20th centuries, the railroads developed ports as necessary parts of their facilities for movement of export and import commodities. These railway-port complexes were sufficient to meet the transportation needs of each of the countries in those earlier years. As traffic grew, the railroads proved inadequate to deal with the increased volume and with the changing patterns of present and potential traffic. With relatively short hauls and little bulk traffic to be moved, highway transportation has steadily eroded rail traffic. Beginning in the 1920's in El Salvador, and a decade or two later in the other four countries, road construction has permitted the natural advantages of trucks and bus transport to take effect fully. Today roads handle the bulk of traffic in all of the countries. As highway networks are expanded and improved, even greater dependence on highway transport is projected for the future. The railroads themselves are in serious difficulties and the ports they own and operate are generally inefficient and seriously congested. With the rising tide of exports and imports, major investments are needed to modernize and expand public port facilities. Port congestion is becoming a real bottleneck to economic development.
2. Air transport has played an important economic role linking isolated communities and sparsely settled areas not served by surface transport with the mainstream of economic life. Intraregional scheduled air services are not adequate to meet the growing demand for them, spurred on as a result of the formation of the Common Market. Of growing importance have been the international air services providing rapid transportation to the countries north and south of the Isthmus.
3. Until relatively recently the one major exception to the development of surface transport along strictly national lines was the Interamerican Highway. This now extends some 2,000 kilometers from the Mexican border with Guatemala in the north to the Panamanian border in the south and is still the main, and in some cases the only, surface transport link tying the five countries together. With this exception, until the latter part of the 1950's virtually no attention was paid to the regional aspects of

surface transportation. Before that, intraregional trade was virtually nonexistent. Only one of Central America's railroads crosses a national boundary and serves the traffic of more than one country.

4. With the establishment of the Common Market and the elimination of most trade barriers among the five countries, intraregional trade has grown rapidly. The tonnage of intraregional trade increased from about 220,000 metric tons in 1962 to 664,000 metric tons in 1964; in value, trade doubled from CA Pesos 50 million to CA Pesos 105 million in the same period, and to CA Pesos 136 million in 1965. Prospects are that the rate of increase of intraregional trade in the future will be slower. Even if this traffic doubled over the next ten years, total volume would still be relatively small. Nevertheless, the construction of transport routes across national boundaries is assuming greater importance to facilitate the exchange of goods and services within the region. The drive to industrialize to supply the regional market is placing new demands on transport. The regional transport network is serving a rising volume of exports to and imports from outside the Common Market; a portion of this trade moves across national boundaries.

5. Concurrent with the demand for regional interconnections are the pressures to open up new areas hitherto unserved by surface transport. It is only in the last decade that feeder and penetration roads have become an integral part of highway planning and construction. With the need to link the more developed western regions with Atlantic ports and the opportunities and pressures for developing new lands on the Atlantic side of the continental divide, roads toward the east and north to serve new production areas are being constructed and planned. El Salvador, with no coast on the Atlantic and little land for further development, already has in being a road network that pretty well serves the entire country. This is not true of the other four countries, each of which has important areas of virgin land yet to be developed.

6. To summarize, highways and ports will increasingly be called upon to serve the traditional and growing export-import traffic of the individual Central American countries. Growing regional trade will demand more and better regional roads. Population and production pressures call for penetration roads to open up new lands for productive use. The Common Market has already stimulated the growth of regional travel and this will increase with more businessmen operating in more than one of the five countries. The role of domestic air transport will continue to be important to reach otherwise inaccessible communities, and international air traffic will continue to increase as economies of the five Common Market countries grow. Given the need of the Central American countries to develop their internal economies industrially as well as in agriculture while at the same time expanding and diversifying their export sectors, investment in transport will continue to demand and receive a high priority for the five countries and for the region as a whole.

I. ROADS

A. Recent Development

7. Except for the road network in El Salvador and the Interamerican Highway, it was not until after World War II that the Central American Republics initiated large road construction programs. Aided by external lending organizations such as the Bank, all five countries planned and carried out major road construction programs in the 1950's spurred on by the need to develop the agricultural potential of their economies, particularly for export crops. From 1953 to 1965, paved and all-weather roads in Central America more than doubled in length, reaching a total of almost 23,000 kilometers by the end of 1965, as shown in the tabulation below. The annual increase in terms of kilometers averaged 11 percent for the region. The most rapid development rate took place in Nicaragua (17 percent yearly), followed closely by El Salvador and Costa Rica (13 - 14 percent annually). In contrast, despite their pressing needs, Guatemala and Honduras were unable to expand their road systems at a rate anything like that of the other countries, achieving an annual rate of increase of only 5 - 6 percent. Their needs were no less than those of the other countries;

Paved and all-weather roads

Country	(thousand kilometers)		Average Annual Percentage Increase
	1953	1965	
Guatemala	4.4	7.6	6
El Salvador	1.5	4.3	14
Honduras	1.6	2.7	5
Nicaragua	1.0	3.1	17
Costa Rica	<u>1.8</u>	<u>4.9</u>	<u>13</u>
Total	10.2	22.6	11

but Guatemala was held back by political uncertainty as well as lack of projects suitable for foreign credits. In Honduras the level of public savings was low during most of the period and political instability was reflected in weakness in planning and execution. These factors resulted in construction efforts inadequate to the needs of these countries.

8. Construction expenditures since 1960 have varied considerably from year to year, depending in large part on the rate of progress and scheduling of works financed abroad, but only in Costa Rica and Nicaragua have they shown a steadily rising trend. Total construction outlays (including feeder or local roads) during 1960-1965 averaged about CA Pesos 25 million annually for the region as a whole; the amounts by countries are as follows:

Country	Total Construction Outlays 1960 - 1965 ^{1/} (million CA pesos)	Percentage Financed with External Funds
Guatemala	38	57
El Salvador	23	40
Honduras	31	62 ^{2/}
Nicaragua	32	21
Costa Rica	<u>26</u>	<u>44</u>
Total	150	44 ^{2/}

^{1/} Period includes 1959/60 for Guatemala and Nicaragua.

^{2/} Percentage based on 1961-1965 data for Honduras.

Foreign financing, accompanied by technical assistance in planning and executing road programs, played a leading role in most countries in carrying forward this program of construction. With the exception of Nicaragua, where such coverage was about one-fifth, the other countries ranged from about 40-60 percent, and the general average of foreign financing was about 44 percent.

9. With few exceptions, the existing basic network of paved and all-weather roads is still concentrated on the Pacific slopes (see Map I). The main roads leading to the Atlantic coast are the Atlantic Highway in Guatemala, and the Western and North roads to Puerto Cortes in Honduras. The major increases in utilization of land for agricultural production from 1952 to 1963 - mainly of coffee, cotton, bananas and sugar - occurred in the areas served by the present road network (see Map II). With the growth of production and trade, including a rising volume of intra-regional trade, there is continued pressure on the present network of trunk roads to serve efficiently the growing traffic and there are increased needs to construct major arteries or to improve those which are no longer adequate for growing volumes of traffic. Moreover, as older areas are developed and population increases, development of new lands and outlets for production is becoming urgent. Construction of penetration roads into areas should be undertaken where adequate and clearly justifying information is available on the natural resources of the area to be developed; increased agricultural credit and technical services are also necessary for achievement of good economic returns. A major deficiency of the road construction programs in the past has been the slowness in building up feeder and penetration roads into isolated or inadequately served areas. Not until recent years have the five countries begun to include these low grade but essential roads as an integral part of road investment plans to an important degree. As of the end of 1965, as shown in the tabulation below, the region had barely 34,000 kilometers of feeder roads.

Kilometers of Feeder Roads
(in thousands)

Country	1965	Planned 1966-69
Guatemala (includes unpaved secondary roads and private roads)	9.5	n.a.
El Salvador	4.7	n.a.
Honduras (includes secondary roads)	2.3	0.7
Nicaragua (includes second class departmental roads)	5.1	1.1
Costa Rica (includes dry season local roads)	12.0	0.6
Total	33.6	2.4 plus

10. Each of the country road investment plans from 1966 through 1969 proposes some expenditures for extending the feeder network, and additional outlays on penetration roads. Except in El Salvador, the mission considers that investment plans after 1969 (before which the pattern is largely determined by ongoing or projects well advanced in planning and studies) should give greatly increased emphasis to penetration roads to open up potentially productive new areas. However, the mission emphasizes that these roads should be constructed only after soils and timber surveys of given areas have been completed and have established that a sound basis for the location of likely and economically justified development exists.

B. Road Investment Plans

The Regional Network

11. Over the last decade, the five Governments have discussed the possibility of a program of construction of regional or integration roads, to form part also of their national road programs. In 1963, a list of 13 roads were designated as "integration roads", marked by the symbol "C.A.", at a special joint meeting of the Ministers of Economy and of Public Works and the Directors General of the Roads Departments of the five countries, and it was recommended to the several governments to carry out the necessary studies and construction according to a specified schedule. While it is not possible to define exactly what are the criteria for an integration

road, the "C.A." or integration roads concentrated on those which would increase the ease of automotive transport between countries, link principal consumption and industrial production centers more effectively, establish adequate routes to ocean ports in the north and east so as to facilitate exports, to link agricultural zones (both present and potential) with consuming centers and export markets. In addition, given the less developed status of Honduras and its central geographical position in the region, special consideration was and is being given to providing that country with a basic network of highways and to diversify and increase its connections with neighboring countries. The basis for the selection of these roads was established by the Central American Bank for Regional Integration (CABEI) and the Secretaria de Integracion Economica Centroamericana (SIECA), following a 1959 study of regional roads made by the Economic Cooperation Committee of the Central American Isthmus which in turn drew heavily on a study made by the United Nations technical assistance experts in 1953.

12. The CA integration roads have a combined length of 5,258 kilometers. Over half (3,040 kilometers) have been constructed, almost 1,500 kilometers are now under construction and about 750 kilometers are still to be undertaken. The integration roads include key roads in each of the five countries. Most of the C.A. roads (see Map I) are located in the three northern countries; in Costa Rica, the only C.A. road is the Interamerican Highway (CA-1). All but the Atlantic Highway in Guatemala (CA-9) and the Interocean Highway in Honduras (CA-5) cross one or more national boundaries. The TSC study estimated that the cost to complete the necessary construction and betterment of the C.A. roads after 1964 would amount to almost CA pesos 120 million of which 45 million would be for the Interamerican Highway (CA-1). A major portion of the expenditures is programmed to take place in the five years 1966-1969; while the data are subject to error, Government plans would call for expenditures of CA pesos 116 million in this period though the mission would estimate CA pesos 97 million as more likely.

13. While the general economic importance of the C.A. roads is difficult to question, and no specific priorities among them were established, there are a few instances in which the prospective traffic loads and economic benefits do not appear to warrant giving them regional significance, even though they may be parts of a route crossing intra-regional boundaries. The mission refers particularly to CA-11, which runs from Vado Hondo in Guatemala via Copan to La Entrada in Honduras, and from Santa Rosa de Copan to Marcala in Honduras and CA-7, which runs from San Miguel in El Salvador to Villa San Antonio in Honduras. Their benefits are doubtful, as indicated below and their construction and/or betterment should be postponed until their economic justification clearly supports the expenditures involved. In contrast, the Atlantic Highway (the Rama Road) in Nicaragua and the Cartago-Limon Road in Costa Rica, giving access by road from the Central Plateau in the Atlantic coast, are not included in the integration road program. In terms of development potential and of providing a major road connection to a major development area of the Costa Rican and also of the Central American economy, the latter project probably deserves a high priority in the immediate years ahead in the Central American regional highway program. Given the changing scene of economic development in Central America, resulting in part from varying external economic influences,

and in part from the effects on the regional pattern of development flowing from the removal of trade barriers as well as the developmental policies of the several countries, there is little doubt that the composition of the network of integration roads and the relative priorities should be reviewed and revised periodically. So too will it be well to review and revise plans for the national road systems, particularly as population and production centers shift and new areas of land come forward to be developed.

14. Only a brief description of the C.A. roads is presented here (a summary tabulation is given in Table 1).

CA-1, The Interamerican Highway, extends 2,000 kilometers from the Guatemala-Mexico border in the north to the Costa Rica-Panama border in the south. Its construction began over 39 years ago and is largely completed. The United States Bureau of Public Roads (USBPR) usually covers two-thirds of the construction costs with grants and the countries pay the remaining one-third of the section in their territories (in some cases with proceeds of Export-Import Bank loans). The countries are responsible for maintaining the road. CA-1 connects all of the capitals of the Central American countries except Tegucigalpa, which is tied in by a 97 kilometer branch road. Despite its age and the relatively low standards to which it was originally constructed, the Interamerican Highway remains the chief arterial route in Central America. It is in good condition except for three sections: 264 kilometers in Northern Guatemala which is now being paved; a short stretch in Nicaragua which is also being repaved; and 330 kilometers from Cartago, Costa Rica to the Panamanian border, requiring betterment and paving for which USBPR and Export-Import Bank financing has been arranged. The Central American Integration Bank, in October 1966, made a loan from its Integration Fund to construct the first 19 kilometers of the 41 kilometer complete re-routing of CA-1 between El Coco and San Ramon in Costa Rica.

CA-2, The Northern Section of the Pacific Coastal Highway (often referred to as the Littoral Highway), runs south from the Mexico-Guatemala border roughly parallel to CA-1 but closer to the Pacific Ocean, through El Salvador to Sirama. Except for some bridges between Escuintla and Taxisco in Guatemala which need widening, the road is in excellent condition and is fully paved. This road has greatly speeded up important agricultural development on the coastal plains of both El Salvador and Guatemala. In El Salvador particularly, it has provided a backbone from which productive feeder roads have been extended in the last decade (see Map II).

CA-3, The Southern Section of the Pacific Coastal Highway, runs from Choluteca in Honduras through Puente Real in Nicaragua and would thus provide the links for through routes from the interior and north of Honduras to the south coast and interior of Nicaragua. The section from Puente Real south to Leon and Managua in Nicaragua is already constructed. Nicaragua is now constructing the section from Puente Real to the Honduras boundary. Honduras plans to start constructing the section from the border to Choluteca in 1968; the mission considers that this project should be completed without delay so that full benefits of this road can be realized.

CA-4, The Western Highway, will link the Pacific port of Libertad (as well as Acajutla via other roads) with San Pedro Sula in Honduras and Puerto Cortes on the Atlantic, thus providing an interocean route. Construction in Honduras is virtually complete and has greatly stimulated agricultural development along its route (see Map II). The remaining sections to be constructed and the paving of the entire route from Chamelecon to the El Salvador border is scheduled to begin in 1967 with the assistance of a Bank loan. El Salvador is expected to complete major betterment of CA-4 within its territory in 1967.

CA-5, The Interocean Highway of Honduras, from the Interamerican Highway close to the Gulf of Fonseca on the Pacific through the capital, Tegucigalpa, and north to San Pedro Sula and Puerto Cortes. The section from Tegucigalpa and Potrerillos (the North Road) has high priority and will be rebuilt completely.

CA-6, Honduras to Nicaragua, runs from Tegucigalpa through Danli and Ocotal to Yalaguna on CA-1 in Nicaragua and will provide a route from Tegucigalpa to Nicaragua some 43 kilometers shorter than CA-1.

CA-7, between El Salvador to Honduras, runs from the Interamerican Highway east of San Miguel in El Salvador through San Francisco Gotera and Marcala in Honduras connecting with CA-5 (the North Road) at Villa San Antonio. While it would link an isolated but unpromising area in Honduras with El Salvador, and provide a connection for eastern El Salvador with Puerto Cortes, it is not a major highway and its general contribution to economic development appears relatively low; it should not be undertaken until more adequate economic justification is developed.

CA-8, between Guatemala and El Salvador, will complete a shortcut from El Molino on CA-1 in Guatemala to La Cuchilla on CA-1 in El Salvador (via Sonsonate); section from Guatemalan border to Ahuachapan in El Salvador remains to be improved.

CA-9, the Atlantic Highway, is a major trunk road wholly in Guatemala and is completed and paved.

CA-10, between Guatemala and Honduras, will connect CA-9 in Guatemala at Rio Hondo with CA-4 in Honduras at Nueva Ocotepeque; it will provide El Salvador with an alternate route to the Atlantic (Puerto Matias Galvez in Guatemala); construction is to be completed by 1969.

CA-11, between Guatemala and Honduras, is in two sections: Vado Hondo (Guatemala) via Copan (Honduras) to La Entrada (Honduras); and from Santa Rosa de Copan (Honduras) to Marcala (Honduras). The Marcala portion would pass through unpromising country. The route as a whole should be given a low priority since traffic generated would be light and it does not provide access to promising new land (see Map III).

CA-12 will connect northern El Salvador with roads leading to Atlantic ports in Guatemala and Honduras.

CA-13 would connect the two Atlantic ports of Barrios in Guatemala and Cortes in Honduras. Although Honduras is working on the section to the Guatemala border, as of mid-1966, Guatemala had not yet accepted the classification of this road as having regional significance and had no plans to construct its portion from the Honduran boundary.

15. With the exceptions noted above, the C.A. roads generally warrant high priority in the national road investment plans and doubtless would have been incorporated even if they had not received the designation of integration roads. The construction of C.A. integration roads contained in the 1966-1969 road investment programs of the five countries constitutes an important part of the road investment plans in the region. The Mission projections of probable expenditures on C.A. roads as a percentage of projected total national 1966-69 roads investment expenditures, by countries in the region, are shown below:

Country	Percentage
Guatemala	29
El Salvador	41
Honduras	69
Nicaragua	26
Costa Rica	<u>31</u>
Regional Total	43

Source: Tables 21-25.

Regional Road Financing

16. An important source for financing the regional road construction program is the Integration Fund of the Central American Bank for Economic Integration (CABEI). After the United States Government, following the visit of President Kennedy to Central America early in 1963, offered to assist in financing a fund for Central American economic integration, the five Governments and the United States agreed that this fund, at least in its first stages, should be used to finance the improvement or construction of the roads in the Central American system. The Integration Fund, from which CABEI makes sub-loans to the individual Governments, was initially established at US\$42 million of which US\$35 million equivalent has been provided by a US AID loan and the remaining US\$7 million equivalent by the five countries. Road sub-loans totalling US\$30 million (of which US\$5 million equivalent are from the countries) were committed from the Fund in the latter part of 1966. The distribution of the remaining US\$12 million

in the Fund is scheduled for additional highways but the allocation to individual projects has not yet been decided. Moreover the sum may be expanded into a larger program. The tabulation below indicates the countries, and the designation of the roads for which the sub-loans were made.

Country and Regional Designation		Kms.	Amount of Loan (millions of CA pesos)
<u>Guatemala</u>			
None	El Rancho - Santa Elena ^{1/}	49	4.2
<u>El Salvador</u>			
CA-1	Cutuco - Goascoran	43	1.9
CA-1	Portezuela - La Cuchilla	44	2.9
<u>Honduras</u>			
None	Tela - La Ceiba	106	8.8
CA-3	El Truinfo - Nicaraguan boundary ^{2/}	13	0.7
<u>Nicaragua</u>			
CA-3	Puente Real - Honduras boundary	44	3.9
CA-6	Ocotal - Honduras boundary	24	2.8
<u>Costa Rica</u>			
CA-1	El Coco - Naranjo ^{3/}	<u>22</u>	<u>4.7</u>
		<u>Total</u>	30.0

^{1/} First section of 129 km. long El Rancho - Coban road project.

^{2/} Section of 52 km. road from Choluteca to Nicaraguan boundary.

^{3/} Section of 42 km. long San Ramon - El Coco road project.

17. CABEI's financing, which covered all of the eligible cost of the projects, included two roads not previously included in the official integration list, one in Guatemala (El Rancho-Santa Elena) and the other in Honduras (Tela-La Ceiba), but considered by CABEI to be of regional importance. The allocation of the remaining US\$12 million from the Integration Fund is also envisaged by CABEI for highways, but the allocations have not yet been determined.

18. Disbursement from the US\$30 million for sub-loans are scheduled to begin early in 1967; (in some cases for reimbursement of outlays already being made). CABEI loans are usually equivalent to 100 percent estimated project cost and the terms are favorable, with interest at 3.5 percent per annum and amortization within a period of 25 years (including a grace period of 7 years) (although the first such loans had a repayment period of 30 years with 10 years of grace). While these terms are intended to stimulate the construction of the integration road program, they naturally give cause for strong preference on the part of ministries to obtain financing from CABEI instead of utilizing other sources lending on more conventional terms. Substantial portions of the Central American regional system are being improved or constructed with assistance from IBRD-IDA, IDB, USBPR (U.S. Bureau of Public Roads) and EXIMBANK and more will be required to help finance the probable CA pesos 90 million or more required to complete the original integration network.

19. Neither CABEI nor SIECA has established an order of priority among the thirteen integration routes. Each country decides which project it wishes to submit to CABEI for financing. Each road loan application to CABEI incorporates complete engineering plans and an economic justification. Loan applications submitted initially for financing from the Integration Fund required more funds than CABEI had available. CABEI has reviewed the applications and in the first round of loan approvals selected projects on which studies were most complete, giving consideration also to appropriate distribution among the several countries.

National Road Investment Plans

20. In 1964, all of the Central American countries prepared road investment programs for the period 1965-1969. The expenditures planned for construction and betterment were, in most cases, two to three times as large as the sums spent in the period 1961-1965. The programs envisaged that foreign financing would at least cover the foreign exchange cost estimated to be at least 60 percent of the cost of the programs. However, based on actual outlays in 1965 and estimated investments in 1966, which fell considerably short of original targets, it became clear that the original plans could not be fulfilled. Hence all five countries' investment programs were revised by the Road Departments of each country. Even these, however, reflect a tendency for shortfalls in outlays in a given year to be added to the program for the next year or so, further distorting the plan targets or, if new projects are begun, requiring a stretch-out of all projects. Better planning would call for postponing some of the new projects not yet started until the projects initiated earlier were completed or had advanced sufficiently to release technical and financial resources required for expeditious execution of the new project.

21. Even the revised road plans for 1966-1969, however, call for very substantial increases over the level of annual investment outlays in the preceding four years, more than triple on the whole, as shown in the following tabulation. The increases are especially large in Guatemala, Honduras and Costa Rica.

Country	(millions of CA pesos)	
	Actual Investment Outlays 1961 - 1965	Planned Investment Outlays 1966 - 1969
Guatemala	24 <u>1/</u>	95
El Salvador	15	45 <u>2/</u>
Honduras	20	68
Nicaragua	21 <u>1/</u>	57
Costa Rica	<u>21</u>	<u>68</u>
Total	101	333

1/ Adjusted to include one-half of fiscal 1961-1962.

2/ Road Department plan for 1966-1967, and Mission estimate for 1968-1969.

Source: National Roads Departments

22. These programs are not likely to be achieved. The main reasons may be listed as follows:

- a. inadequate procedures and insufficient experienced governmental administrative staff to process the greatly enlarged programs;
- b. insufficient capacity of the roads departments to plan, design and supervise such large construction programs;
- c. in some cases, too small and inadequately financed and inexperienced local construction firms;
- d. putting-out for bids construction packages too small to interest international contractors;
- e. inability of force account to execute construction;
- f. shortages of local currency in some countries; and
- g. slow progress in negotiating and ratifying foreign loans.

23. The mission has made projections of investment outlays likely to be attainable in each of the countries from 1966 through 1969. In doing so, it has taken account of operative and administrative capacity of the public authorities concerned, the status of preparation of projects for financing and execution, the status of existing financial commitments, the desirability of completing existing projects before new ones are undertaken, judgement as to relative priorities of various projects, the

possibilities of using large construction organizations and international consultants to carry out programs; the overall expenditures for 1966-1969 projected by the mission are about 30 percent less than the total of the five governments' revised road programs:

Country	1966 - 1969	
	Government plan (millions of CA pesos)	Mission projection
Guatemala	95	48
El Salvador	45 <u>1/</u>	40
Honduras	68	53
Nicaragua	57	51
Costa Rica	<u>68</u>	<u>51</u>
<u>Total</u>	333	243

1/ Road Department plan for 1966-67, and mission estimates for 1968-69.

In Guatemala, the reduction is about 50 percent, but in the other countries the reduction ranges from about 10 percent to 25 percent. Yet the total projection of the mission, CA pesos 238 million, would be more than double the actual expenditures in the preceding four years, and in each country, the increase would be at least 100 percent, being higher in Honduras (177 percent) and Costa Rica (143 percent). These increases, as indicated in the discussion of country programs below, will require much better organization, procedures and effort than before on the part of all the countries, and is likely to strain their capacities to the utmost.

Guatemala road program

24. Guatemala's planned road investment for 1966 - 1969 totalling CA pesos 96 million would almost quadruple its road expenditures actually made from 1962-1965. The objectives of this program are threefold: 1) expand and improve the trunk system of paved and all-weather roads which now consists of three major highways - the Interamerican Highway, the Inter-ocean Highway and the Pacific Highway; 2) improve or construct the integration roads in its territory - CA-2, CA-8, CA-10, CA-11 and CA-12; and 3) mount two large programs of feeder and penetration roads - one by the Roads Department and the undeveloped Peten forest area penetration roads by the Army. About 22 percent of the Government planned program is allocated to C.A. integration roads, about 40 percent to national roads and the remainder to feeder roads and other essential activities such as studies, foreign consultants and maintenance equipment. If they could be realized, these objectives would contribute to Guatemala's economic development. Most of the projects planned by the Roads Department are based on sound economic

criteria. Exceptions are the Coban - Chisec - Chinaja project, the Mendez Sebol - Chisec project (both in the southern Peten), and CA-11, Jocatan - Camotan; neither projected traffic nor penetration to new areas of production warrant the construction of these roads until the 1970's at the earliest. Even when these projects are deleted from the 1966-1969 road investment plan, the total projected for the four year period is very large. Judging from past performance, and taking into account the physical limitations of capacity detailed above as well as fiscal constraints, the judgement of the mission is that the most that Guatemala will be able to spend on its road program is about 50 million CA pesos between 1966 and the end of 1969. Even this reduced program will strain Guatemala's road building capacity. Heavy reliance will have to be placed on international consultants and contractors if the lower level of investments projected by the mission is to be achieved.

25. The mission regards the El Rancho - Coban road (except the paving) and the San Julian - El Estor - San Felipe and Morales - Puerto Mendez projects as having a priority second only to the purchase of maintenance equipment. High priority is also attached by the mission to the feeder and penetration road projects designed to tap or to encourage new settlement and agricultural production. Even so, the mission believes that construction of the planned penetration and feeder road projects will stretch beyond 1969. The same is true of the integration road projects including the rehabilitation of the Interamerican Highway. The following tabulation summarizes the Government planned road investment by years to the period 1966-1969 and the mission projected investment; a detailed comparison project by project is shown in Table 21.

	1966	1967	1968	1969	Total
	(millions of CA pesos)				
Government Planned	8.5	27.1	29.5	30.3	95.4
Mission Projected	8.3	12.3	13.5	14.1	48.2

El Salvador Road Program

26. Unlike the other four Common Market countries, El Salvador started building roads in the 1920's and its network now reaches virtually into all of the regions of this small country. The two major east - west highways (CA-1 and CA-2) are intersected by four trunk routes running north-south. Except for feeder and farm to market roads, with few exceptions El Salvador's basic road network is virtually completed. Much of the 1966-1969 program published by the Government in 1965 calls for major betterments on existing routes rather than for new construction because of the very rapid increase in traffic on key routes in recent years. (In some cases increases have been 20 to 40 percent per year.) Work is being completed on the following roads, which have regional significance: CA-4, Tejutla to the Honduran boundary to connect with the Western Highway in Honduras;

Santa Tecla - La Libertad (the continuation of this road to the Pacific port); and San Salvador to the Fort of Acajutla.

27. The Government has revised the two years 1966-1967 of its earlier five year program and is currently revising the investment plans for 1968 and 1969. Taking account of the operative capacity of the Roads Department, the mission has projected sums for 1966 and 1967 somewhat lower than Government planned investment for these two years, mainly on the national roads, assuming that the Roads Department will rely on international consultants to assist it. The totals of the Government planned road investment for the years 1966 and 1967 and mission projected annual total investments through 1969 are as follows; a road by road comparison is shown in Table 22.

	1966	1967	1968	1969	Total
			(millions of CA pesos)		
Government Planned	8.5	13.5	n.a.	n.a.	n.a.
Mission Projected	6.7	10.2	11.9	11.5	40.3

Honduras Road Program

28. Until the mid-fifties, the road network of Honduras consisted largely of a road north from Tegucigalpa toward the Atlantic and one leading south from the capital city to the Pacific Port of San Lorenzo. Transversing this was the 151 kilometers of CA-1, the Interamerican Highway from the El Salvador to the Nicaraguan boundaries. In recent years the Western Highway, from San Pedro Sula to the El Salvador boundary, the Eastern Highway from Tegucigalpa to Santa Maria, and the Olancho Highway extending north and east of Tegucigalpa have been added. The goals of the Honduran 1966-1969 roads investment plan are to extend and improve this basic network, to continue the construction of feeder roads to open up promising new land for agricultural purposes to the north and east of the capital, and to construct the eight integration roads assigned to the country. The construction of the integration roads would constitute well over half of the CA pesos 68 million planned for road investment over the period 1966-1969. There is little question of the need for all of the roads included in the 1966-1969 Government investment plan. But taking into account past performance and the capacities of the Roads Department, even with heavy reliance on international consultants and contractors, it is doubtful whether the planned investment program can be achieved in full. Mission projected investment as to what might be realized over the four-year period through 1969 is CA pesos 53 million. Honduras' road program for 1966-1969 will be the largest in Central America.

29. A critical feature of even the reduced program is that it will require an increase in annual construction expenditures from levels of CA pesos 4 and 5 million annually in 1965 and 1966 (and a peak of CA pesos 6 million in 1960), to levels of 13 to 18 million annually in 1967-1969. The great bulk of this increase will associate with two Bank

financed projects, the Western Highway construction and paving, and the North Road (Tegucigalpa - Potrerillos), that alone will result in annual outlays ranging between CA pesos 8 to 11 million between 1967 and 1969. Also contributing importantly to the high level of total outlays will be two other foreign-financed projects, the North Coast road, and the farm-to-market roads; these two projects will bring construction expenditures on the four projects named to between CA pesos 11 to 16 million in the years 1967-1969; in 1968, expenditures on these four projects will amount to 90 percent of the program in that year.

30. Clearly, to attain these sharply increased levels will require heavy reliance on the use of international consultants and contractors which the authorities are willing to do. Moreover, it will require improvement in government procedures and practices in order to speed up the processing and administration of contracts for these large projects which in the past have been limiting factors on work progress.

31. In reviewing the program, the mission considered the following projects to have high priority during the next few years: the reconstruction of the North Road; construction on portions of the Western Highway and its paving; completion of CA-3 from Choluteca to the Nicaraguan border; construction on CA-6 from Danli to the Nicaraguan border; the North Coast Road project; and the feeder roads. In view of the size of the overall program, some CA roads, planned by the Government for 1968 and 1969, should be deferred to 1970 or after: on CA-7 and 10 because they are not major trunk roads; on CA-11 and 11A because of low economic priority; and on CA-13 (Puerto Cortes to Guatemalan border) because it will not yield full benefits unless Guatemala constructs the connecting road on its side. Construction on the North Coast Highway is likely to take longer than originally expected. Construction of the Juticalpa - Puerto Castilla Road should be postponed unless a firm decision is taken to proceed with the Olancho pulp and paper mill project now under study. A comparison of mission projections, project by project, with the Government plans for 1966-1969, is shown in Table 23; a comparison of the annual totals follows:

	1966	1967	1968	1969	Total
	(millions of CA pesos)				
Government Plan	5.0	19.9	19.8	22.9	67.6
Mission Projection	5.0	12.8	17.8	17.0	52.6

Nicaragua Road Program

32. Nicaragua has more kilometers of highway relative to population than other Central American countries, but fewer relative to its land area. Existing roads are concentrated on the Pacific slopes and only one, the Rama Road, stretches toward the Atlantic. Unlike Guatemala, Honduras and Costa Rica, Nicaragua has no deepwater port on the Atlantic, although, as indicated below, a study of the need and possible location of such a port on the Atlantic is now proceeding with U. N. Development Program assistance.

33. The major highways of the country are CA-1, the Interamerican Highway; the Littoral Highway between Managua and the Port of Corinto; and the Rama Road. Nicaragua's objectives for its 1966-1969 road program are to provide two more trunk links to Honduras (CA-3 and CA-6), to improve and extend towards the north and east its basic network of paved and all-weather roads, and to launch an additional series of feeder and penetration roads extending north and east to serve new and potential pockets of agricultural production. In addition, the plan includes a major penetration road to be started in 1969; this would run some 400 kilometers northeast from Las Mercedes to the town of Rio Tuma and eventually to Jiloa in the northeast corner of the country. However, not enough is known about the soils in the areas north and east of the country to justify a penetration road into this virgin country.

34. Nicaragua's road planning appears well defined for 1966 and 1967 but is far less so for the years 1968 and 1969. Slippages in the investment programs for 1965 appear to have been added to plans for 1966 with an increase from actual expenditures in 1965 of CA pesos 6.4 million to CA pesos 14.6 million in 1966. The peak of the Government's planned road investments would occur in 1967 when expenditures would reach CA pesos 20.9 million, a level three times as high as that in 1965, the best previous recent year. Thereafter, owing to the lack of project planning, they would drop to CA pesos 10.3 million in 1968 and 11.2 million in 1969.

35. A little less than one-fourth of the four-year investment program of the Government is for integration roads, with another fourth for the improvement and extension of the national network. Almost two-fifths of the program is allocated to feeder and penetration roads and the remainder to maintenance equipment and miscellaneous but essential activities. The large bulge in the Government investment plan in 1967 is caused in part by the CA pesos 8.0 million programmed for the feeder roads under the "milk project" (Plan Lechero) in the region of Matagalpa, financed by IDB. However, it is most likely that expenditures on this project will peak in 1968 and the mission's estimates reflect this slippage. Other adjustments included in the mission's projections are in two of the regional roads, CA-1 and CA-3, and in the self-help penetration roads, all of which will take longer to do than is shown in the Government plan. Pending more knowledge of soils and potential development in the north and east, mission projections postpone till after 1969 the beginning of construction of the major penetration road to the northeast from Matigos to El Cabo.

36. The road investment expenditures projected by the mission in the light of operative capacity to plan and construct roads, would provide a lower but steadier and sustained build-up than that envisaged in the Government's plan. Greater efforts are needed in Nicaragua to prepare feasibility and other studies to maintain an effective ongoing program of road investment after 1969. The Government investment plan and mission projections (compared in detail in Table 24) are summarized as follows:

	1966	1967	1968	1969	Total
		(millions of CA pesos)			
Government plan	14.6	20.9	10.3	11.2	57.0
Mission projections	11.9	13.6	12.0	13.1	50.8

Costa Rica road program

37. The present roads network of this most southern of the Common Market countries is based on the Interamerican Highway that runs about 700 kilometers northwest - southeast from the border with Nicaragua to the Panamanian border. Spurs serve the Nicoyan Peninsula in the northwest and there is a substantial network of roads of various classes serving the Central Plateau. New construction is pushing towards the untapped agriculture regions in the north and east to the Atlantic, although, as yet, there is no road linking the important Atlantic coast region of Limon with the rest of the country. Systematic planning for the construction of a roads system adequate to Costa Rica's development requirements was initiated with Plan Vial I in 1962. Financed by the Bank and IDA, and also AID, this program sought to balance the construction of all-weather roads with feeder roads (some financed by IDB) designed not only to link existing production areas with markets but also to open up new lands with promising potential. The Government has prepared a draft of Plan Vial II that it proposes to implement beginning in 1969. This is an enlargement and extension of Plan Vial I and would appear to be suitable for external financing. Completion of major rebuilding of the southern section of the Interamerican Highway to the Panamanian border is also planned. The Highway Department's revised program for 1966-1969 calls for total outlays of CA pesos 68 million, and would raise expenditures from an estimated CA pesos 10 million in 1966 (compared with a high of CA pesos 7 million in 1965) to CA pesos 22 million in 1969. Such an overall increase is over-ambitious.

38. Instead of completing Plan Vial I expeditiously and thereby reaping the full development benefits the expenditures would bring, Costa Rica has launched additional projects that have strained its road planning and construction capabilities to the detriment of ongoing projects. Over 400 kilometers of major reconstruction and betterment for the Interamerican Highway comprises one-fourth of the total investment planned by the Government for the period 1966-1969. Preliminary work has begun on the complete realignment and construction of a new 42-kilometer link on CA-1 (the Interamerican Highway) between El Coco and San Ramon, and a loan from CABEI's Integration Fund has recently been obtained for a 23-kilometer section of this road (El Coco - Naranjo), but without firm assurance that funds will become available for the remaining portion of the link needed to make the project viable. The San Ramon - El Coco

highway would provide a modern alternate route to a tortuous, heavily traveled existing section of the Interamerican Highway. Its benefits would consist mainly of reduction of travel costs and time from San Jose to the Pacific coastal port of Puntarenas; while the TSC study reports a high benefit-cost ratio, a major portion of these benefits consist in savings of time and fares to passengers. Work has also proceeded on the important Cartago - Limon road, the section from Turrialba to Siquirres is virtually complete and work has been at a slow pace on the Siquirres - Limon portion. The mission considers the completion of the road to Limon to have high priority in terms of the development strategy in the country, since it would provide the first road link to the Atlantic (now dependent on rail connections), particularly important for the development of exports to U.S. and European markets; it would also stimulate development of the new areas served by the proposed highway. However, the commitment already undertaken by the Costa Rican Government, together with the great difficulties the Government is encountering in meeting its construction schedules, as well as serious difficulties in meeting local currency requirements, lead the mission to conclude that it would not be desirable or feasible to schedule the Siquirres - Limon section before 1969 in addition to the large increase required to carry out existing projects. The Government therefore faces a difficult choice if it wishes to proceed expeditiously with the Siquirres - Limon road, involving a reduction or elimination of some other projects during the next few years.

39. In its projections, taking account of the operative and financial limitations referred to above, the mission would stretch out the 21 million CA peso-planned reconstruction of the southern section of the Interamerican Highway (CA-1) beyond 1969. The importance of completing road projects already underway before attempting new projects cannot be overstressed. Hence, even with a considerable improvement in operative capacity, the mission considers that at best stage II of Plan Vial, planned to start in 1969, should begin on a more modest scale than that now envisaged by the Highway Department. Overall, the mission projects a total program of CA pesos 50.6 million, but even this level is high and will require extra efforts by the Government and outside consultants and contractors for its accomplishment. The Government planned investment and mission projections for 1966-1969, shown in detail project by project in Table 25, are summarized as follows:

	1966	1967	1968	1969	Total
	(millions of CA pesos)				
Government plan	10.0	18.4	15.3	24.6	68.3
Mission projection	10.0	13.7	11.9	15.0	50.6

C. Road Organization and Administration

Organization

40. In Central America, the Roads Departments are a part of the Ministries of Public Works, except in Costa Rica where the Department is a part of the Ministry of Transportation. Generally speaking, the Departments are organized along similar lines, with from four to six Divisions: Administrati , Planning, Design, Construction, Maintenance and Shops. Each of the Departments retains resident international consultants that assist in road planning, designing, construction supervision and the development of adequate maintenance systems. All of the Departments suffer in varying degree from a shortage of trained and experienced engineers and technicians although the supply of trained personnel has improved in recent years. All need strengthening in planning, in design work and in inspection and supervision.

41. Except for the study on a ten year highway program for Honduras conducted by Stanford Research Institute in 1962, the only systematic and comprehensive traffic count and origin and destination survey of any Central American country is included in the 1964-1965 TSC study.^{1/} Costa Rica, with 8 permanent counting stations and 348 mobile stations, Nicaragua, with 4 permanent counting stations and 72 mobile stations, and El Salvador where the TSC traffic flow data was updated in 1965, all have adequate systems for the orderly collection of traffic statistics and the collection and use of origination and destination data. This type of research is practically non-existent in Guatemala and in Honduras. In these two countries, the consultants make traffic counts for specific road studies but there is no organized system for the countrywide collection of traffic statistics. Guatemala is establishing a Traffic Division in the Roads Department to organize such a system and Honduras should do the same.

Design Standards

42. The TSC study has recommended minimum design standards (Table 14) for application in the region by the several highway departments; these appear adequate except that the bridge design loading should be H20-S16 instead of H15-S12 for important high-traffic routes, and that in particularly mountainous terrain the width requirement for road shoulders could be reduced. Given the growing importance of intra-regional traffic, the countries should, where necessary, adjust their standards so that they meet at least the minimum recommended by the TSC study subject to the modifications noted above.

^{1/} TSC Consortium, Central American Transportation Study, 1964-1965, Vols. I and II. This study was commissioned by CABEI (the Central American Bank for Economic Integration).

43. Design standards for each country (summarized in Tables 9-13) vary in some details but are essentially similar. While adequate in most respects, there are important deficiencies in several of the countries.

44. In Guatemala, existing law provides for a right-of-way width of only 25 meters and restricts construction over a width of 80 meters. However, new roads are being designed with a 40 meter right-of-way since a new law is under preparation which will lift the construction restriction and which will specify a 40 meter right-of-way. The early implementation of the new law is important since the existing law neither provides sufficient right-of-way nor is fair to landowners.

45. In El Salvador, the Highway Department is preparing to enforce safety and weight regulations based on the Central American Accord on Highway Traffic, which establishes pavement design methods similar to those in use in the United States and provides for a single axle load of 8 metric tons (17,600 pounds).

46. In Honduras, the geometric design standards for road alignment provide separate standards for five categories of roads; this is needlessly complex and too refined for the geographic configuration of the country and the prevailing patterns of traffic. A reduction to three categories would be in order and speed-horizontal design standards should be reexamined. Honduras should also develop standard criteria for pavement design.

47. Design standards in Nicaragua have recently been modified and the standards for national highways (first class) are under discussion. It is intended to revise all the standards on the basis of present day engineering principles and Nicaragua will therefore have the opportunity of bringing the new minimum standards up to the level of the regional standards recommended in the TSC study.

48. In Costa Rica the design standards have recently been revised. The new standards appear to be adequate and are close to the regional standards recommended in the TSC study. In fact, the bridge design loading is H20-S16 for highways with an ADT greater than 1,000 which is higher than the TSC recommendation of H15-S12 loading in all cases.

D. Construction

49. The local construction industry in each of the five countries is small, weak and inadequate to meet the demands placed upon it by the expanding road programs. Costs are high, performance schedules are seldom achieved, and the inability of most firms to arrange for adequate financing limits their opportunities to grow. The mission recommends that all of the countries take steps to encourage the growth of their construction industries. Equal treatment in the employment of Central American construction firms is provided for in Article 16 of the General Treaty for Central American Integration and its application should assist in the growth of the regional construction industry. The possibility of more adequate credit facilities for construction firms should be explored.

International contractors employed on large jobs should be encouraged to join with local contractors so that the latter may gain experience.

50. Most road construction is performed under contract except in Nicaragua where until recently all road construction except the U.S. financed Rama Road and the Interamerican Highway was done by force account. Nicaragua still relies largely on force account but is now in the process of shifting to contract work. This process should be encouraged. Supervision costs are much too high in Guatemala (up to 22 percent of construction costs) and are high in Nicaragua as well (up to 18 percent of construction costs). This is because government supervision largely duplicates the supervision carried out by consultants. It should be possible to lower these percentages to the usual 5 to 7 percent of construction costs by streamlining supervision practices and eliminating the duplication mentioned above.

E. Maintenance

51. Maintenance in all five of the countries has improved in recent years but is still inadequate except in Nicaragua. The reasons for relatively poor maintenance are several. Usually budgets are inadequate. Except in Costa Rica annual road maintenance expenditures from 1960 through 1965 have remained at the same levels or have actually decreased during this period when sizable additions to the road network have been made (Table 7). Moreover, in some cases, equipment has been undermaintained or abused and there has been failure to provide adequate replacements. Also, the practice of using maintenance forces and equipment for construction on major road betterment and shortages of personnel skilled in modern maintenance methods diminishes effectiveness of maintenance. The mission considers that each government should provide adequate maintenance of roads which have been built at high cost, and take measures to establish sound organization and procedures, as well as necessary resources for maintaining them.

52. In Guatemala maintenance continues to be the foremost problem facing the Roads Department. While there is urgent need for new equipment there is also need to correct deficiencies in the maintenance system, as noted above. The pending Export-Import Bank loan of CA pesos 5.2 million is intended to replenish the present supply of equipment. The separate maintenance staff and equipment pool for the Interamerican Highway results in an inefficient allocation of men and equipment. It should be abolished and its resources and personnel combined with the national maintenance organization.

53. The maintenance budget of El Salvador is inadequate in relation to the relatively high volume of traffic using the roads. Per kilometer maintenance allocations vary between CA pesos 100 for rural roads to CA pesos 660 for paved trunk roads. These are not large enough to maintain the roads in good condition. The pending Export-Import Bank loan of 2.6 million dollars for new maintenance equipment merits a high priority based on the need of the country to upgrade maintenance.

54. In Honduras, highway maintenance is mechanized to a large extent. Most of its fleet of maintenance equipment, however, was purchased before 1960 and is now over-age and worn out, in part because of inadequate maintenance. The Roads Department is considering the preparation of a loan application for some 2 million dollars for the purchase of maintenance equipment over a five year period. This project should be given high priority by the Government.

55. Nicaragua's road maintenance sets a high standard. It is highly efficient and is run by experienced and well trained engineers. It has a pool of maintenance equipment valued at about CA pesos 3 million, and new equipment is being added from a recent US\$2.8 million Export-Import Bank equipment purchase loan. As the Construction Division reduces the volume of force account work in favor of contract construction, another large pool of equipment (estimated at some CA pesos 4 million) will be turned over gradually to the Maintenance Division. The Maintenance Division also constructs from 30 to 100 kilometers of local roads per year financed with contributions from local authorities and private land holders. In case it were necessary, by curtailing this program the Maintenance Division should be able to carry out an adequate maintenance program even under an accelerated program of new road construction.

56. Costa Rica's Road Department maintains all national and regional roads and assists the local road boards in the maintenance of rural roads. Highway maintenance and shop equipment is valued at some CA pesos 4 million, which includes over CA pesos 2 million of equipment purchased under the Bank financed Stage I of the Plan Vial. Stage II of the Plan Vial now being prepared for 1969 contemplates the purchase of an additional CA pesos 2.3 million of maintenance equipment. Even if it were necessary to postpone part of Stage II of the Plan Vial until 1970, the maintenance equipment purchases should start in 1969. With some additional staffing, Costa Rica's Maintenance Division should be able to keep pace with a reasonably stepped up rural building program.

F. Transport Industry

57. The characteristics of the highway transport industry are similar in all five of the Common Market countries. The private truck and bus carriers are for the most part small and not linked together in an effective organization. The industry is largely composed of owner operators with one or two vehicles. Only a handful of firms own and operate more than 15 to 20 vehicles. There is no economic regulation and rates, fares and schedules are usually negotiated for each load to be transported. None of the transport firms operating within the countries have regularly published tariffs. In the absence of data, it is impossible to determine whether rates are based on full costs, but the presence of vigorous competition suggests that rates are not likely to exceed costs; indeed some rates set by small truckers are alleged to be less than costs including depreciation.

58. As far as could be ascertained, there is no shortage of buses and trucks to carry the traffic generated in the Central American countries.

No doubt there may be a local shortage at peak periods of shipment, and some surplus in particular locations at any given time. The few large truckers complain about cutthroat competition from small owner-operators and would welcome economic regulation. Highway rolling stock appears adequate to the present needs of the five countries. Costs are high, but this should be expected with the high cost of equipment and the difficult terrain and poor condition of many of the roads.

59. All of the five countries have adhered to the Central American Accord on Highway Traffic, based on the Geneva Convention on Highway Traffic. Although truck axle loadings are limited by the Accord to eight metric tons, only in Nicaragua and Costa Rica is any attempt made to enforce the axle load weight limit. However, the other three countries are in the process of installing weighing machinery and plan to initiate enforcement programs.

60. The enforcement of axle load limitations is very important since higher axle loads cause road surfaces to deteriorate rapidly and increase the costs of adequate maintenance. Excess axle loadings reduce the economic life of the road and increase the necessity for major betterment. This is a problem in all of the countries and is only partially solved by the four countries that prohibit the importation of vehicles designed for axle loadings of more than 8 metric tons. Honduras does not have any limitation on the size of trucks imported.

61. The total number of four-wheeled, self-propelled registered vehicles since 1960 in all five countries increased annually at an average rate of 7 percent reaching a total of 43,000 trucks, 86,000 passenger cars and 39,000 other vehicles in 1965 (Table 8). Within the region, the average annual increase in total registered vehicles ranged from only 3 percent in El Salvador to 12 percent in Honduras, the latter reflecting the efforts made to improve its road network and vehicle fleet. In Costa Rica and El Salvador, the number of trucks registered increased very slowly in the last few years but in the other three countries the increase averaged more than 10 percent annually. Honduras is the only country in the region which has been admitting trucks free of duty in order to catch up in the development of her transport industry.

62. Data on registration of trucks does not show capacity. However, observation and other evidence indicates that the size of trucks has increased noticeably in recent years as roads have been improved and better maintained and the road networks extended. Hence the increase in carrying capacity is probably considerably greater than the rise in vehicle registrations would indicate.

G. Customs Barriers

63. With unified external tariffs and with internal free trade, both goals of the Common Market, already largely accomplished, total through transport costs from foreign seller to local buyer will have a greater impact on determining the combination of transport modes and routes used than in the past when the import tariffs in force varied considerably from one

country to another. The cheapest and most efficient routes and facilities will be utilized more readily as artificial barriers to trade are equalized or removed. Because transport cost considerations will be more important than when tariffs existed internally in the region and before the common uniform tariff came into being, each of the five Common Market countries should be alert to reducing the cost of the transport component of both imports and exports. However, the spur towards greater efficiency in transport will be dulled unless traffic can move across national boundaries within the region without costly delays. Recognizing the importance of this factor, in 1963 the five countries adopted a uniform code of customs procedures (Codigo Aduanero Uniforme Centroamericano). Nevertheless, while progress in freedom of movement has been made since then, bus and truck operators are still harassed by customs inspections and delays, even though over 90 percent of all intra-regional trade is now or will soon be free of duty. A major cause of delay is the hours during which customs offices are closed; open hours are usually from eight to twelve in the morning and two to six in the afternoon. On heavily traveled routes, many times shipments are not cleared before customs closes. Clearance often involves complete unloadings and reloading to all inspection on grounds of preventing possible smuggling of goods subject to customs duties. The resulting delays are costly to both shipper and operator, even though there is a provision in the uniform customs code (Article 8) whereby the consignee may pay the costs of customs during non-working hours. While the transit of bonded and sealed cargo is provided for in the Code, the costs of transport are burdened by the national rules requiring that the trucker must pay not only the salary of a customs guard assigned to accompany the vehicle across the country, but also pay his fare back to the other border. The practice of posting a customs guard on the vehicle during transit of a country is wasteful and unnecessary. It would be preferable to increase the amount of the performance bond put up by trucker, or to impose heavier fines if the in-transit seal is broken. The mission recommends that steps be taken to eliminate these and other remaining impediments to commerce.

H. Conclusions

64. The program of construction of Central American roads, including those financed from sources other than the Integration Fund plus the countries' national programs are planned at a total of about CA pesos 340 million for 1966-1969, a level more than triple that of expenditures in the four immediately preceding years. Even though loans already approved or under consideration can be expected to cover a high proportion of these expenditures, the administrative and construction effort required by a program of this size is likely to mean that the road construction program will not be completed according to plan but will stretch out through the early 70's. The mission's estimates indicate overall the feasible expenditures within the period 1966-1969 will be about one-third less than the combined programs of the national authorities; but the shortfall will vary among the countries anywhere from one-eighth to one-half. Such a postponement of expenditures is not likely to present the Government authorities with major problems of

choice, except in Costa Rica and perhaps Honduras, where the necessary studies and financing arrangements are advanced, and the authorities will probably have to choose between undertaking several major programs at one time, thus prolonging their completion (and delaying the realization of the benefits of investments) or postponing the beginning of some projects.

65. In any case, by the early 1970's Central America is likely to have the kind of highway network which had been envisaged for the late 60's. This network will provide a hard surfaced and relatively high-speed highway from the Mexican to the Panamanian border as part of the Interamerican Highway from the United States to Panama. The existing coastal highway in Guatemala and El Salvador will, through the new connection between Honduras and Nicaragua, provide a useful alternate route to the Interamerican Highway for most of the distance from the Mexican border to Nicaragua. The TSC study recommends that within the next decade this route should be improved, mostly by widening, to the standards of a "Central American Throughway" which would by-pass all the major towns and follow the coastal route. The cost of these improvements and of a new coastal highway in Costa Rica which will be required for such a throughway is estimated at about US\$35 million and probably would be justified only if there were a very substantial increase in trade with Panama, which is not now a member of the Central American Common Market. Consequently such a large investment has to be considered in terms of the development of traffic in the longer range future; as a preliminary step toward facilitating littoral traffic trade, the maintenance of the existing coastal highway should be substantially improved. Further, the mission considers that after the substantial investments in the Interamerican Highway scheduled to take place in the 60's, and the completion of major trunk routes to the Atlantic seaboard, the countries' road investment programs in the 70's should place greater emphasis on opening up new areas with penetration roads and developing the feeder road system. Thus the strategy of highway development would facilitate the integration of the Central American area and reduce transportation costs thereby stimulating the growth of its internal market; it would also provide outlets for exports to both coasts, open new areas to development, and enable existing agricultural areas to reach their markets more quickly and cheaply. This strategy would correspond to the general economic outlook for Central America as described by the mission in Volume I. The highway system, as it would look in the early 70's upon completion of the present program (see Map I), would broadly correspond to the needs of the region as a whole; the following stage, however, should concentrate on consolidating the main network with necessary feeder and penetration networks, rather than embarking on major construction along the traditional routes of the Pacific regions.

66. Even to complete the reduced programs projected by the mission, the capacities of the Road Departments will be strained, and heavy reliance on international contractors and consultants will be necessary. In all countries, except Nicaragua, maintenance organizations, maintenance equipment pools and maintenance expenditures are inadequate. Local construction firms need to be strengthened and encouraged. Design standards of all five countries appear adequate

with few exceptions, but bridge design standards should be raised from H15-S12 to H20-S16. Axle load limitations should be strictly enforced to prevent severe road damage and to keep maintenance expenditures within bounds. Finally, to attain full benefits from the investments made and being planned, it will be necessary to continue to improve customs practices and procedures to eliminate delays at country borders that are costly to shippers and carriers.

II. RAIL TRANSPORT

A. Introduction

67. There is no regional network of railroads in Central America and only one railroad operates in more than one country. All 13 railroads operating today are narrow gauge lines. Five are captive lines - that is, they are owned by and serve exclusively one or the other of the 2 fruit companies - Standard or United. Two others are also owned by the fruit companies but provide only limited public service; since they do not operate as full public utilities, they are not considered here. Of the remaining 6 railroads rendering public utility service and considered in this report, 4 are owned and operated by Government entities and 2 are privately owned and operate under terms of franchise agreements with the Government. These 6 roads are listed below:

Name	Symbol	Ownership	Route Kms.
Ferrocarriles Internacionales de Centro America Guatemala and El Salvador	FICA (IRCA)	Private	
Guatemala Division			820
El Salvador Division			460
Ferrocarril de El Salvador	FES	Public	143
Ferrocarril Nacional de Honduras	FNR	Public	114
Ferrocarril del Pacifico de Nicaragua	FPN	Public	319
Ferrocarril Electrico al Pacifico, Costa Rica	FEP	Public	124
Northern Railway-Costa Rica Railway	Nor-CR or No.Ry.	Private	<u>359</u>
		T o t a l	2339

68. Before the large-scale road construction in Central America began some 20 years ago, these 6 isolated shortline railroads carried the bulk of the exports and imports between ports and areas of concentrated population. Each of them still serves at least one port and until a decade ago handled a major portion of the traffic between principal ports and population centers. One important characteristic of railroad operations in Central America is that 4 of the 7 deepwater ports of Central America and 2 of the lighterage ports are still owned and operated

by the railroads. Access to the facilities of these ports by trucks is denied. The 3 railroads that show a profit operate port monopolies and it is quite likely that these profits accrue in whole or large part from port revenues rather than from rail revenues. Only one of these, Puntarenas in Costa Rica, is operated by a publicly-owned railroad, but in view of plans to expand the port, the Government plans to create an autonomous port authority to operate the port.

69. With the development of highway networks in each of the 5 Common Market countries, competition by truck and bus has caused a steady diversion of traffic from the railroads despite the growth of export and import traffic. Moreover, the majority of Central America's railroads were constructed in an era when degrees of curvature from 12 to 30 degrees were not uncommon and when grades of 3 and 4 percent in mountainous terrain were considered as normal. These characteristics, combined with light and now well-worn rails, generally antiquated equipment and inadequate maintenance of roadbed, severely limit the speed of trains and the volume of traffic carried. Thus, with few exceptions, the railroads have not been able to adjust to the new competition. Those with a combined port-rail operation have been more successful in resisting traffic diversion, but even in these cases, except for the Northern Railway in Costa Rica, the impact of carriage by highway is reflected in the declining traffic figures of the railroads.

B. Rates, Revenues and Investment

70. Each of the railroads has its own method of establishing rates and fares. Although tariff schedules are submitted to Governments for approval, in fact this has had no effect upon their levels. In none of the countries is there any real economic regulation of the railroads by Government. In practice, the railroads have complete freedom to fix and adjust rates. On those few routes where rail monopolies still exist, the railroads charge what the traffic will bear. Where highway competition has cut into rail freight and passenger volumes, the railroads have belatedly reduced rates, but without improved services, they have been unable to recover the lost traffic. Rates and fares are set without regard to cost and not one railroad has installed a modern cost accounting system. In the absence of knowledge of true costs it is impossible to establish rates and fares in a scientific and logical manner. In most instances those rates that are published are complex, with far too many commodity and class rates. The attempt of the TSC study to analyze existing rates and fares showed only that rate-making procedures vary widely and that rates are set without regard to costs. In those instances where railroads still operate ports, it is impossible to separate port costs from railroad costs. All of the railroads except the FEP in Costa Rica and the El Salvador Division of the FICA have suffered substantial operating losses in recent years. Two, FNH of Honduras and Northern of Costa Rica, may show operating profits in 1966.

71. The TSC study estimated that the minimum additional investments required by the railroads immediately for capital improvements amounted to CA pesos 24 million. Further, the TSC study recommended investments over

the 10 year period 1965 through 1974 of CA pesos 100 million for the relocation of 1,600 kilometers of existing line. Finally, the report urged an investment of CA pesos 150 million between 1975 and 1984 to construct connections that would transform the isolated shortlines with differing gauges into a full-fledged regional carrier with a common gauge.

72. The mission was unable to find any economic justification for these large investments. Neither now nor in the foreseeable future will there be a significant demand for long hauls of bulk materials in Central America for which the railroads would be more suitable than highway transport. Despite the recent falling traffic and monetary operating losses, the railroads themselves are not planning any new investment in rolling equipment, rail alignment or track extension. Two are considering relatively small investments to complete dieselization only. None of the Governments are planning any investment in public railroads. In any case, however, some investments are contemplated in diesel motive power units which are much more efficient than steam engines; these might be purchased with the help of foreign suppliers credits.

73. With the dismal outlook for increases in traffic, declining traffic and revenues, and the poor physical condition of the rail carriers, the rail investment recommendations of the TSC report are open to serious question. Although intra-regional traffic will continue to grow with the growth of the economies, little of this will exceed hauls of more than 200 to 300 miles. The bulk of traffic tonnage of Central America will continue to be between the ports and the centers of population. These distances are relatively short and freight moving over them can usually be handled more efficiently by truck than by rail. The fact is that little public or private investment either should be or is going to be made in the inefficient and rundown railroads of Central America. Whether they should be abandoned and if so whether the road transport industry will be or can be made capable of absorbing the traffic they now carry will need to be considered on a case by case basis by the Governments, taking into consideration such factors as relative distribution costs by rail and the costs of dismissing or otherwise absorbing railway labor employees.

74. Traffic, revenue trends and present problems of each of the 6 railroads are briefly analyzed below; traffic and earnings data for these railroads for 1960-1965 are summarized in Table 26.

C. Carriers

Ferrocarriles Internacionales de Centro America - Guatemala Division (FICA or IRCA)

75. FICA, made up of a combination of lines between 1877 and 1929, today serves both Guatemala and El Salvador. Since each Division operates as though it were a separate railroad, they are analyzed separately here. FICA is owned by a group of American and British stockholders. It operates under terms of a series of contracts with the 2 Governments concerned (over 40 contract laws in Guatemala and 11 in El Salvador). In effect it has a

substantial degree of autonomy in operations in both countries. The Guatemala Division's 820 kilometers of 36-inch gauge mainline extends from the Mexican border (where traffic is interchanged with the standard gauge Mexican Railways) via the Pacific ports of Champerico and San Jose across the country to Puerto Barrios on the Atlantic. A connecting link with the El Salvador Division provides that country access to the Atlantic port of Barrios (a free port for El Salvador). In addition, in Guatemala, FICA owns and operates the facilities at Puerto Barrios and owns the port facilities at San Jose which are operated by a separate firm, Agencia Maritima S.A., under contract.

76. Freight tonnages moved (over 623 thousand tons in 1965), and passengers carried (over 1,500,000 in 1965), are substantial but have declined markedly since 1960 - freight by 30 percent and passengers by 25 percent. Some 80 percent of the export traffic tonnage hauled in 1965 was bananas and coffee. The average length of haul is 167 kilometers. Some traffic has been diverted to the Government port of Matias de Galvez which was constructed to break the railroad's monopoly at Puerto Barrios. However, the railroad port of Puerto Barrios handles all banana exports from Guatemala with mechanical conveyor equipment and also all grain imports by Guatemala with mechanical equipment. Tonnages through Puerto Barrios have declined only slightly despite the competition of Matias de Galvez.

77. Although the mission was not able to obtain financial information on the Guatemala Division of FICA, data in the TSC study show that the line incurred substantial losses every year between 1958 and 1963 amounting to CA pesos 1.3 million in the latter year. News reports indicate that losses in 1964 and 1965 amounted to CA pesos 42 thousand and CA pesos 1.3 million respectively. Physically, except for motive power, the properties of the Guatemala Division are in relatively good condition. To complete dieselization, the Division needs 4 1500-HP diesel locomotives and 6 700-HP diesel locomotives. With spares and workshop facilities, this investment is estimated by the mission at CA pesos 2.7 million. There appears to be a fairly strong case for this investment, which probably would be financed by a supplier credit.

78. The Division suffers from serious overstaffing. It could operate efficiently and still dismiss at least a thousand of its more than 3,000 employees, and another 350 after complete dieselization. However, existing laws and regulations require substantial severance pay for each employee dismissed, a financial burden the carrier says it is unable to meet. But even without sharp reductions in employment and complete dieselization, the Guatemala Division could probably effect further economies that could decrease and perhaps eliminate recent annual deficits. Train miles now are heavily in excess above that required to handle the tonnage carried. Better operating and traffic information would enable the Transport Department to schedule daily tonnage and relate it to cars available. Punctuality is below standard because of poor operational practices and frequent breakdowns. This condition combined with low commercial train speeds induces shippers and passengers to seek alternative transport services. Special rates and fares offered to customers to compete with truck service must be approved by New York headquarters with a consequent loss of time and traffic opportunities.

79. With all of its problems, the Guatemala Division of FICA carries and will continue to carry a significant volume of freight; it could do this efficiently provided it completes full dieselization and finds a solution to gross overstaffing. It would also be beneficial to efficiency if a greater degree of cooperation could be developed between the railways, the labor unions and the Government.

Ferrocarriles Internacionales de Centro America - El Salvador Division

80. In contrast with the Guatemala Division of FICA, the El Salvador Division has not only kept up its traffic and passenger volume, but has also turned in a steady profit, according to its management. Operating over 460 kilometers of track from the Guatemala border to the Port of Cutuco at the other end of the country, the Division connects with the Government-owned railroad at San Salvador.

81. Between 1960 and 1965 the El Salvador Division of FICA averaged annually nearly 500 thousand tons of freight, ranging between 449 thousand tons to 535 thousand tons, with a slight upward trend. The average length of haul was 146 kilometers. Passenger traffic has also held up well, averaging 3.6 million per year over this same period. Tariffs and fares have been adjusted to compete with trucks and buses. The El Salvador Division enjoys a big advantage in having an absolute monopoly of port facilities at the Port of Cutuco on the Gulf of Fonseca. Only the railroad has access to the facilities at this port where over half of El Salvador's waterborne traffic is handled. Through port-railway tariffs are quoted. It is questionable whether the Division would show a profit without the revenues derived from the port operation. However, the port itself is inefficient and congested, and requires a major investment to install modern facilities; this aspect is discussed in the section on ports below. However, as in Guatemala, the El Salvador railroad operations of FICA provide essential transportation services to the economy and will continue to make a contribution to El Salvador's economy for many years to come.

Ferrocarril de El Salvador

82. Unlike FICA, this railroad is in very poor condition from every point of view. It operates over 143 kilometers of track between the Pacific port of Acajutla and San Salvador, with a 40 kilometer spur reaching to Santa Ana. It was taken over by the Government in 1963. Its equipment is antiquated; over half of its freight cars are wooden with an average age of 45 years and its steam locomotives average 58 years of age. Rails are old and worn, ties are rotting and alignment and grades of the track are severely limiting. There is no programmed maintenance of equipment, and maintenance of way, track and structures, if any, is all performed by hand methods. The line is overstaffed. As freight and passenger traffic has declined, FES has incurred operating losses every year since 1961 which have been borne by the Government. FES had a monopoly at the Port of Acajutla before the new port was constructed in 1961; now it moves only about 3,000 of the average monthly tonnage of 32,000 tons handled by the port.

83. Very recently, responsibility for the railroad has been turned over to CEPA, the autonomous port authority operating the ports of Acajutla and La Libertad. The TSC report estimated that a minimum investment of CA pesos 4.2 million would be required to put the FES into a fairly efficient operating position. However, the mission does not believe that the future prospects of the FES would warrant investment of this magnitude. Traffic can be carried more conveniently and usually at lower cost by road. On the other hand, the railroad can be kept alive only through continued and growing Government subsidies. Losses exceeded CA pesos 300,000 in 1965 and the Government should therefore study the feasibility of phasing out the railways operations.

Ferrocarril Nacional de Honduras (FNH)

84. FNH was taken over by the Government in 1958. It operates over 114 kilometers of mainline between Potrerillos, a banana producing center, via San Pedro Sula, a rapidly growing industrial and commercial center, to Puerto Cortes, the country's largest commercial port. The largest export commodity hauled is lumber. The Tela railroad, wholly owned by the United Fruit Company and serving the company port of Tela, is of the same gauge; it interchanges traffic with the FNH and utilizes 21 kilometers of the FNH track into Puerto Cortes. In comparison with most of the other railroads in Central America, the equipment (except motive power), ties and rails of the FNH are new and well maintained. The steam locomotives need to be replaced by diesels within 2 years and the company plans to finance the 6 diesel locomotives required out of its own resources and with the help of supplier credits. The total investment to convert fully to diesel power, including shop equipment, is estimated at CA pesos 2.2 million and the resulting cost savings might possibly pay for the new equipment.

85. Average freight haul in 1965 was 60 kilometers. Beset by heavy competition from trucks and buses for its short-haul freight and passenger movements, FNH traffic has dropped off from 274 thousand tons and 390 thousand passengers in 1960 to 217 thousand tons and 213 thousand passengers in 1965. Passenger traffic evidently will continue to decline but it appears possible that the downward trend in freight traffic may slacken.

86. The FNH has shown operating losses every year since 1961. However, by dismissing excess staff and instituting various economies, the deficit was cut from over CA pesos 170 thousand in 1962 to almost nothing (CA pesos 300) in 1965. Conversion from steam to diesel would reduce operating costs and may put the railroad in a position to show a return on investment for some years ahead.

Ferrocarril del Pacifico de Nicaragua (FPN)

87. The FPN, a Government-owned railroad, operates 319 kilometers of mainline track linking the modern deepwater port of Corinto on the Pacific with the largest cities in Nicaragua, namely Leon, Managua and Granada. Except from 1912 to 1928, when it was operated by a private U.S. company, the railroad has been in Government hands since the first

construction started in the 1870's. FPN also operates 2 boats on Lake Managua. With the severe competition from trucks and buses operating on highways that closely parallel the railroad, FPN's traffic volume has shrunk severely, by 61 percent in freight and 42 percent in passenger traffic, since 1959. Petroleum, once the largest commodity hauled, now is imported through the port of Somoza instead of Corinto. Revenues have shrunk in consequence and the line has incurred annual operating deficits averaging over CA pesos 100,000 almost every year since 1959 despite drastic cuts in expenditures for maintenance and repair. If these expenditure reductions are continued, they could bring about a severe physical breakdown of the railroad itself.

88. Operating expenses have also been reduced by the purchase in 1964 of 6 diesel locomotives financed by a supplier credit. These new locomotives are well maintained. The same cannot be said for the 5 steam locomotives still in service, or for the rolling stock. There is no programmed maintenance for this equipment. Rails are old and heavily worn and ties, even on the mainline, are old and rotting away. Bridges and other structures are in poor condition. The 4 principal structures of the line carry a 6-kilometer-per-hour speed restriction.

89. The purchase of 2 more 600-HP diesel engines would complete the conversion of the railroad from steam to diesel. Although such new motive power would reduce operating costs somewhat, the railroad generally is in such bad condition that it would require much more than this modest investment to rehabilitate it. Thus the TSC report estimates that a minimum investment of CA pesos 4.4 million would be required from 1965 to 1969. But an examination of the position and possibilities of the FPN by the IBRD staff in 1961 indicated that the economic benefits and returns would not justify any substantial investment for rehabilitating the railroad. So far as the mission could ascertain, the Government is not prepared to make any substantial investment in the FPN. All the evidence indicates that no further investment should be made and the FPN should be abandoned.

Ferrocarril Electrico al Pacifico (FEP), Costa Rica

90. Government-owned and operated since construction first began in the mid-19th century, FEP is the only electrified railroad in Central America. It operates over 124 kilometers of single track between the Pacific port of Puntarenas and San Jose, the capital city, where it interconnects and exchanges traffic with the privately-owned Northern Railway. Freight traffic on the FEP increased slightly every year from 1960 except for 1965 when total tonnage carried dropped to 361 thousand tons from a peak of 401 thousand tons in 1964. However, freight carried in 1965 exceeded that carried in 1960, and averaged some 371 thousand tons annually over the 6 years. Passenger traffic increased by about 3 percent over the same period. The average length of haul is just over 90 kilometers. The physical properties are in relatively good condition. Track and rolling stock are well maintained as are the 14 electric locomotives and 4 diesel electric locomotives that supply the railroad's motive power.

91. FEP owns and operates the port facilities at Puntarenas and trucks do not have access to the pier. With a major expansion planned for the port, the Government plans to transfer responsibility for port operations from FEP to a new autonomous port authority yet to be established. The loss of FEP's monopoly position in Puntarenas may reduce the traffic volume now utilizing the railroad.

92. FEP has earned a modest operating profit every year since 1960, averaging about CA pesos 170,000 annually. Although the line is in good condition, is relatively well managed and is operating at a profit, because of its short-haul, consideration should be given to merging it with the much larger Northern Railroad. If this could be accomplished the excess capacity of rolling stock and motive power of the FEP could be used to bolster the Northern Railway operation. Electrification could also be extended on the Northern line toward the Continental Divide at Siquirres, if this were shown to be economically justified.

Northern Railway and Costa Rica Railway (No. Ry.)

93. This railroad operates the properties of both the Northern Railway and the old Costa Rica Railway. Started in 1871, it is a British-owned company with headquarters in New York. Under terms of a series of contract laws, the railroad is to pass in its entirety to the Government in 1989. With its franchise good for another 23 years the company has no plans for large investments. This does not augur well for the continued provision of efficient public service on an expanding scale, although it has recently converted from steam to diesel locomotives.

94. Northern Railway operates over 359 kilometers of mainline 42-inch gauge track from San Jose to the Atlantic port of Limon, with branches to Alajuela, Guapiles and Atalanta. It owns and operates the facilities of the all-railway port at Limon. The line has no through road competition between Siquirres and Limon, a distance of 61 kilometers, but such competition will arise when an all-weather road is built. Plans are well advanced to parallel the railway with such a road. Moreover, studies are under way for a new port project at Moin, near Limon, which would accommodate motor vehicles.

95. The property, including track and rolling stock, is adequately maintained, even though maintenance of way is difficult in the mountainous terrain through which the railroad passes. Heavy grades and sharp curves are numerous on the climb over the Continental Divide and slides are frequent. Track maintenance is all performed by hand. With the purchase of 6 diesel locomotives in 1965, the line is now completely converted to diesel power.

96. Both freight and passenger traffic have increased considerably since 1960 and show no signs of slackening off. Once the Siquirres-Limon road is built, some passenger traffic can be expected to be diverted to road transport. But the railroad will probably retain most of its longer haul, full carload traffic if rates are adjusted, while losing some of its less-than-carload traffic to trucks. The average length of freight

hauls is about 124 kilometers. Over the years Northern Railway has made a modest return on investment. This railroad, like FICA in Guatemala and El Salvador, is an essential part of the basic transportation system in Costa Rica. A merger of Northern and the FEP would result in a major railroad route connecting the Pacific port of Puntarenas and the Atlantic port of Limon.

97. The difficulty facing Northern and the Government is that the franchise under which the railroad operates expires in 1989. It behooves both the railroad and the Government to explore ways to extend the franchise or come to some other arrangement that would provide the railroad or the Government with an incentive to invest in new and modern equipment and to continue good performance on maintenance.

D. Conclusion

98. Proposals to extend and link the public railroads in Central America appear to be uneconomic and impractical. Investments required would be much larger than the estimated economic benefits. This is not only because the railroads are losing traffic and piling up operating losses in most cases, but also because of the distances involved, the differing gauges, the generally poor condition of rails, roadbed and rolling stock and the absence of demand for long-haul bulk traffic. However, in some instances, conditions and operations of the several railways could be improved by some relatively minor investments and better operating practices so that they could provide an important transportation service contribution to the economic growth of the region. In others, particularly the publicly owned railways in El Salvador and Nicaragua, the prospects for such a role are non-existent. In such cases, decisions on how to phase-out operations will require consideration by the public authorities of whether their traffic can be absorbed economically by other means of transport. Consideration should also be given to what to do with the labor force (and the costs of making re-adjustments in labor), and what use or disposal should be made of rolling stock and fixed property.

III. PORTS

A. Introduction

99. Central America is served by over 30 ports on the Atlantic and the Pacific coasts. Some are special purpose ports owned and operated by private interests as in the case of several banana, bulk petroleum and mineral ports. While these ports are important to the economies of the countries and play a major role in handling export and import traffic, they are not considered here precisely because they are specialized ports not available to the general public and do not involve public investments. Other ports are small fishing ports that also handle small tonnages of freight in coastal trade. The ports of principal interest here are the public general cargo ports, whether operated directly by a government agency, a publicly or privately-owned railroad company or an autonomous public port authority.

100. The development of ports in Central America has been closely related to banana production and to railroads. Railroads were undoubtedly the most efficient system of handling the international trade of Central America in the nineteenth century and often had to provide port services to handle such traffic. Thus railroads now own and operate major public ports in Guatemala, El Salvador and Costa Rica. Yet the tie-in between railroads and ports has become a serious impediment to the development of modern port facilities in the region. The railroads generally have resisted the participation of highway transportation in the flow of cargo to and from their ports and have often lagged in improving their port facilities to move the increasing volumes of cargo efficiently. The only major port construction or improvement projects over the past decade have been the publicly owned ports of Corinto in Nicaragua, Acajutla in El Salvador and Matias de Galvez in Guatemala.

101. The tonnages of Central America's three principal export crops - coffee, cotton and bananas - are estimated to increase by about 75 percent between 1965 and 1975. Other export crops, such as lumber and meat, are also likely to increase considerably in volume. Moreover, despite growing intra-regional trade, imports from abroad will follow an upward trend with the growth of the Central American economy. For countries as dependent upon international trade as are the five Common Market countries, it is essential to have efficient ports capable of moving present and future exports and imports at minimum cost. Inadequate port facilities impose a heavy burden of costs on the economies of the five countries. Rising traffic at most ports points to the need for adding to existing capacity, or in some cases building new ports. Plans for investing in additional port facilities are well advanced in each of the countries at seven major public ports for an estimated total investment of between CA pesos 50 and CA pesos 60 million.

B. Current Facilities and Traffic

102. The principal public service ports of the region with facilities for berthing deep-draft ships are listed below. In addition there are many small public ports that have no berthing facilities for deep-draft vessels but use lighters to transfer cargo between seagoing vessels and piers. For most of these, current general cargo traffic is well below 100,000 tons per year. At several of these ports, however, the current and anticipated volume of traffic is high enough to justify exploring the feasibility of installing new deep-water port facilities. Various studies have been made for a port at San Jose in Guatemala, a study is underway for an Atlantic port in Nicaragua and one is scheduled to be made for a Pacific port in Honduras.

Country and Port	Ownership and Administration	Served by	Number of Berths	Current annual traffic (excluding petroleum) (Thousand metric tons)	
				Total	Of which bananas
Guatemala					
Matias de Galvez	Port authority	Road	3	260	
Puerto Barrios	Private railroad	Rail	4 ¹ / ₂	330	60
El Salvador					
Acajutla	Port authority	Road and Rail	2	380	
Cutuco	Private railroad	Rail	2	210	
Honduras					
Puerto Cortes	Port authority	Road and Rail	3 ¹ / ₂	730	380
Nicaragua					
Corinto	Port authority	Road and Rail	3	640	
Costa Rica					
Puntarenas	Government Railroad	Rail	2	280	
Puerto Limon	Private railroad	Rail	3 ¹ / ₂	400	97

¹/₂ Barrios has one banana berth, Cortes has two and Limon has portable banana loading equipment.

C. Port Administration

103. The public ports administration developed different ways as a result of historic circumstances. Many were built and are still operated by railroads. Others were administered by the National Governments, usually through their Department of Customs. More recently, autonomous public port authorities have been created to take over the administration of some existing ports or to administer new ports. Currently the following forms of administration are in effect in the principal Central American ports.

104. A private railroad, FICA, owns and operates the ports of Puerto Barrios in Guatemala and Cutuco in El Salvador. FICA also owns the lighterage port of San Jose, Guatemala, which is leased and operated by a private agency in Costa Rica, the port of Limon is owned and operated by the private Northern Railroad Company, and the port of Puntarenas is managed by the Ferrocarril Electrico del Pacifico (FEP), an autonomous agency of the Government which administers both the port and the railroad.

105. The ports of Matias de Galvez in Guatemala, Acajutla in El Salvador and Corinto in Nicaragua, are administered by autonomous public port authorities. The administration of Puerto Cortes in Honduras, up to recently in charge of the customs authorities, was transferred in 1966 to a newly-created National Port Authority. The lighterage port of Amapala-San Lorenzo in Honduras is operated by the Government customs office.

106. Administration by port authorities has proved to be the most satisfactory form of port administration in Central America. The creation of port authorities has come about in the cases mentioned above concurrently with a major modernization of port facilities or the construction of an entirely new port. This has generally favored efficient operations. The ports that are historically linked with a railroad development and administered by the railroad company have suffered from the decline of the railroads' role in inland transportation. Lack of funds for improvements and expansion of port facilities, and reluctance of the railroads to provide adequate truck access to the ports have caused the railroad ports to become outmoded and inefficient.

D. Port Finances and Traffic Data

107. Reliable and meaningful information on port traffic is often difficult to obtain; the available data are summarized in Table 27. Financial information on the operation of railroad-owned ports is not available. The ports are treated by the railroads as an integral part of their railroad operations. The two principal railroads involved, IRCA and the Northern of Costa Rica, state that the profits of their port operations off-set to some extent losses they incur on their rail-haulage operations. The financial condition of port authorities of Matias de Galvez and Corinto appear to be satisfactory, but data are not available for the port of Acajutla. The financial prospects for the new national port authority which now administers Puerto Cortes appear satisfactory.

E. Investment Plans for Port Expansion

108. Facilities at five of the eight deep-water ports appear to be insufficient to handle the current volume of traffic without lengthy and costly ship delays. These are Acajutla, Puerto Cortes, Corinto, Puntarenas and Puerto Limon. The port of Matias de Galvez is operating near capacity. While it can perhaps handle some 20 percent more than its current traffic, this capacity probably will be more than fully absorbed before new facilities can be completed. Puerto Barrios and Cutuco, both railroad ports with inadequate facilities, are also operating at or near their capacity; there are no plans to expand and modernize them. Cargo handled at each of these ports has declined slightly in recent years, at Puerto Barrios because of competition from Matias de Galvez and at Cutuco because of competition from Acajutla.

109. The status of present plans for expansion for six of the eight public deep-water ports from 1966-1970 and the status of three port studies that may eventually lead to new deep-water ports is summarized in the following tabulation.

Status of Port Investment Plans, 1966-1970

Country and Port	Estimated Cost (million CA pesos)	New Berths	Status
Matias de Galvez, Guatemala	6.0	3	EXIMBANK loan signed.
San Jose, Guatemala ^{1/}	15.8	2	Preliminary feasibility study completed, 1963; economic data being prepared, further studies being considered.
Acajutla, El Salvador	6.0	3	IDB loan concluded.
Puerto Cortes, Honduras	6.8	2	IBRD loan signed 1966
A Pacific port, Honduras ^{1/}	-	-	Terms of reference for a location and feasibility study prepared.
Corinto, Nicaragua	6.0	2	Definitive economic and engineering studies underway.
An Atlantic port, Nicaragua ^{1/}	-	-	Location and feasibility study underway.
Limon-Moin, Costa Rica	8.0	3	Feasibility studies to be ready 1968.
Puntarenas, Costa Rica	3.6	2	Feasibility studies to be ready 1968.

^{1/} Possible new ports.

110. Expenditures for these planned port investments for 1966-1970 might be as follows (no estimates are yet available for a Pacific port, Honduras or an Atlantic port, Nicaragua):

Projected Port Investment Expenditures, 1966-1970
(millions of CA pesos equivalents)

Country and Port	1966	1967	1968	1969	1970
Guatemala					
Matias de Galvez	-	2.0	3.0	1.0	-
San Jose ^{1/}	-	-	1.0	3.0	4.0
El Salvador					
Acajutla	1.0	3.0	2.0	-	-
Honduras					
Puerto Cortes	0.2	0.9	2.0	2.8	0.9
Nicaragua					
Corinto	-	0.5	3.0	2.5	-
Costa Rica					
Limon-Moin	-	0.5	2.0	4.0	1.5
Puntarenas	-	0.2	2.0	1.4	-
Total	1.2	7.1	15.0	14.7	6.4

^{1/} Very provisional and included for financial planning purposes.

F. Individual Ports

Matias de Galvez, Guatemala

111. The present facilities were completed in 1955 and consist of a 3-berth marginal wharf 457 meters in length and are operated by an autonomous authority. A transit shed with an area of 10,800 square meters serves two of the three berths. Crude oil imports are handled by a pipe line on the wharf. The port is served by highway only. In 1965 the port handled 260,000 metric tons of cargo, exclusive of petroleum, with exports constituting about a third of the total. Principal exports handled are sugar and coffee. With the help of an Export Import Bank loan, three new berths will be built and are expected to be in operation in 1969.

Puerto Barrios, Guatemala

112. Facilities were constructed in 1897 and consist of a 330 meter long, 40 meter wide finger pier connected to the shore by a 320 meter long causeway, which is accessible by rail only. There are four berths, one equipped with banana loading conveyors. The pier is also equipped with petroleum product lines and bulk grain unloading facilities. A transit shed with an area of 5,400 square meters is located on the pier and three warehouses on shore afford an additional 6,000 square meters of covered storage space. Excluding petroleum, traffic in 1965 amounted to 330,000 metric tons with exports accounting for about half of this total. Coffee and bananas are the principal export items handled and wheat and fertilizers are the principal imports.

San Jose, Guatemala

113. Guatemala does not have a port on the Pacific with deep-water berths. The two lighterage ports of San Jose and Champerico both are entirely open roadsteads. Tonnage handled at the two ports together more than doubled between 1960 and 1965 reaching 200,000 metric tons, excluding petroleum. If a deep-water port with a protected harbor were constructed at San Jose, it could handle substantially all of the traffic now going through Champerico.

114. An economic and engineering feasibility study of a combined fishing and commercial port on Guatemala's Pacific coast made in 1964, recommended the construction of such a port at a new harbor to be dredged out of swampland southeast of San Jose at a cost estimated to be almost GA pesos 16 million. The harbor would initially have a 1,100 foot wharf for berthing two large cargo vessels and facilities for docking six fishing boats. The study presents an economic justification for a fishing port in the proposed harbor but presents something less than a full economic justification for the project as a whole. A fishing port by itself would not justify such a large investment. On the basis of information available at the time to the mission, it was still uncertain whether the high cost of the proposed port project in relation to its potential traffic volume for some time would yield a sufficient economic rate of return to justify the investment. Thus economic aspects of the port will need to be carefully considered before any decision is taken to proceed with the construction of a new port at San Jose. The alternative possibility of relying on expanded port facilities at Acajutla in El Salvador should also be explored.

Acajutla, El Salvador

115. Completed in 1961 and operated by an autonomous authority, this port is formed by a 763 meter long breakwater that shelters the harbor basin from the Pacific swell. The outer 363 meters of the breakwater has a width of 37 meters; berthing facilities for two vessels on the harbor basin side are in use; the two berths on the ocean side are not used because of the Pacific swell. A cargo transit shed on the pier has an area of 4,000 square meters and a warehouse on shore has an area of 22,000 square meters. Oil Tankers are served by a submarine pipeline.

116. The port is served by highway and by railroad. Port traffic in 1965 was some 380,000 metric tons, excluding petroleum, with exports accounting for about a third of the total traffic. Coffee is the largest export item, followed by sugar and cotton. A loan recently granted by IDB will help finance the addition of three new berths at a cost of CA pesos 6 million.

Cutuco, El Salvador

117. The port facilities, constructed in 1915, consist of a two-berth finger pier 150 meters long and 24 meters wide, connected to the shore by a 152-meter trestle. The pier has a transit shed with an area of 1,860 square meters and is equipped with petroleum pipelines, but is accessible by rail only. On shore there are several warehouses with a total area of some 22,000 square meters. The port is owned and operated by FICA as a railroad monopoly. If the port were expanded and modernized, it would be a strong candidate to serve the region of the Golfo de Fonseca, bordered by the three countries of El Salvador, Nicaragua and Honduras. But, if the port is not modernized and expanded, traffic will be diverted to Acajutla and to a Pacific port being considered in Honduras. FICA has no plans for modernization or expansion of the port, although its franchise runs until 1989. While it provides that the Government can buy out the railroad including port facilities in 1970, it is doubtful that the Government would buy out the railroad solely to gain possession of the port facilities. From an economic point of view, however, it is likely that a railway-government agreement for modernizing and expanding Cutuco would benefit both the economy and the railroad.

A port on the Pacific coast, Honduras

118. Honduras has no deep-water port on the Pacific. The lighterage port at Amapala, located on an island in the Golfo de Fonseca, is the most expensive and awkward port in Central America. All imports must be lightered ashore for customs clearance before being relightered over a distance of 30 kilometers to San Lorenzo on the mainland. While exports can be lightered from San Lorenzo directly to ships anchored off Amapala, it has often proved necessary to stockpile them at Amapala. Despite high costs, exports through Amapala increased steadily between 1960 and 1965 and more than doubled over this period, reaching 85,000 tons in 1965. With both imports and exports, Amapala handled 103,000 tons in 1965, excluding petroleum. There have been several preliminary engineering and economic feasibility studies for a Pacific port for Honduras. One of these studies, made by Tippetts, Abbett, McCarthy and Stratton in 1958, is considered to be a suitable point of departure for a further investigation of one or two sites. At the request of the Honduran Government the Bank has drawn up terms of reference for a site selection and feasibility study that should provide information required for a sound decision on the question of the economic and technical justification for a port on the Pacific coast of Honduras.

Puerto Castilla, Honduras

119. Once a major port, traffic through Puerto Castilla vanished in 1938 when the Trujillo Railroad Company stopped shipping bananas. The pier, built in 1923, has almost completely deteriorated. The port is used only for the shipment of small tonnages of frozen meat and plywood to Puerto Cortes. A decision to go ahead with the long-pending pulp and paper project in the area would require the rebuilding of the port at Castilla. Without the traffic that this facility would generate there is no economic justification to build a new port at Castilla in the foreseeable future.

Puerto Cortes, Honduras

120. Facilities at Puerto Cortes consist of a 292 meter long banana wharf constructed in 1919 and a 196 meter long general cargo wharf constructed in 1955. Petroleum products are handled at a separate berth. The banana wharf is equipped with loading conveyors and has an open shed with an area of 2,300 square meters. The general cargo wharf has a transit shed with an area of 3,200 square meters. The port is served by highway and by railroad. It will be administered by a new autonomous port agency organized in 1966. Current traffic, excluding petroleum, amounts to 730,000 metric tons of which 380,000 is banana exports. Other important exports are lumber, minerals and coffee. In 1965 the port handled some 90,000 tons of imports. With congestion at the port a matter of growing concern, the port authority is proceeding with a CA pesos 6.8 million program to expand it by adding two new berths by 1970, with the assistance of a Bank loan extended in 1966.

Corinto, Nicaragua

121. New port facilities were completed in 1960 with the assistance of a Bank loan; they consist of a 366 meter long concrete wharf with two transit sheds. An old 160 meter pier of wood on concrete piles is connected to the new concrete wharf, and connects to shore by a 117 meter long approach trestle. The port is served by highway and by railroad. It is administered by an autonomous port authority and is considered to be the most efficient deep-water port in Central America. In 1965, Corinto handled 640,000 tons, of which about 65 percent was exports, mainly cotton, cotton seed and sugar. Technical studies have been made of the addition of two new berths, at a cost estimated at CA pesos 6 million, as part of a long term port development program to increase capacity to 750,000 metric tons by 1970. Since current traffic volume exceeds the present capacity of the port, it is urgent to complete the studies and, on the basis of their results, to arrange for the foreign financing needed to help carry out the project.

Atlantic Port, Nicaragua

122. In 1966, with the financial help of the United Nations Development Program and with IBRD as executing agent a study was begun of the regional development possibilities of Nicaragua's Mid-Atlantic

area. This includes the feasibility of a modern port and possible connecting road to the Bluefields region as well as possibilities for a coastal shipping canal, river navigation and agricultural development. The study is expected to be completed in 1968; thus major investments which might result cannot be expected until 1969 or later.

Puntarenas, Costa Rica

123. Constructed in 1929, facilities at this port consist of a 149 meter long pier connected to shore by a 345 meter long trestle. The pier provides berthing for two vessels but is accessible only by rail. Petroleum is handled by a nearby submarine pipeline. The port is operated by the Government-owned railroad. Traffic in 1965, excluding petroleum, amounted to 200,000 tons with exports accounting for about 35 percent of the total. The main export is coffee. A feasibility study of Costa Rica's ports was conducted by Transportation Consultants, Inc. in 1964 and it recommended a CA pesos 3.6 million expansion project to add two new berths to the port. Preliminary engineering for this project is about to begin as part of the Limon-Moin-Puntarenas port studies. The Government is planning to place administration of the port in the hands of an autonomous port authority.

Puerto Limon, Costa Rica

124. Constructed at the turn of the century, port facilities at Limon consist of two T-shaped piers. One, known as the national pier, is used only for shallow-draft vessels and is in extremely poor condition. The other, called the metallic pier, is 320 meters long and 24 meters wide and is connected to shore by a 366 meter long access trestle. This pier accommodates three vessels and is accessible by rail only as it is owned and operated by the Northern railway. The rail layout is awkward and inefficient. Petroleum products are handled by pipelines on the pier and bananas are loaded by portable conveyors that can be mounted on the vessel loading. Covered storage space on shore is provided by five warehouses with a total area of 7,240 square meters. Traffic through the port in 1965 was 460,000 metric tons, excluding petroleum, and is about evenly divided between imports and exports. Banana exports amount to some 100,000 tons. Other significant exports are coffee and sugar. The port is badly congested and will become even more so since banana exports through it are expected to rise sharply in the near future.

125. In 1964 the United Nations Special Fund financed a preliminary economic and engineering survey of Costa Rica's ports and railroads. The study recommended that a new port should be constructed at Moin Bay three and a half miles to the north of Limon. The first phase of construction, estimated to cost CA pesos 8 million, would provide a sheltered harbor and 3 deep-water berths. A consultant is being selected to carry out more detailed preliminary engineering and locational studies for a port at or near Moin Bay. It will probably take six or seven years before the new port becomes operational. Meanwhile, with exports - especially bananas - projected to increase rapidly, the Government must come to an early decision on temporary facilities to handle the increased tonnage in the interim period.

G. Conclusions

126. Port expansion will be an important field of public investment activity in the next several years in order to serve the rapidly rising volume of traffic. Thus far, the decisions on port development have been taken by individual governments mainly on the basis of national considerations. With the removal of trade barriers in the area, and the establishment of uniform external tariffs, each port becomes in effect capable of serving a much larger economic sphere of influence; traffic will flow to and from these ports on the basis of the cheapest combination of charges for ocean freight, land transport, port charges and costs of port delays. Among other things, this will spur competition for greater efficiency at the various ports. It also emphasizes the need for planning and considering port construction on the basis of regional rather than purely national traffic flows.

127. Thus far, there have been few cases where one international port, instead of several national ports, might best serve traffic requirements. The forthcoming expansion of Puerto Cortes is based in part on the service needs of El Salvador as well as Honduras. The principal case for considering a regional coordination of port development relates to the Gulf of Fonseca, which includes the shorelines of El Salvador, Honduras and Nicaragua and is located near the center of the Pacific coastline of the region. The ports of Cutuco (El Salvador) and Corinto (Nicaragua) already serve the general area. But as noted above, the railroad-owned port of Cutuco is accessible only to rail traffic and there are complex problems of railway-government relationships to solve before expansion at Cutuco could be undertaken. Corinto, which now needs expansion, will become more accessible to Honduran traffic when the road shortcut to Honduras is built (CA-3, Choluteca to Puente Real); assistance in financing this project is being provided by CABEI, and construction will take until the early 70's. In Honduras, the existing lighterage port facilities at Ampala-San Lorenzo are inefficient and the Honduran authorities have felt for some time that a deep-water Honduran port on the Gulf of Fonseca would be necessary to permit more rapid agricultural-industrial development of its southern regions, which have lagged in comparison with the rapid growth in the north. At first sight, however, it appears that it might be more economical to ship by road to Corinto, once the highway short-cut has been built, or even through El Salvador.^{1/} In view of these factors, SIECA has been endeavoring for some time to develop the bases for a joint study of an agricultural-industrial-transportation complex in the Gulf of Fonseca area to provide a sound basis for regional development. The cost of a feasibility study for an Honduran port on the Pacific is, in any case, included in the US\$4.6 million Bank loan for Puerto Cortes. Once such a study is complete, there should be close consultation among the countries, the responsible Central American organizations, and external financing agencies, before decisions are made to embark on development of important new port facilities in the area.

^{1/} See preliminary evidence in TSC Report, page 399

128. Two other areas might be suitable for coordinated regional port development. The Guatemalan authorities have been planning to construct a new deep-water port on the Pacific coast, at San Jose or Champerico. At the same time, the capacity of the Salvadorean Port of Acajutla (120 miles from Guatemala City) is being increased as part of a long-range expansion program. While the probable expansion of cotton production in Guatemala in the 1970's would provide substantial traffic for a new Guatemalan port, the alternative of relying on expanded facilities at Acajutla should also be explored. Another case is that of the two Atlantic ports of Guatemala, one of which (Barrios) is now being expanded, and Puerto Cortes in Honduras, which is about to be expanded and improved by help of a Bank loan. At present, the ports serve two distinct hinterlands. But with the possible improvement of short-cut roads from El Salvador to Guatemala's Atlantic Highway and the construction of a road connecting the Honduran and Guatemalan Atlantic ports (the section in Honduras is already under way), there may be not only increasing competition between them but opportunities for more efficient use of these port facilities. Although the next stage of expansion at these ports beyond the present ones is still some years away, decisions on this further stage will need to take account of the coordinated development of the Atlantic ports in both countries.

129. Aside from these cases, the other major port developments in Central America do not at present pose significant issues of regional coordination. But the cases described make it clear that Central America will need to draw up a region-wide port development program in the next few years if the best locations for expansion are to be chosen from the point of view of one common market economy.

IV. AIR TRANSPORT

A. Introduction

130. Air transport in the Central American Region began to develop in the 1920's and has played an important role in the development of the economy in recent years. The particularly rugged and mountainous terrain made the speed, flexibility and relatively low ground investment of air transport particularly attractive, and the absence of or slow growth of surface transportation gave air transport a natural monopoly which continues on some routes even today. Except in El Salvador, there are many towns and settlements in Central America that are linked with the outside only by air transportation.

131. Today the regional and international air transport picture is due to change radically after a decade of fairly steady growth and development. So far Pan American Airways (PAA) is the only airline with jet equipment of the 7 airlines now serving the region. When others obtain jet equipment now on order, the capacity available for passenger and ton miles will increase sharply, even if current equipment operated internationally is sold. The high productivity of a medium-sized jet aircraft, compared to equipment now operating, is shown below.

Type of equipment	Seat kilometers per hour of flying time
<u>Medium jet</u>	
727 or equivalent	90,000
<u>Present equipment</u>	
Viscount	35,000
DC-6B	17,000
DC-3	7,500

Thus, delivery of the 2 jets now on order for just one airline now operating 3 Viscounts will increase seat/kilometer capacity by almost 100 percent.

132. Under these conditions, it is difficult to see how 6 small airlines can continue profitable international operations. Maximum returns from the tremendous productivity potential of jet aircraft require extensive route miles, considerable traffic, and high equipment utilization. Not one of the 6 airlines has these basic requirements. The only economic answer to profitable international operations for air transport in Central America in the jet age is some kind of cooperative arrangements that would reduce the number of Central American carriers to one or 2 operations. Yet to organize fewer but stronger airlines will require governmental initiative and an act of a high degree of international cooperation.

B. Governmental Organization and Role

133. While in most countries, the Government plays an active role in planning, regulating and even operating air transport, this is not the case in Central America, except in Guatemala, where the air carrier is entirely publicly owned. By law, the Departments of Civil Aviation are responsible for the economic and safety regulation of air transport; in practice these departments limit themselves to manning and operating airports and providing meteorological services. The airlines themselves establish fares, schedules and frequencies. There is no regional route or service planning either among the 5 Governments or the 6 airlines. In the absence of effective economic regulation by the Governments concerned, the concept of air transport as a public service has suffered. One result is that, except for TACA which inter-connects all of the 5 country capitals and connects them with Panama, Mexico and the United States, there is very little in the way of what might be termed regional air transport services. The regional segments flown by the country carriers are incidental to their international flights to the United States, Mexico or Panama. Regional service is currently inadequate to meet present demand.

134. The location of the Departments of Civil Aviation in the ministerial structure of the Governments varies as follows:

Guatemala	Ministry of Communications
El Salvador	Ministry of Public Works
Honduras	Ministry of Communications and Public Works
Nicaragua	Ministry of War, Marine and Aviation
Costa Rica	Ministry of Transport

Even though only one of the Departments is formally linked to the military, in practice the Air Forces of the countries (except in El Salvador and Costa Rica) are closely connected with the operation of airlines. Each of the 5 countries is a member of the International Civil Aviation Organization (ICAO) and each has been assisted greatly by that organization in establishing and maintaining technical and safety standards. The Regional Aviation Assistance Group (RAAG, a U.S. Federal Aviation Agency staff group maintained in Panama by the U.S. AID program), has given important assistance in the selection and installation of communications and air navigation facilities, and it has also made feasibility and engineering studies for some of the major airports to equip them to handle jet aircraft.

C. Air Navigation Facilities and Airports

135. Although regional planning has been noticeably absent in the establishment of rates, routes and schedules, it has been important in the area of communications and air navigation facilities. Pursuant to a regional treaty signed in 1964, all air communication and air navigation facilities are operated and maintained by a new regional organization,

the Corporacion Centroamericana de Servicios de Navegacion Aereo (COCESNA). This is an important organization and is a splendid example for regional cooperation. The air navigation facilities and communications equipment operated by COCESNA are available to all users of air space on a non-discriminatory basis at standard user fees. Prior to its formation, these facilities were owned and operated by some of the airlines or by the Governments without regard to duplication of equipment or services. COCESNA not only operates the facilities within the Common Market region, but also supplies voice and teletype connections with Panama and Miami. A part of its temporarily excess telecommunication capacity is being used by Central Banks to provide them with adequate rapid services which will need to be provided by the Central American telecommunications network which has been slow in developing.

136. While Central America is relatively well off for air navigation aids and air service communications, it badly lacks night lighting systems; as a result there is no commercial night flying in Central America, which is a major cause for low equipment utilization by the carriers.

137. Of the six major airports in Central America, there is one at each of the capitals of the countries and a sixth at San Pedro Sula, Honduras. Only three - La Aurora Airport at Guatemala City, Ilopango at San Salvador and La Mesa at San Pedro Sula - are long enough and have sufficient bearing strength to handle large jet aircraft. With U.S. AID financing, La Mercedes at Managua is being lengthened and its bearing surface strengthened to be made usable for jets without crippling load limitations. A RAAG study in 1965 recommended the lengthening and strengthening of the runway at Toncontin Airport at Tegucigalpa and the Honduran Government has applied for a CA pesos 1.3 million loan to CABELI to undertake the airport improvement recommended. CABELI has made no decision on this loan application. The Department of Civil Aviation of Costa Rica estimates that the cost for improving El Coco Airport to jet standards to be CA pesos one million. Financing for this project has not been arranged. Improvements should be made at both these airports because of their key importance to regional and international air transport in the jet age.

138. Four of the five countries (El Salvador excepted) have rather extensive domestic air transport services. The outlying airports (away from the capitals) are poorly constructed and badly maintained. Most are unpaved flight strips maintained sporadically by the local community served. With few exceptions, the one or two flights scheduled daily for these communities do not require a control tower or air navigation equipment or landing aids and traffic does not warrant very much in the way of improvement of these flight strips. For safety, however, airstrips handling at least one scheduled flight per day should be fenced to keep animals off the grass runways.

139. Realized and planned investments in airports, 1962-1969, generally appear to be modest and suitable to meet needs. However, Guatemala's program includes CA pesos 2.3 million for 1966; hardly any

of this has been spent and it is unlikely that more than CA pesos 0.5 million will actually be spent during the year. Projected investments in airports for 1966-1969, as estimated by the mission, are summarized in the following table:

Realized and Projected Investments in Airports, 1962-1969
(million CA pesos equivalents)

Country	Realized Expenditures				Mission Projections			
	1962	1963	1964	1965	1966	1967	1968	1969
Guatemala	1.3	-	-	0.1	0.5	1.5	1.0	0.7
El Salvador	0.1	2.1	2.0	-	-	-	-	-
Honduras	-	1.0	0.5	0.5	0.4	0.4	0.4	0.4
Nicaragua	-	-	0.3	0.7	1.6	0.6	0.7	0.9
Costa Rica	<u>0.7</u>	<u>0.7</u>	<u>0.3</u>	<u>0.6</u>	<u>0.5</u>	<u>1.3</u>	<u>1.7</u>	<u>0.8</u>
Total	2.1	3.8	3.1	1.9	3.0	3.8	3.8	2.8

Source: National Planning Boards

D. The Carriers

140. Of the 6 carriers associated with the 5 Common Market countries, 5 have headquarters in Central America. Four operate both domestic and international services, and the other 2 operate regional and international routes only. All 4 operating both domestic and international services are just breaking even or are losing money on their domestic operations, but are recouping on their international runs. As described below, all 6 of the airlines are quite small and each has little equipment. Traffic data are summarized in Table 28.

Empresa Guatemalteca de Aviacion (AVIATECA)

141. Wholly owned by the Government of Guatemala, AVIATECA is operated as an autonomous corporation by Air Force officers. Its equipment consists of 4 DC-6's, one DC-4, 2 C-46's and 4 C-47's. AVIATECA serves 14 domestic points, 2 regional cities and 4 cities outside of the region. Between 1960 and 1965 domestic passenger miles flown increased on the average just over 8 percent per year, reaching a high of 6.9 million miles in 1965. Freight ton miles flown domestically dropped by 50 percent in 1961 when the Atlantic road was completed and have since stayed steady at about 0.5 million ton miles per year. While both passenger and weight

load factors are high, equipment utilization is low, partly because of thin traffic domestically and partly because there is no night flying in Guatemala.

142. Regionally, AVIATECA serves San Salvador and San Pedro Sula but these stops are made on its international routes to Miami, New Orleans, Mexico City and Acapulco. In 1965 both regional and international passenger traffic and freight ton miles were about 4 times its domestic passenger and cargo traffic. Management is considering extending the airline's international operations to Houston, Puerto Rico via Kingston and Panama. Lack of funds and physical resources and obsolete equipment with no jet aircraft yet on order combine to make these plans for expansion somewhat unrealistic at present. The management hopes to purchase 2 small commercial jets, and presumably the money for such an investment would come from the Government or from supplier credits.

143. AVIATECA had operating losses in the years 1960-1962 which were covered by the Government (which also advanced funds in 1964 to purchase equipment). The carrier showed small and rising profits in 1963 to 1965. Available data indicates that return on equity was below one percent; this would be improved appreciably if AVIATECA were reimbursed by the Government for carrying the mail (which it now does at no charge), and if it were paid for losses incurred on "national interest" services to Peten, the only transport connection with that underdeveloped jungle region. While domestic traffic will rise, though slowly, over the next few years, international traffic is more difficult to project since other carriers in the region are preparing to operate jet equipment in 1967. Guatemala generates the largest amount of international traffic in Central America and this will continue to be the case. However, competing carriers operating jet equipment are likely to siphon off a good share of the international traffic now served by AVIATECA.

144. The management expresses sympathetic interest in the concept of a regional airline, but is pessimistic that this will come about. An experiment in pooling of equipment and services was tried with one of the Honduran airlines between Guatemala City and San Pedro Sula but this did not work out to the satisfaction of either carrier.

Transportes Aereos Centroamericanos (T.A.C.)

145. TACA is the only fully regional airline in Central America. Incorporated in El Salvador, it operates no domestic flights but does provide daily flights between Panama, the 5 Central American capitals, thence to New Orleans and Mexico. It is privately owned by United States and El Salvador stockholders. Its fleet consists of 3 Vickers Viscount jet-prop aircraft and 2 CA-4's which it uses for cargo flights; 2 British BAC-111 medium range jets are on order. An aggressive competitor, TACA considers that it has currently captured about 60 percent of the regional air passenger market even though PAA is competing with jet equipment. Passenger traffic on the airline has increased steadily since 1960 at an average annual rate of over 6 percent; freight traffic has increased more slowly at an annual average rate of about 3 percent over the same period.

Its passenger and weight load factors were quite high, and because of excellent scheduling, equipment utilization is higher on TACA than on the other Central American carriers.

146. After substantial losses in 1960-1962, TACA's profits increased rapidly from 1963-1965. Return on invested capital increased from 5.8 percent to almost 14 percent in 1965. The airline is efficiently managed in all respects and will be the first of the Central American airlines to operate pure jet equipment.

Transportes Aereos Nacionales (TAN)

147. With only one DC-6 and 3 C-46's, TAN operates regionally between San Pedro Sula, Tegucigalpa, San Salvador and Guatemala City on its international flights to and from Miami. The airline is reported to have one BAC-111 jet aircraft on order. In 1963, the last ICAO figures available, TAN flew just over 17 million passenger miles with a passenger load factor of 59 percent. It carried 2.6 thousand metric tons of freight. No meaningful financial data on the airline's operation was available to the mission.

Servicios Aereos de Honduras

148. SAHSA is owned one-third by PAA (under CAB order to divest itself of this interest), one-third by the Honduran Government and one-third by Honduran citizens. Its domestic service is to 32 points in Honduras, the largest number served by any of the Central American domestic carriers. It operates 7 DC-3's, 2 C-46's and one DC-6 and is acquiring a Convair 440 but no jet equipment. Between 1960 and 1965 its domestic passenger service increased on the average by 4.5 percent annually, reaching almost 22 million passenger miles. Freight ton miles declined slightly over the period and averaged some 1.2 million ton miles. Equipment utilization rates are not high, but its domestic passenger and weight load factors in 1965 were 46 and 72 percent respectively. Regionally the airline operates via Guatemala City, San Salvador and Belize to Miami. With the DC-6 operating for the first time in 1965, international passenger miles flown jumped from under 6 million in 1964 to 15.5 million in 1965 and its small international freight doubled to 0.6 million ton miles. International passenger load factors were below 40 percent until 1965 when this figure climbed to 50 percent. The weight load factor in that year was 60 percent. The airline reported net losses in 1960 and 1961; since then it has shown a profit each year. The TSC study computed an estimated return on investment in 1963 of 17 percent. However, the coming intense jet competition can be expected to affect adversely the now profitable international operations.

Lineas Aereas de Nicaragua (LANICA)

149. LANICA is owned privately by one of Nicaragua's leading citizens, with PAA holding a small interest. It serves 5 domestic towns, none of which have road or rail connections with the rest of the country. It has one DC-6, one C-47, 4 C-46's and one DC-4, and it has ordered one

BAC-111 jet aircraft. In recent years LANICA's domestic passenger miles flown increased at an average rate just over 3 percent a year, reaching a high of 4.4 million passenger miles in 1965. Freight ton miles have remained constantly at low levels. Domestic load factors have been high. LANICA's international passenger mile traffic has increased much more rapidly than its domestic traffic, quadrupling from 1960 to 1965 to about 17 million passenger miles, with a high passenger load factor. Freight carried, however, has declined from 1960 to 1965. Advance financial data indicates that generally it has been profitable since 1960. The TSC report estimates the rate of return on investment of over 8 percent for 1964. While LANICA's domestic traffic should hold up well over the next 5 years, with intensified jet competition, and despite the addition of the jet plane now on order, LANICA is likely to have difficulties in operating a profitable international operation.

Lineas Aereas Costarricenses (LACSA)

150. LACSA provides air service to 10 cities in Costa Rica, several of which have no surface transportation connections with the rest of the country. It operates a fleet of 2 DC-6's, 5 C-46's and 2 small C-45's. Domestic passenger miles flown have declined by an average of 4 percent per year in recent years, totaling about 7 million in 1965. Domestic freight operations are low and declining. Equipment utilization is poor. Domestic passenger and weight load factors in 1965 were 45 and 62 percent respectively.

151. Internationally, LACSA serves Miami via Grand Cayman Island, Mexico City via San Salvador and Panama City, and has fared much better in this than in its domestic service. Passenger miles flown internationally have virtually doubled since 1960, and freight ton miles flown have also increased, although not as sharply, to 7 million ton miles of cargo in 1965. Based on paid-in capital, the TSC study estimates that the rate of return from 1959-1963 averaged about 2 percent per year. LACSA should be able to improve its domestic services sufficiently so that the decline in domestic traffic can be arrested. In the face of increasing international jet capacity, it is difficult to see how the international operations of the airline will be able to stand up to the increased jet competition just ahead.

E. Conclusions

152. Domestic air services in Guatemala, Honduras, Nicaragua and Costa Rica are essential for the economic development of these countries. The services now provided domestically in these countries appear adequate and can probably continue to be operated with little loss, using fully depreciated equipment already owned by the airlines. If necessary and in some cases, in the interests of rapid communication to isolated areas, Government subsidies might be justified to keep these domestic operations going.

153. Regionally and internationally the outlook is very different. At present all of the Central American airlines operating international routes are enjoying rising traffic and high load factors. However, once the jet aircraft now on order are in operation, competition will intensify radically. The increased capacity brought by the jets on order will demand longer route patterns and higher traffic densities than now exist. The traffic will not be sufficient to permit all 6 of the airlines that now operate in the region plus PAA to continue earning the kind of profits on international operations that they have enjoyed since the early 1960's. Thus, solutions will have to be sought; these lie in the direction of consortia or a well developed system of pooling covering spare parts, maintenance, repair, equipment, traffic and perhaps revenues. Undoubtedly, there are many obstacles to such solutions but they are needed if adequate and economic service is to be available regionally and internationally. The airlines themselves financed a feasibility study in 1960 for possible merger. The study, made by a foreign consulting firm, clearly showed the advantages of merger. The 6 airlines should make a renewed effort to organize a regionally integrated operation. Should steps along these lines be slow in coming, the Governments would have no recourse but themselves to seek a regional solution to assure adequate and efficient regional and international air services.

V. TRANSPORT COORDINATION

A. Rail-Air-Road Coordination

154. As in most countries, in each of the five Central American Republics little if any attention has been given to transport coordination. To be sure, with no national - let alone regional - network of railways, there has been less need for such coordination than in many other countries. Nevertheless, on routes where new highways have been built paralleling railroads, traffic has been diverted to trucks and buses. The sharp fall-off in rail traffic on four of the seven railroads and the absence of increases in traffic on two others in a period when total traffic was increasing is the direct result of road competition. On only one of the seven railways serving the general public has traffic increased since 1960 (Table 26), primarily because there is no road competition on the main route of the railroad. On routes where road and rail transport compete, since the Governments impose no restrictions, users of transport have a free choice to select the transport mode best suited to their requirements. The trend in all five of the countries is toward the use of road transport services. Road transport in the Central American countries has also offered competition to domestic air transport and has cut into traffic in some cases. As new roads have connected towns and localities hitherto served only by air, some freight traffic and, more significantly, passenger traffic has been diverted from air carriers to trucks and buses.

155. One element affecting the choice of mode used by the shipper or the passenger is the degree of direct or indirect subsidization received by each transport mode. As indicated below, available evidence shows that road users are heavily subsidized indirectly in the sense that road user charges cover considerably less than government road costs. Rail-road users are also subsidized not only because the carriers enjoy a tax free status but also because revenues from port operations received by some of the railroads are used to cover deficits incurred in hauling traffic. To the degree that landing fees do not cover in full the investment, maintenance and operating costs of airports and ancilliary facilities, air transport users are also subsidized. For those airlines whose profits from international operations cover deficits of domestic operations, domestic users are enjoying a subsidy. In addition, both rail and air carriers are subsidized in those cases where governments cover operating deficits.

B. The Governments' Road Costs and User Charges

156. In the absence of data, it has not been possible for the mission to estimate the extent of subsidization received by rail and air transport users. It is clear, however, that road users in Central America now enjoy large indirect subsidies in the form of low road user taxes, including motor fuel taxes. To obtain a general order of magnitude as to the extent of the road user subsidization, the mission has attempted a rough approximation of the annual costs of the road systems to the Governments and the revenues received from road users. (Appendix A presents the data, assumptions and calculations of these costs and revenues.) In 1964, the

estimated annual costs of providing services of trunk and principal roads was as follows:

	G	ES	H	N	CR 1/
	(million CA pesos)				
Annual depreciation of the road system	11.7	9.2	4.4	5.0	7.5
Interest on invested capital	10.1	8.0	3.8	4.6	6.7
Maintenance and administrative road costs	<u>5.6</u>	<u>1.6</u>	<u>1.9</u>	<u>2.8</u>	<u>1.6</u>
Total	27.4	18.8	10.1	12.4	15.8

1/ G=Guatemala; ES=El Salvador; H=Honduras; N=Nicaragua; CR=Costa Rica.

157. Total revenues collected from road users in 1964 are estimated as follows:

	G	ES	H	N	CR 1/
	(million CA pesos)				
Gasoline duties and taxes	6.8	6.3	2.1	4.7	4.6
Import duties on vehicles and parts	3.9	4.7	0.3	2.7	3.7
Vehicle ownership tax	1.1	1.2	0.3	-	-
License and other fees	<u>0.7</u>	<u>1.2</u>	<u>0.6</u>	<u>0.3</u>	<u>0.9</u>
Total	12.5	13.4	3.3	7.7	9.2

1/ G=Guatemala; ES=El Salvador; H=Honduras; N=Nicaragua; CR=Costa Rica.

158. Not included in the road costs to governments are the costs of constructing and maintaining city streets. Yet a portion of road user revenues is derived from city traffic, mostly from passenger cars and small trucks. The portion of city traffic to total traffic in each of the countries is not known, but a reasonable assumption based on experience in other countries is that it amounts to about one-third of total traffic. With an adjustment on this basis, estimated annual government road costs covered by annual intercity road user revenues is as follows:

Country	Costs (million CA pesos)	Adjusted Revenues	Percentage of Costs Covered by Adjusted Revenues
Guatemala	27.4	8.3	30
El Salvador	18.8	8.9	47
Honduras	10.1	2.2	22
Nicaragua	12.4	5.1	41
Costa Rica	15.8	6.1	39
		Average	36

159. Road users, however, pay in full for the initial and operating costs of their equipment which generally tend to amount to between 70 and 90 percent of total road transport costs. Thus, even though road users are paying only between a quarter and a half of government road costs, they are still paying somewhere between 75 and 95 percent of total road transport costs.

160. More refined data and calculations for each government's road costs and road user collections than shown above would be required to obtain an accurate estimate of road user subsidization. However, it appears on the basis of these rough calculations that there is room for increasing user charges on inter-city traffic. The mission considers that such increases should be made since they would contribute to a more economic pricing of road services in relationship to the cost of providing them as well as a more rational allocation of investment resources over the longer run; such increases would also be a source of additional revenues which might be used to finance increasing road expenditures. The revision of road user charges should be based on detailed studies of road user costs and their proper apportionment among users. In addition, given the growing inter-relationship of road transport with economic development of the region, such studies would best be made on a regional basis and in any event should take account of the regional aspects of transportation.

C. Government Regulation

161. The Central American Governments have legal authority to regulate rail and air transport rates, fares, routes and schedules and to license such carriers. In practice, however, these carriers operate with full autonomy and not one of the Governments attempts their economic regulation. Again, although all the countries have laws permitting at least some regulation of buses, only Costa Rica and El Salvador have attempted their economic regulation. Costa Rica's efforts have not been very effective, mostly because of the difficulty of controlling the many small owner-operators, but El Salvador has had success in determining bus routes to be served, the number of vehicles on specified routes and fares to be charged.

The regulation of trucks is all but nonexistent in any of the five countries. There appears to be sufficient bus and truck competition in each of the countries to prevent monopoly situations from arising. In fact, the few larger bus and truck companies complain against what they term cut-throat competition from small owner-operators and evidently would welcome economic regulation by the Governments. But the bus and truck capacity in each of the countries appears adequate to their road transport needs without significant surpluses of capacity. Finally, with so many small operators of trucks and buses, legal regulation of the economic aspects of road transport would be extremely difficult if not impossible to enforce. Because of adequate competition, sufficient but not excessive capacity and difficulties of enforcement, the economic regulation of road carriers appears neither necessary nor feasible at this time.

D. The Railroad Problem

162. Only one of the seven railroads serving the general public in Central America shows substantial rising traffic. This is the Northern Railway in Costa Rica and its monopoly position on the Siquirres-Limon route will disappear when its tracks are paralleled by the road now under construction. All the rest (taking together both the Guatemala and El Salvador Division of IRCA, the International Railways of Central America) are not sharing in the growth of traffic in each of the five countries. Indeed, four of the seven are losing traffic and are showing financial losses.

163. Substantial additional investment to rebuild and improve the railroads would in most cases appear to be unjustified on economic grounds; however, abandonment would require an examination of whether the traffic could be carried at lower cost by road, including both operating costs and costs to increase road capacity where required to handle the volume and type of traffic now served by the railroads. Moreover, it would require examination of problems related to the re-training, re-employment or pensioning of existing labor force. This aspect of transport coordination clearly needs more detailed analysis and consideration than has been given to it in any of the countries involved.

APPENDIX A

ESTIMATES OF ROAD COSTS AND ROAD USER REVENUES FOR 1964

Introduction

1. The calculation of road costs and road user revenues requires some major assumptions that should be tailored as closely as possible to actual conditions in a country. Nevertheless, the results will vary widely, depending not only on the assumptions but also on the methodology employed in arriving at the Government road costs and the tax and other revenues that properly can be assigned as charges paid by road users for their use of the road facilities. The results of the exercise in costs and revenues presented here must be used with extreme caution. They show only very rough orders of magnitude of the proportions of estimated government road costs covered by estimated road user payments. Much more detailed and refined data would be necessary for each country before the percentages calculated could be relied on as very precise. To repeat, the calculations presented here should be used as rough indicators only.

Governments' Estimated Road Costs

2. The method employed here in estimating road costs quantifies the replacement costs of the principal roads. The road costs are taken to include depreciation of the road system, interest on capital invested in roads and the costs of maintenance and administration for the same year (1964) as income received from road users. It is considered appropriate to charge only the costs of trunk and principal highways to road users; costs of penetration and feeder roads to open up new areas in advance of traffic growth have not been included in these calculations of road costs.

3. In the absence of data on each country, the average construction costs of different grades of road are those calculated by Bank experts on the basis of conditions and experience in Honduras. These are average construction costs for level, rolling and mountainous terrain. It is assumed that construction costs of roads are the same in each country, though it is recognized that per kilometer construction costs are likely to vary somewhat, but probably not a great deal. Another assumption is that the economic life of paved and unpaved roads is 20 and 15 years respectively; this is the conservative life span frequently used and probably overrates costs somewhat.

4. Depreciation has been calculated on a straight line depreciation basis with no allowance for possible residual value of the roads at the end of their assumed life. The opportunity cost of invested capital is assumed to be 10 percent for each of the countries and is applied on half of the calculated invested capital on the assumption that the present road systems are at the midpoint of their assumed life spans. In actual fact, El Salvador's system now probably averages more than half the assumed life spans, while Honduras' newer system is probably considerably less than half.

5. On the basis of current prices of construction, the total costs of all trunk and principal roads in each of the 5 countries are calculated as follows:

Road Type	Length in Kilometers					Cost Per Km. (million CA pesos)	Total Construction Costs (million CA pesos)				
	G	ES	H	N	CR		G	ES	H	N	CR
<u>Trunk</u>											
Paved	1,193	877	359	750	625	0.090	107.4	78.9	32.3	67.5	56.3
Unpaved	399	114	492	353	692	0.050	17.0	5.7	24.6	17.6	34.6
<u>Principal</u>											
Paved	68	180	36	69	371	0.065	3.4	11.7	2.3	4.5	24.1
Unpaved	1,868	1,616	429	68	456	0.040	74.7	64.6	17.2	2.7	18.2
Total							202.5	161.0	76.4	92.4	133.2

1/ G=Guatemala; ES=El Salvador; H=Honduras; N=Nicaragua; CR=Costa Rica.

6. With the assumed economic lives of roads, and using straight-line depreciation with no residual value, the annual depreciation costs are calculated to be:

Road Type	Economic Life	Annual Depreciation Costs (million CA pesos)				
		G	ES	H	N	CR
<u>Trunk</u>						
Paved	20	5.4	3.9	1.6	3.4	2.8
Unpaved	15	1.1	0.4	1.6	1.2	2.3
<u>Principal</u>						
Paved	20	0.2	0.6	0.1	0.2	1.2
Unpaved	15	5.0	4.3	1.1	0.2	1.2
Total		11.7	9.2	4.4	5.0	7.5

7. Applying the opportunity cost of capital to half of the amounts invested in roads (this assumes that each road system averages half of its life span), and adding total 1964 costs of maintenance and administration of roads (only a minor portion of these expenditures is applied to feeder roads), the total estimated government annual road costs in 1964 are:

	(million CA pesos)				
	G	ES	H	N	CR
Annual depreciation of road system	11.7	9.2	4.4	5.0	7.5
Opportunity cost of invested capital	10.1	8.0	3.8	4.6	6.7
Maintenance and administration costs	5.6	1.6	1.9	2.8	1.6
Total	27.4	18.8	10.1	12.4	15.8

Road User Tax Contributions, 1964

8. Collected by the Governments from road users are: fuel import duties and taxes, import duties on vehicles and parts, import duties and/or excise taxes on tires, vehicle ownership taxes, and license fees. The mission has good data on revenues for all these taxes except those on tires. It could be argued that only import duties on fuel, vehicles and parts above the average duty should be allocated to road user payments. Similarly, it can be argued that only that portion of excise taxes on fuel, vehicles and parts above the average of all excise taxes is properly allocable to road users. In the absence of such averages, however, all of the import duties and excise taxes are considered to be part of road user revenue.

9. Government road costs do not include the costs of constructing, maintaining and administering city streets. Yet users of these streets pay the same user charges that are paid by intercity road users. For developing countries such as those in Central America it is estimated that somewhere a third of the user charge revenues comes from city traffic; on this basis it follows that only two-thirds of user revenues are paid by the users of intercity roads. Taxes collected from road transportation in 1964 were:

Central America: Taxes Collected from Transportation, 1964
(million CA pesos)

Country	Gas- oline Tax	Import Duties on Vehicles and Parts	Vehicle Ownership Tax	License Fees	Other Taxes	Total	Of which Contributed by Intercity Users 1/
Guatemala	6.8	3.9	1.1	0.7		12.5	8.3
El Salvador	6.3	4.7	1.2	0.1	1.1	13.4	8.9
Honduras	2.1	0.3	0.3	0.1	0.5	3.3	2.2
Nicaragua	4.7	2.7		0.3		7.7	5.1
Costa Rica	4.6	3.7		0.9		9.2	6.1

1/ Assuming that about one-third is collected from city street users.

10. The proportion of government road costs paid for through user taxes in 1964 is as follows:

Country	(million CA pesos)		
	A. Two-thirds of 1964 User Taxes	B. Road Costs	Percentages of A to B
Guatemala	8.3	27.4	30
El Salvador	8.9	18.8	47
Honduras	2.2	10.1	22
Nicaragua	5.1	12.4	41
Costa Rica	<u>6.1</u>	<u>15.8</u>	<u>39</u>
Total	30.6	84.5	36

11. Again it must be stressed that these percentages are at best only an approximation. They do serve to indicate that for the region on a whole a little more than a third of road costs are recovered by governments by road user charges. But the range is considerable, Honduras showing little more than one-fifth and El Salvador somewhat less than one-half.

STATISTICAL APPENDIX

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24	Nicaragua: Road Investments, 1965-1969
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28	Central America: Air Traffic, Load Factors and Earnings, 1960-1965

Table 1: CENTRAL AMERICA: INTEGRATION ROADS

Designation	Description	Status	Total Length in Kms.	Estimated cost to complete after 1964 1/ (millions of CA pesos)
CA-1	Interamerican Highway	Portions completed and some to be constructed.	2,000	45.0
CA-2	Pacific Coastal Highway, Northern Section, (between Guatemala and El Salvador)	Completed and fully paved.	632	-
CA-3	Pacific Coastal Highway, Southern Section, (between Honduras and Nicaragua)	Construction of 52 km. in Honduras scheduled to start in 1968. Construction of 44 kms. in Nicaragua proceeding; CABEI financing arranged. Remaining 135 km. in Nicaragua is paved and in good condition.	231	4.3
CA-4	Western Highway (between Honduras and El Salvador)	Construction and paving about to begin or completed in El Salvador and Honduras.	378	5.1
CA-5	Interocean Highway (in Honduras)	South highway completed and paved. San Pedro Sula-Puerto Cortés section completed and paved. Tegucigalpa-Potreriillos under construction.	439	25.0
CA-6	Alternate Interamerican Highway - Eastern Section (between Honduras and Nicaragua)	Scheduled to start construction in Honduras in 1967. CABEI financing arranged for Nicaraguan section of 24 km from Ocotal to the Honduran boundary.	197	7.5

Table 1 (cont'd): CENTRAL AMERICA: INTEGRATION ROADS

Page 2.

<u>Designation</u>	<u>Description</u>	<u>Status</u>	<u>Total Length in Kms.</u>	<u>Estimated cost to complete after 1964 1/2 (millions of CA pesos)</u>
CA-7	Alternate Interamerican Highway, Southern Section (between Honduras and El Salvador)	Honduras construction La Paz-Marcala scheduled to start in 1968. El Salvador construction from San Francisco Gotera to Honduran border scheduled to start in 1968. Road is good between San Miguel - San Francisco Gotera and La Paz-Villa San Antonio.	203	5.9
CA-8	El Molino-Sonsonate-CA-1 interesection (between Guatemala and El Salvador)	Guatemala section under construction; all-weather road exists in El Salvador from Guatemalan border to CA-1 intersection.	148	3.5
CA-9	Atlantic Highway (Guatemala)	Completed and fully paved.	412	-
CA-10	Río Hondo - Nueva Ocotepeque (between Guatemala and Honduras)	Under construction in Guatemala. Honduras construction scheduled to begin in 1968.	116	2.2

Table 1 (cont'd): CENTRAL AMERICA: INTEGRATION ROADS

<u>Designation</u>	<u>Description</u>	<u>Status</u>	<u>Total Length in Kms.</u>	<u>Estimated cost to complete after 1964 1/ (million of CA pesos)</u>
CA-11	Vado Hondo - Copan - Santa Rosa - Marcala (between Guatemala and Honduras)	Western section in Guatemala under construction. Construction from Copan ruins in Honduras to Guatemalan border scheduled for construction in 1968. Eastern section in Honduras from Santa Rosa to La Esperanza scheduled for construction beginning in 1967.	276	10.4
CA-12	Acajutla-Padre Miguel (between El Salvador and Guatemala)	Construction from Acajutla in El Salvador to Guatemalan border completed or under construction. Padre Miguel-Anguiatu section in Guatemala is scheduled for construction in late 1967.	133	4.6
CA-13	Puerto Cortés-Entre Ríos (between Honduras and Guatemala)	Honduras construction program to Guatemalan border to start in 1967. Guatemala section not scheduled at all.	93	4.2
Grand Total			5,258	117.7

1/ TSC estimates (see Source).

Source: TSC Consortium, Central American Transportation Study, 1964-1965.

Table 2: GUATEMALA: HIGHWAY NETWORK, 1965
(Kilometers)

	Paved	Earth or Gravel	Total
<u>Maintained by Government</u>	<u>1571</u>	<u>6389</u>	<u>7960</u>
<u>DGC Roads</u>	1571	6000	7571
Primary	1249	298	1547
Secondary	322	5702	6024
<u>FYDEP Roads</u>	-	389	389
<u>Not maintained by Government</u>	-	1535	1535
Private Roads	-	1831	1831
	<u>Total</u>	<u>9755</u>	<u>11326</u>

Source: Directorate General of Highways (DGC)

Table 3: EL SALVADOR: HIGHWAY NETWORK, 1963
(Kilometers)

Class	Total	Paved	Improved	Unimproved
Trunk	992	878	114	-
Departmental	2,848	180	1,616	1,052
Feeder	<u>4,689</u>	-	294	4,395
Total	8,527			

Source: Roads Department

Table 4: HONDURAS: HIGHWAY NETWORK, 1959-1965
(Kilometers)

Class of Highway ^{1/}	1959	1960	1961	1962	1963	1964	1965
<u>Total</u>	<u>2,779</u>	<u>3,057</u>	<u>3,137</u>	<u>3,200</u>	<u>3,312</u>	<u>3,595</u>	<u>3,639</u>
Trunk Highways							851
--Paved							359
Principal Highways							465
--Paved							36
Secondary Roads							931
Feeder Roads							1,392

^{1/} This classification adopted in 1964 and first applied in 1965. Earlier classifications do not lend themselves to these categories.

Source: Roads Department

Table 5: NICARAGUA: HIGHWAY NETWORK, 1966
(Kilometers)

	Paved	All Weather	Dry Season	Total
National Roads:	378	238	-	1,116
Departmental Roads:				
First Class	-	521	-	521
Second Class	-	1,504	-	1,504
Local Roads:	-	-	3,550	3,550
Total	878	2,263	3,550	6,691

Source: Highway Department

Table 6: COSTA RICA: HIGHWAY NETWORK, 1959-1965
(Kilometers)

YEAR	TOTAL					NATIONAL ROADS					REGIONAL (SECONDARY) ROADS					LOCAL ROADS				
	Total	Concrete	Asphalt	All Weather Roads 1/	Dry Season Roads 2/	Total	Concrete	Asphalt	All Weather Roads 1/	Dry Season Roads 2/	Total	Concrete	Asphalt	All Weather Roads 1/	Dry Season Roads 2/	Total	Concrete	Asphalt	All Weather Roads 1/	Dry Season Roads 2/
1959	13,942	83	955	2,149	10,755	1,275	57	552	440	226	802	26	328	427	21	11,865	--	75	1,282	10,508
1960	13,944	85	955	2,149	10,755	1,277	59	552	440	226	802	26	328	427	21	11,865	--	75	1,282	10,508
1961	13,949	85	964	2,297	10,603	1,277	59	552	490	176	802	26	328	427	21	11,870	--	84	1,380	10,406
1962	13,960	85	975	2,489	10,411	1,277	59	552	550	116	802	26	328	427	21	11,881	--	95	1,512	10,274
1963	14,470	85	1,004	3,175	10,206	1,279	59	556	618	46	828	26	345	439	18	12,363	--	103	2,118	10,142
1964	16,106	85	1,035	3,440	11,546	1,363	59	566	692	46	800	26	345	457	--	13,915	--	124	2,291	11,500
1965	16,949	85	1,062	3,756	12,046	1,397	59	584	708	46	837	26	354	457	--	14,715	--	124	2,591 ^{3/}	12,000 ^{3/}

1/ Roads with gravel or improved soil surfacing.

2/ Earth Roads.

3/ Estimate.

Source: Highway Department.

Table 7: CENTRAL AMERICA: ROAD MAINTENANCE EXPENDITURES,
 1960 - 1965
 (Millions of CA Pesos)

Country	1960	1961	1962	1963	1964	1965
Guatemala ^{1/}	5.5	5.3	5.4	5.4	5.6	5.2
El Salvador	1.5	1.6	1.4	1.5	1.4	1.4
Honduras	1.9	1.6	1.5	1.5	2.0	1.5
Nicaragua ^{1/}	2.1	2.3	2.2	2.8	2.8	2.3
Costa Rica	<u>0.9</u>	<u>0.9</u>	<u>1.3</u>	<u>3.2</u>	<u>3.1</u>	<u>3.3</u>
Total	11.9	11.7	11.8	14.4	14.9	13.7

^{1/} Fiscal Years, 1960-1964

Source: National Highway Departments

**Table 8: CENTRAL AMERICA: NUMBER OF REGISTERED FOUR-WHEELED
SELF-PROPELLED VEHICLES, BY TYPES, 1960-1965
(Thousands)**

	1960	1961	1962	1963	1964	1965	Average Annual Percent Increase
<u>Guatemala</u>	<u>41.0</u>	<u>44.5</u>	<u>48.1</u>	<u>53.0</u>	<u>58.2</u>	<u>57.9</u>	7
Cars	23.5	25.7	28.0	28.0	31.2	31.0	5
Trucks	7.1	7.6	8.1	12.6	14.0	13.9	16
Other	10.4	11.2	12.0	12.4	13.0	13.0	4
<u>El Salvador</u>	<u>29.1</u>	<u>32.0</u>	<u>32.7</u>	<u>33.2</u>	<u>34.0</u>	<u>34.3</u>	3
Cars	18.5	20.2	21.0	21.7	21.1	21.3	3
Trucks	3.3	3.4	3.6	3.3	3.7	3.7	2
Other	7.3	8.4	8.1	8.2	9.2	9.3	5
<u>Honduras</u>	<u>11.0</u>	<u>11.3</u>	<u>11.6</u>	<u>14.3</u>	<u>16.0</u>	<u>18.7</u>	12
Cars	5.5	5.7	5.9	7.5	8.8	9.7	13
Trucks	3.9	4.0	4.0	4.9	5.9	7.0	13
Other	1.6	1.6	1.7	1.9	1.3	2.0	4
<u>Nicaragua</u>	<u>15.9</u>	<u>16.1</u>	<u>17.3</u>	<u>19.4</u>	<u>21.0</u>	<u>23.3</u>	9
Cars	8.7	8.3	8.1	8.6	8.9	9.8	1
Trucks	5.0	4.8	5.4	6.9	7.1	8.5	12
Other	2.2	3.0	3.8	3.9	5.0	5.0	21
<u>Costa Rica</u>	<u>25.6</u>	<u>26.4</u>	<u>26.9</u>	<u>28.3</u>	<u>30.8</u>	<u>33.9</u>	5
Cars	10.0	10.3	10.5	11.3	12.3	14.0	7
Trucks	8.4	7.9	7.8	8.2	8.9	10.2	4
Other	7.2	8.2	8.6	8.8	9.6	9.7	6
<u>Central America</u>	<u>122.6</u>	<u>130.3</u>	<u>136.6</u>	<u>148.2</u>	<u>160.0</u>	<u>168.1</u>	7
Cars	66.2	70.2	73.5	77.1	82.3	85.8	5
Trucks	27.7	27.7	28.9	35.9	39.6	43.3	9
Other	28.7	32.4	34.2	35.2	38.1	39.0	4

Source: National Highway Departments.

Table 9: GUATEMALA: DESIGN STANDARDS

Average Daily Traffic in Design Year	Road Classification	Design Speed KPH	Width (m) and type of pavement ^{1/}	Roadway Width		Right of Way Width M	Minimum Radius M	Maximum Grade %	Sight Distance for Stopping		Sight Distance for Passing	
				Cut M	Fill M				Minimum M	Recommended M	Minimum M	Recommended M
3,000 to 5,000	Type "A" Flat Rolling Mountainous	100 80 60	2x7.20 Concrete or Asphalt Concrete or Multiple Surface Treatment	25	24	50	375 225 110	3 4 5	160 110 70	200 150 100	700 520 350	750 550 400
1,500 to 3,000	Type "B" Flat Rolling Mountainous	80 60 40	7.20 Asphalt Concrete or Double Surface Treatment	13	12	^{3/} 40	225 110 47	6 7 8	110 70 40	150 100 50	520 350 180	550 400 200
900 to 1,500	Type "C" Flat Rolling Mountainous	80 60 40	6.50 Asphalt Concrete or Double Surface Treatment	12	11	^{3/} 40	225 110 47	6 7 8	110 70 40	150 100 50	520 350 180	550 400 200
500 to 900	Type "D" Flat Rolling Mountainous	80 60 40	6.00 Double Surface Treatment	11	10	^{3/} 40	225 110 47	6 7 8	110 70 40	150 100 50	520 350 180	550 400 200
100 to 500	Type "E" Flat Rolling Mountainous	50 40 30	5.50 Single Surface Treatment	9.50	8.50	^{3/} 40	75 47 30	8 9 10	55 40 30	70 50 35	260 180 110	300 200 150
up to 100	Type "F" Flat Rolling Mountainous	40 30 20	5.50 Gravel or Improved Soil	9.50	8.50	25	47 30 18	10 12 14	40 30 20	50 35 25	180 110 50	200 150 100
^{2/} Structures - Loading H15-S12 Height 4.75m Width 7.90m												

^{1/} Type A highways have median areas of 1.50m in width.

^{2/} The standards for Structures are the same for all road types, except for Type A where the width is double.

^{3/} The existing law provides 25m only.

Source: Directorate General of Highways, June 1966.

Table 10: EL SALVADOR: DESIGN STANDARDS

Average Daily Traffic in Design Year	Road Classification	Design Speed KPH	Width (m) and Type of Pavement	Right-of-Way Width	Minimum Radius M	Maximum Grade Percent	Sight Distance for Stopping M
2000 and over	<u>Primary</u>						
	Flat	90	Roadway 11	30	250	5	160
	Rolling	70	Pavement 7.30		200	6	130
	Mountainous	50			80	7	100
500 to 2000	<u>Secondary</u>						
	Flat	80			150	5	130
	Rolling	70	-	-	100	6	100
	Mountainous	50			60	8	80
100 to 500	<u>Tertiary</u>						
	Flat	60	Roadway 7-8		150	6	120
	Rolling	50		20	100	8	100
	Mountainous	40			40	10	80

Structures: U15- S12

Source: Roads Department

Table 11: HONDURAS - DESIGN STANDARDS

Average Daily Traffic in Design Year	Road Classification	Design Speed KPH	Width M	Right of Way M	Minimum Radius M	Maximum Grade %	Sight Distance Stopping	M Passing
500	<u>AA</u>							
	Flat	100	Roadway 10	30	287	4	150	770
	Rolling	80	Pavement 7		220	5	105	490
	Mountainous	60			71	6	80	300
400 to 500	<u>A</u>							
	Flat	80	Roadway 10	30	287	5	105	490
	Rolling	60	Pavement 7		143	7	80	300
	Mountainous	50			71	8	65	200
100 to 400	<u>Primary</u>							
	Flat	80		30	191	8	105	490
	Rolling	60			115	9	80	300
	Mountainous	40	Pavement 6		47	10	50	125
50 to 100	<u>Secondary</u>							
	Flat	50		30	95	8	65	200
	Rolling	40	Roadway 7		57	11	50	125
	Mountainous	25	Pavement 5		25	11	25	75
50	<u>Tertiary</u>							
	Flat	40		30	71	9	50	125
	Rolling	30	Roadway 5.4		47	11	30	100
	Mountainous	20	Pavement 4		20	11	25	60

Structure: H20 - S15

Source: Roads Department.

Table 12: NICARAGUA: DESIGN STANDARDS

Road Classification	Design Speed KPH	Width M	Right of Way Width M	Minimum Radius M	Maximum Grade Percent	Bridge Design Loading and Width M	Sight Distance for Stopping
<u>National Roads</u> ^{1/}							
		Subgrade 8.50					
		Surfaced 6.00					
<u>Second Class</u>		Shoulders 1.25				HL5-S12	
Flat	80		40	200	3	7.30	110
Rolling	60			120	5		75
Mountainous	40			50	7		45
<u>Departmental Roads</u>							
		Subgrade 6.0					
		Surfaced 6.0					
<u>First Class</u>		Shoulders -				HL5-S12	
Flat	60		25	120	5	3.50	75
Rolling	45			60	7		55
Mountainous	30			30	9		30
<u>Departmental Roads</u>							
		Subgrade 5.0					
		Surfaced 5.0					
<u>Second Class</u>		Shoulders -				HL5-S12	
Flat	50		20	75	6	3.50	60
Rolling	40			50	8		45
Mountainous	30			30	10		30

^{1/} Standards for National Roads, 1st Class, are under discussion.

Source: Roads Department.

Table 19: COSTA RICA: DESIGN STANDARDS

	Average Daily Traffic in Design Year						
	8,000-33,000 Rural	8,000-33,000 Urban	3,000-8,000	1,000-3,000	400-1,000	100-400	Under 100
Design Velocity (Km/hr)							
Plains	104	80	104	96	88	88	64
Rolling	88	80	88	80	72	72	48
Mountainous	64	64	64	64	48	48	40
Min. Curve Radius (m)							
Plains	400	215	400	300	275	275	130
Rolling	275	215	275	215	180	180	70
Mountainous	130	130	130	130	70	70	50
Maximum Grade (%)							
Plains	4	4	4	4	4	4	5
Rolling	5	5	5	5	6	6	8
Mountainous	6	6	6	7	8	8	10
Stopping Sight Distance (m)							
Plains	180	110	180	150	130	130	90
Rolling	130	110	130	110	100	100	65
Mountainous	90	90	90	90	65	65	50
Surfaced Width (m)							
Plains	2 x 7.3	2 x 7.3	7.3	6.7	6.1	6.1	5.5
Rolling	2 x 7.3	2 x 7.3	7.3	6.7	6.1	6.1	5.5
Mountainous	2 x 7.3	2 x 7.3	7.3	6.7	6.1	6.1	5.0
Width of Shoulders (m)							
Plains	3.05	3.05	2.45	1.80	1.80	1.20	1.20
Rolling	3.05	3.05	2.45	1.80	1.80	1.20	1.20
Mountainous	2.45	2.45	1.80	1.80	1.20	1.00	1.00
Width of Bridges (m)	Equal to surfaced width and shoulders except for spans larger than 30 m.			7.9 - 8.5	7.3 - 7.9	7.3	4.3
Bridge Design Loading	H20 - S16	H20 - S16	H20 - S16	H20 - S16	H15-S12	H15-S12	H - 15
Right-of-Way Width (m)	40	36	25	20	20	20	20

Source: Highway Department.

Table 14: CENTRAL AMERICA: HIGHWAY DESIGN STANDARDS
RECOMMENDED BY TSC

Item	Plain		Rolling		Mountain	
	Min. ^{1/}	Pref. ^{1/}	Min.	Pref.	Min.	Pref.
Design speed (km./hr.)	80	-	65	-	50	-
Curvature radius (m.)	230	-	125	-	55	-
Roadway width (m.)	9.5	10.8	9.5	10.8	8.5	9.5
Bridge design loadingHI5-SI2.....					

Item	Average Daily Traffic in Design Year							
	Under 500		500-1,000		1,000-2,000		Above 2,000	
	Min.	Pref.	Min.	Pref.	Min.	Pref.	Min.	Pref.
<u>Right-of-way width (m.)</u>	25	30	25	30	25	30	30	35
<u>Surfaced width (m.)</u>								
Plain	6.1		6.75		7.35		7.35	
Rolling	6.1		6.1		6.75		7.35	
Mountain	6.1		6.1		6.1		6.75	
<u>Shoulder width (m.)</u>								
Plain	1.75	2.40	1.75	2.40	1.75	2.40	2.40	2.40
Rolling	1.75	2.40	1.75	2.40	1.75	2.40	1.75	2.40
Mountain	1.25	1.75	1.25	1.75	1.25	1.75	1.25	2.40
<u>Bridge width (m.)</u>								
Plain	7.3		7.9		8.5		8.5	
Rolling	7.3		7.3		7.9		8.5	
Mountain	7.3		7.3		7.3		7.9	
<u>Maximum grade^{2/} (%)</u>								
Plain	5		4		4		3	
Rolling	6		5		5		4	
Mountain	7		6		6		5	

^{1/} Min. = Minimum; Pref. = Preferred.

^{2/} Passing lanes where grades exceed 4 percent for distances exceeding one kilometer.

Source: TSC Consortium, Central American Transportation Study, 1964-1965, Vol. I, p. 173.

Table 15: CENTRAL AMERICA: ACTUAL INVESTMENTS IN ROADS, 1962-1965,
AND PLANNED INVESTMENTS, 1966-1969
(Million C.A. Pesos)

Country	Actual Investment				Total
	1962	1963	1964	1965	
Guatemala ^{1/}	4.4	6.4	6.7	6.8	24.3
El Salvador	4.1	2.6	2.4	5.8	14.9
Honduras	5.4	4.8	5.4	4.0	19.6
Nicaragua ^{1/}	4.4	5.0	5.5	6.4	21.3
Costa Rica	<u>3.7</u>	<u>4.3</u>	<u>6.0</u>	<u>6.7</u>	<u>20.7</u>
Total	22.0	23.1	26.0	29.7	100.8
				^{2/}	
	Planned Investment				Total
	1966	1967	1968	1969	
Guatemala	8.5	27.1	29.5	30.3	95.4
El Salvador	8.5	13.5	n.a. ^{3/}	n.a. ^{3/}	n.a.
Honduras	5.0	19.9	19.8	22.9	67.6
Nicaragua	14.6	20.9	10.3	11.2	57.0
Costa Rica	<u>10.0</u>	<u>18.4</u>	<u>15.3</u>	<u>24.6</u>	<u>68.3</u>
Total	46.6	99.8	n.a.	n.a.	n.a.

^{1/} Original data for fiscal years 1961-1964 to 1963-64 were adjusted to annual basis from mid year 1962.

^{2/} Revised programs for 1966-1969.

^{3/} Being revised; original estimates were 7.9 for 1968 and 8.3 for 1969.

Source: Roads Departments.

Table 16: GUATEMALA: HIGHWAY EXPENDITURES, 1959-1965
(Million C.A. Pesos)

Fiscal Year	-----C O N S T R U C T I O N -----										-----M A I N T E N A N C E -----			--ADMINISTRATION --		TOTAL EXPENDITURES		
	---Foreign Loans---			Foreign Grants---		---Loans & Grants---		--Local Revenues--		Total Expenditures---		Foreign Loans	---Expenditures---		Amount		Percent- age of (2)	
	IBRD	Eximbank	DLP	AID	BPR	Amount	Percent- age of (1)	Amount	Percent- age of (1)	Amount	Percent- age of (2)		Amount	Percent- age of (2)				
										(1)							(2)	
1959-1960	0.30	-	-	0.86	1.65	2.81	39%	4.32	61%	7.13	51%	0.07	5.38	5.45	40%	1.24	9%	13.32
1960-1961	0.22	-	-	0.24	1.23	1.69	36%	3.02	64%	4.71	42%	0.02	5.26	5.28	47%	1.24	11%	11.23
1961-1962	-	0.16	0.10	0.31	2.34	2.91	71%	1.18	29%	4.09	38%	-	5.39	5.39	50%	1.23	12%	10.71
1962-1963	-	1.13	1.49	0.16	0.68	3.46	75%	1.29	25%	4.75	42%	-	5.43	5.43	48%	1.08	10%	11.26
1963-1964	-	2.31	2.41	0.16	0.14	5.02	72%	3.07	38%	8.09	54%	-	5.61	5.61	38%	1.12	8%	14.82
2nd Semester of 1964	-	0.46	0.48	-	0.33	1.27	48%	1.39	52%	2.66	42%	-	2.30	2.30	36%	1.41	22%	6.37
1965	-	2.33	1.56	-	0.76	4.65	68%	2.16	32%	6.81	48%	-	5.15	5.15	36%	2.37	16%	14.33
TOTALS	0.52	6.39	6.04	1.73	7.13	21.81	57%	16.43	43%	38.24	46%	0.09	34.52	34.61	42%	9.69	12%	82.54

Source: Directorate General of Highways
June, 1966

Table 17: EL SALVADOR: HIGHWAY EXPENDITURES, 1960-1965
(Million C.A. Pesos)

Year	Construction			Maintenance ^{1/}
	Local Funds	External Funds	Total	Total
1960	1.7	1.0	2.7	1.5
1961	3.1	2.2	5.3	1.6
1962	3.3	0.8	4.1	1.4
1963	1.5	1.1	2.6	1.5
1964	1.4	1.0	2.4	1.4
1965	2.8	3.0	5.8	1.4

^{1/} Does not include equipment depreciation.

Source: Roads Department and IBRD

Table 18: HONDURAS: HIGHWAY EXPENDITURES, 1959-1965^{1/}
(Million C.A. Pesos)

Year	Construction	Maintenance	Total
1959	5.5	1.7	7.2
1960	6.3	1.9	8.2
1961	4.9	1.6	6.5
1962	5.4	1.5	6.9
1963	4.8	1.5	6.3
1964	5.4	2.0	7.4
1965	4.0	1.5	5.5

^{1/} These figures are inconsistent with those supplied by the Planning Office.

Source: Roads Department.

Table 19: NICARAGUA: HIGHWAY EXPENDITURES, 1959-1965
(Million C.A. Pesos)

Year	Construction			Maintenance	Total
	Local Funds	Foreign Funds	Total		
1959-60	3.8	0.8	4.6	2.1	6.7
1960-61	3.4	0.3	3.7	2.3	6.0
1961-62	3.5	0.8	4.3	2.2	6.5
1962-63	3.1	1.6	4.7	2.8	7.4
1963-64	3.7	1.5	5.2	2.8	8.0
1964 2nd Semester	2.9	0.0	2.9	1.4	4.3
1965	<u>4.7</u>	<u>1.6</u>	<u>6.4</u>	<u>2.3</u>	<u>8.6</u>
Total	25.1	6.7	31.7	15.8	47.6

Source: Roads Department, July, 1966.

Table 20: COSTA RICA: HIGHWAY EXPENDITURES, 1959-1965
(Million C.A. Pesos)

	Construction			Maintenance		
	External Loans and Grants	Local Financing	Total Construction	External Loans	Local Financing	Total Maintenance
1960	0.2	1.7	1.9	-	0.9	0.9
1961	1.6	1.9	3.5	-	1.0	1.0
1962	1.7	2.0	3.7	-	1.3	1.3
1963	2.3	2.0	4.3	1.1	2.1	3.2
1964	2.7	3.2	5.9	0.9	2.2	3.1
1965	2.8	3.9	6.7	0.6	2.7	3.3

Source: Highway Department.

Table 21: GUATEMALA: ROAD INVESTMENTS 1965 - 1969
(millions of G.A. Pesos)

Project	KM	Total Estimated Cost	Actual Expenditures through 1965	1966		1967		1968		1969		Total 1966-1969		After 1969	
				Government Plan	Mission Projected										
Integration Roads															
CA-1 Interamerican Highway (Completion)	264	11.5	1.2	3.5	3.3	4.0	2.0	2.8	2.0	-	2.0	10.3	9.3	-	1.0
CA-2 Escuintla- Taxisco	51	2.2	-	-	-	-	-	1.1	-	1.1	-	2.2	-	-	2.2
CA-8 Oratorio-Rio Paz	49	5.0	4.8	0.2	0.2	-	-	-	-	-	-	0.2	0.2	-	-
CA-10 Rio Hondo- Honduras Boundary	94	8.7	4.9	0.3	0.3	2.4	1.2	1.1	1.1	-	1.2	3.8	3.8	-	-
CA-11 Jocotan-Camotan	41	3.8	-	-	-	-	-	-	-	1.9	-	1.9	-	1.9	3.8
CA-12 Padre Miguel- Anguiatu	23	2.9	-	-	-	0.5	-	1.8	-	0.6	0.4	2.9	0.4	-	2.5
Sub-total	522	34.1	10.9	4.0	3.8	6.9	3.2	6.8	3.1	3.6	3.6	21.3	13.7	1.9	9.5
National Roads															
El Rancho-Coban	129	16.6	-	0.3	0.3	4.0	4.6	7.6	3.0	4.7	5.0	16.6	12.9	-	3.7
San Julian -El Estor- San Felipe and Morales	241	29.4	0.5	0.8	0.8	2.5	1.0	8.1	1.5	9.3	3.1	20.7	6.4	8.2	22.5
Coban-Chisec-Chinaja	70	7.7	-	-	-	-	-	-	-	1.1	-	1.1	-	6.6	7.7
Las Rosas-Mulua	48	3.8	3.6	0.1	0.1	0.1	0.1	-	-	-	-	0.2	0.2	-	-
Mendez-Sebol-Chisec	140	15.4	-	-	-	-	-	-	-	1.1	-	1.1	-	14.3	15.4
Sub-total	628	72.9	4.1	1.2	1.2	6.6	5.7	15.7	4.5	16.2	8.1	39.7	19.5	29.1	49.3
Secondary Roads	-	2.5	0.1	0.3	0.3	0.5	-	0.8	-	0.8	-	2.4	0.3	-	2.1
Feeder Roads	-	29.6	-	-	-	5.1	0.5	3.9	0.5	6.3	0.5	15.3	1.5	14.3	28.1
Peten Feeder Roads (FYDEP)	-	6.4	1.1	1.3	1.3	1.0	0.5	1.0	0.5	2.0	0.5	5.3	2.8	-	2.5
Other Activities	-	10.5	4.6	1.6	1.6	1.6	0.6	1.3	1.3	1.4	1.4	5.9	4.9	-	1.0
Sub-total	-	49.0	5.8	3.2	3.2	8.2	1.6	7.0	2.3	10.5	2.4	28.9	9.5	14.3	33.7
Maintenance Equipment	-	5.8	0.3	0.1	0.1	5.4	1.8	-	3.6	-	-	5.5	5.5	-	-
TOTAL	-	161.8	21.1	8.5	8.3	27.1	12.3	29.5	13.5	30.3	14.1	95.4	48.2	45.3	92.5

Source for Government Plan: Directorate General of Highways, June 1966

Table 22: EL SALVADOR: ROAD INVESTMENT, 1965-1969
(Millions of C.A. Pesos)

Project	Kilo- meters	Investments								Totals		
		1966		1967		1968		1969		1966-67		1966-69
		Govern- ment Plan	Mission Projected	Govern- ment Plan	Mission Projected	Govern- ment Plan 1/ Estimate	Mission Estimate	Govern- ment Plan 1/ Estimate	Mission Estimate	Govern- ment Plan	Mission Estimate	Mission Estimate
<u>Integration Roads</u>	<u>526</u>	<u>2.2</u>	<u>2.2</u>	<u>6.4</u>	<u>4.6</u>	<u>n.a.</u>	<u>5.8</u>	<u>n.a.</u>	<u>6.7</u>	<u>8.6</u>	<u>6.8</u>	<u>19.3</u>
CA-1 Interamerican Highway (Betterment)	284	0.6	0.6	2.5	1.5	n.a.	2.5	n.a.	2.5	3.1	2.1	7.1
CA-4 Tejutla - Honduras Boundary	98	1.2	1.2	2.3	1.5	n.a.	1.2	n.a.	1.2	3.5	2.7	5.1
CA-7 San Francisco Gotera - Honduras Boundary	62	0.2	0.2	0.9	0.9	n.a.	1.0	n.a.	1.0	1.1	1.1	3.1
CA-8 Ahuachapan - El Jobo	49	-	-	0.1	0.1	n.a.	0.5	n.a.	1.0	0.1	0.1	1.6
CA-12 Santa Anna-Metapan - Guatemala Boundary	33	0.2	0.2	0.6	0.6	n.a.	0.6	n.a.	1.0	0.8	0.8	2.4
<u>National Roads</u>		<u>4.8</u>	<u>3.0</u>	<u>4.0</u>	<u>2.5</u>	<u>n.a.</u>	<u>3.0</u>	<u>n.a.</u>	<u>3.0</u>	<u>8.8</u>	<u>5.5</u>	<u>13.5</u>
Key roads are: San Salvador - Acajutla Santa Tecla - La Libertad Sonzacate-San Jorge Sitio del Nino-Apopa San Miguel-Agua Salada												
<u>Other Roads and Activities</u>		<u>1.5</u>	<u>1.5</u>	<u>3.1</u>	<u>3.1</u>	<u>n.a.</u>	<u>3.1</u>	<u>n.a.</u>	<u>1.8</u>	<u>4.6</u>	<u>4.6</u>	<u>9.5</u>
Secondary Roads		0.6	0.6	0.5	0.5	n.a.	0.5	n.a.	0.5	1.1	1.1	2.1
Feeder Roads		0.9	0.9	1.3	1.3	n.a.	1.3	n.a.	1.3	2.2	2.2	4.8
Maintenance Equipment				1.3	1.3	n.a.	1.3	n.a.		1.3	1.3	2.6
<u>TOTAL</u>		<u>8.5</u>	<u>6.7</u>	<u>13.5</u>	<u>10.2</u>		<u>11.9</u>		<u>11.5</u>	<u>22.0</u>	<u>16.9</u>	<u>40.3</u>

1/ 1968-1969 program under revision.

Source: Roads Department and mission estimates.

Table 23: HONDURAS: ROAD INVESTMENT, 1965-1969
(millions of C.A. Pesos)

Project	Kilo- meters	Total Esti- mated Costs	1965 Expendi- tures	Investment										Total 1966-1969	
				1966		1967		1968		1969		Government Plan	Mission Projected		
				Government Plan	Mission Projected										
<u>Integration Roads</u>															
CA-3 Choluteca - Nicaraguan Boundary	52	6.0	-	-	-	-	-	0.3	0.3	0.6	0.5	0.9	0.8		
CA-4 Chamelecon - El Salvador Boundary	251	12.9 ^{1/}	1.4	1.4	2.6	2.0	1.4	4.5	1.4	4.0	6.8	11.9			
CA-5 Tegucigalpa - Potrerillos	243	23.8	2.9	2.9	5.0	6.0	5.7	6.7	4.8	5.8	20.4	22.4			
CA-6 Danli - Nicaraguan Boundary	34	1.3	-	-	-	-	-	0.3	0.3	0.4	0.4	0.7	0.7		
CA-7 Villa San Antonio - Marcala - El Salvador Boundary	136	3.5	-	-	-	-	-	-	-	1.8	-	1.8	-		
CA-10 Nueva Ocotepeque - Guatemala Boundary	22	1.0	-	-	-	-	-	-	-	1.0	-	1.0	-		
CA-11 Copan - Guatemala Frontier	66	0.5	-	-	-	-	-	0.5	-	-	-	0.5	-		
CA-11A Santa Rosa-Gracias - La Esper- anza	94	2.4	-	-	0.7	-	-	0.7	-	1.0	-	2.4	-		
CA-13 Puerto Cortes - Guatemala Boundary	69	4.0	-	-	0.4	-	-	0.4	-	1.4	-	2.2	-		
Sub-total	947	55.4	4.3	4.3	9.7	8.0	10.3	11.8	12.4	11.7	36.7	35.8			
<u>National Roads</u>															
North Coast Highway	379	24.2	-	-	6.1	1.0	4.7	2.0	5.6	2.0	16.4	5.0			
Juticalpa - Puerto Castilla	276	12.0	-	-	-	-	2.0	0.6 ^{2/}	2.8	1.5 ^{2/}	4.8	2.1 ^{2/}			
Sub-total	655	36.2	-	-	6.1	1.0	6.7	2.6	8.4	3.5	21.2	7.1			
<u>Other Activities</u>															
Amala Valley Feeder Roads	53	1.1	-	-	1.1	1.1	-	-	-	-	1.1	1.1			
Farm to Market (penetration roads)	602	6.9	0.7	0.7	2.3	2.0	2.3	2.9	1.6	1.3	6.9	6.9			
Bridges	-	3.5	-	-	0.7	0.7	0.5	0.5	0.5	0.5	1.7	1.7			
Sub-total	655	11.5	0.7	0.7	4.1	3.8	2.8	3.4	2.1	1.8	9.7	9.7			
<u>T O T A L</u>	<u>2,257</u>	<u>103.1</u>	<u>3.8 ^{3/}</u>	<u>5.0</u>	<u>5.0</u>	<u>19.9</u>	<u>12.8</u>	<u>19.8</u>	<u>17.8</u>	<u>22.9</u>	<u>17.0</u>	<u>67.6</u>	<u>52.6</u>		

^{1/} Includes new paving and 25 km. reconstruction of this road from 1967, plus \$400,000 for feasibility studies of feeder roads and reconstruction of Tegucigalpa - Juticalpa road.

^{2/} Subject to locating and establishing a pulp and paper mill.

^{3/} Breakdown not available.

Source for Government plan: Roads Department, June, 1966

Table 21: NICARAGUA: ROAD INVESTMENTS 1966 - 1969
(millions of C.A. pesos)

Project	KM	Total Estimated Cost	Actual Expenditures through 1965	1966		1967		1968		1969		Total 1966-1969		After 1969	
				Government Plan	Mission Projected										
<u>Integration Roads</u>															
CA-1 Interamerican Highway	158	6.2	0.6	1.0	1.0	0.2	0.2	1.7	1.0	2.2	1.5	5.1	3.7	0.5	1.9
CA-3 Puente Real - Honduras Bdry.	43	4.8	-	1.6	1.0	3.0	1.5	0.2	1.3	-	1.0	4.8	4.8	-	-
CA-6 Yalaguna - Ocotal-Las Manos	45	5.0	1.8	-	-	2.6	2.6	0.6	0.6	-	-	3.2	3.2	-	-
Sub-total	246	16.0	2.4	2.6	2.0	5.8	4.3	2.5	2.9	2.2	2.5	13.1	11.7	0.5	1.9
<u>National Roads</u>															
Rama Road Construction and Paving	236	7.7	1.5	1.0	1.0	1.1	1.1	1.2	1.2	2.0	2.0	5.3	5.3	-	-
Telica - San Isidro	96	8.9	6.7	1.7	1.7	0.4	0.4	-	-	-	-	2.1	2.1	-	-
Jiloa - La Paz	49	2.3	1.2	1.1	1.1	-	-	-	-	-	-	1.1	1.1	-	-
Moyogalpa - Altigracia	30	1.3	0.2	1.0	1.0	0.2	0.2	-	-	-	-	1.2	1.2	-	-
Leon Beltway	10	0.2	-	0.2	0.2	-	-	-	-	-	-	0.2	0.2	-	-
Diriamba - Casares	22	1.1	-	0.2	0.2	0.9	0.9	-	-	-	-	1.1	1.1	-	-
Obraje - Malpaisillo	39	0.6	-	-	-	0.5	0.5	0.1	0.1	-	-	0.6	0.6	-	-
Granada Beltway	3	0.8	-	-	-	-	-	-	-	0.8	0.8	0.8	0.8	-	-
Condega - San Juan de Limay - Somotillo	75	2.3	-	-	-	-	-	-	-	0.7	0.7	0.7	0.7	1.5	1.5
Nandaime - Tipitapa	50	1.5	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	1.0	1.0
Matiguas - Rio Tuma - Comarca - El Cabo	365	17.8	-	-	-	-	-	-	-	2.0	-	2.0	-	15.8	17.8
Las Mercedes - Jiloa	14	1.0	-	-	-	-	-	-	-	0.6	-	0.6	-	0.4	1.0
Sub-total	999	44.5	9.6	5.2	5.2	3.1	3.1	1.3	1.3	6.6	4.0	16.2	13.6	18.7	21.3
<u>Other Activities</u>															
El Viejo - Conseguna	82	2.1	0.3	0.6	0.6	0.9	0.9	0.3	0.3	-	-	1.8	1.8	-	-
Plan Lechero feeder roads	457	13.9	-	2.1	-	8.0	2.9	3.8	6.0	-	5.0	13.9	13.9	-	-
Penetration Roads	530	5.5	-	0.3	0.3	1.7	1.0	1.7	1.0	1.8	1.0	5.5	3.3	-	2.2
Administration (Construction)		3.7	-	1.0	1.0	1.4	1.4	0.7	0.7	0.6	0.6	3.7	3.7	-	-
Maintenance Equipment		2.8	-	2.8	2.8	-	-	-	-	-	-	2.8	2.8	-	-
Sub-total	1069	28.0	0.3	6.8	4.7	12.0	6.2	6.5	8.0	2.4	6.6	27.7	24.5	-	2.2
T O T A L	2314	88.5	12.3	14.6	11.9	20.9	13.6	10.3	12.0	11.2	13.1	57.0	50.8	19.2	25.4

Source: Roads Department and mission estimates.

Table 25: COSTA RICA: ROAD INVESTMENT 1966-1969
(millions of C.A. pesos)

Project	KM	Total Estimated Cost	Actual Expenditures Through 1965	1966		1967		1968		1969		Total 1966-69		After 1969	
				Government Plan	Mission Projected	Government Plan	Mission Projected	Government Plan	Mission Projected	Government Plan	Mission Projected	Govt. Plan	Mission Projected	Govt. Plan	Mission Projected
<u>Integration Roads</u>															
CA-1 Interamerican Highway	438	21.2	-	-	-	4.9	2.0	6.9	3.4	6.9	3.4	18.7	8.8	2.5	12.4
CA-1 El Coco - San Ramon	42	11.6	-	0.3	0.3	1.6	1.0	2.3	2.9	3.0	3.0	7.2	7.2	4.4	4.4
Sub-total	480	32.8	-	0.3	0.3	6.5	3.0	9.2	6.3	9.9	6.4	25.9	16.0	6.9	16.8
<u>National Roads</u>															
Plan Vial - First stage	569	18.9	8.0	4.1	4.1	5.6	5.6 ^{1/}	1.2	1.2 ^{1/}	-	-	10.9	10.9	-	-
Cartago-Limon	140	15.1	-	0.6	0.6	0.7	(1.5) ^{1/}	0.5	(2.5) ^{1/}	2.3	(3.0) ^{1/}	4.1	0.6	11.0	14.5
Plan Vial-Second stage	649	36.1 ^{2/}	-	-	-	-	-	-	-	6.8	3.0	6.8	3.0	29.3	33.1
Sub-total	1358	70.1	8.0	4.7	4.7	6.3	5.6	1.7	1.2	9.1	3.0	21.8	14.5	40.3	47.6
<u>Other Activities</u>															
Feeder Roads	582	8.1	2.1	2.4	2.4	2.4	2.4	1.3	1.3	-	-	6.1	6.1	-	-
Right-of-way, miscellaneous construction, engineering and supervision.	-	14.9	2.4	2.6	2.6	3.2	2.7	3.1	3.1	3.3	3.3	12.2	11.7	-	-
Sub-total	582	23.0	4.5	5.0	5.0	5.6	5.1	4.4	4.4	3.3	3.3	18.3	17.8	-	-
Maintenance Equipment	-	2.3	-	-	-	-	-	-	-	2.3	2.3	2.3	2.3	-	-
T O T A L	2420	128.2	12.5	10.0	10.0	18.4	13.7	15.3	11.9	24.6	15.0	68.3	50.6	47.2	64.4

^{1/} Figures in parentheses shown for illustrative purposes as high-priority alternative to other projects within limits of overall expenditures projected by mission.

^{2/} Tentative and subject to substantial change.

Source for Government Plan: Ministry of Transport, Highway Department, July, 1966.

Table 26: RAILROAD TRAFFIC AND EARNINGS, 1960-1965

Railroads	1960	1961	1962	1963	1964	1965
<u>1. Ferrocarriles Internacionales de Centro Americana</u> <u>(Guatemala Division)</u>						
Freight (thousands of metric tons)	923	803	729	779	732	624
Passengers (thousands)	2,000	1,771	1,648	1,766	1,744	1,593
Profit (loss) ^{1/} (U.S. \$ thousands)	(507)	(776)	(1,338)	(1,016)	(42) ^{2/}	(1,336) ^{2/}
<u>2. Ferrocarriles Internacionales de Centro America</u> <u>(El Salvador Division)</u>						
Freight (thousands of metric tons)	488	449	470	513	535	480
Passengers (thousands)	3,803	3,514	3,565	3,520	3,580	3,545
Profit (loss) (U.S. \$ thousands)	n.a.	n.a.	n.a.	n.a.	600	600
<u>3. Ferrocarriles de El Salvador</u>						
Freight (thousands of metric tons)	160	121	82	89	61	74
Passengers (thousands)	1,004	942	937	853	855	720
Profit (loss) (U.S. \$ thousands)	128	(22)	(266)	(147)	(226)	(323)
<u>4. Ferrocarril Nacional de Honduras</u>						
Freight (thousands of metric tons)	274	270	268	212	242	217
Passengers (thousands)	390	380	365	292	235	213
Profit (loss) (U.S. \$ thousands)	82	(24)	(171)	(61)	(50)	(0)
<u>5. Ferrocarril del Pacifico de Nicaragua</u>						
Freight (thousands of metric tons)	304	253	254	240	187	163
Passengers (thousands)	1,653	1,465	1,499	1,460	1,416	1,325
Profit (loss) (U.S. \$ thousands)	(259)	(152)	(87)	(44)	(97)	(98)

Table 26 (cont'd): RAILROAD TRAFFIC AND EARNINGS, 1960-1965

Railroads	1960	1961	1962	1963	1964	1965
<u>6. Ferrocarril Electrico al Pacifico, Costa Rica</u>						
Freight (thousands of metric tons)	348	367	368	380	402	361
Passengers (thousands)	705	697	700	735	731	725
Profit (loss) (U.S. \$ thousands)	124	209	125	155	204	192
<u>7. Northern Railway, Costa Rica</u>						
Freight (thousands of metric tons)	497	475	549	576	n.a.	n.a.
Passengers (thousands)	910	948	916	833	n.a.	n.a.
Profit (loss) (U.S. \$ thousands)	(136)	57	(22)	584	n.a.	n.a.

1/ Not clear whether this includes the profits of the El Salvador Division.

2/ Unofficial data from news reports.

Source: Individual Carriers and Government Statistical Bureaus.

Table 27: CENTRAL AMERICA: TRAFFIC AT PRINCIPAL PORTS ^{1/}, 1960-1965
(Thousand Metric Tons)

Ports	1960	1961	1962	1963	1964	1965
<u>Matias de Galvez</u>				179	247 ^{2/}	408 ^{2/}
Exports				94	106	78
Imports		NO PORT		85	141	330
<u>Barrios</u>	544	506	489	455	529	284
Exports	274	234	173	180	249	119
Imports	270	272	316	275	280	165
<u>Cortes</u>	525	610	495	480	523	682 ^{2/}
Exports	371	410	319	306	344	500 ^{3/}
Imports	154	200	176	174	179	182 ^{3/}
<u>Tela</u>	59	56	74	76	101	n.a.
Exports	2	5	14	16	18	n.a.
Imports	57	51	60	60	83	n.a.
<u>La Ceiba</u>	197	199	222	292	207	n.a.
Exports	157	163	178	232	161	n.a.
Imports	40	36	44	60	46	n.a.
<u>Limon</u>	318	353	423	442	427	441
Exports	110	131	162	178	179	212
Imports	165	178	207	210	195	186
Petroleum Imports	43	44	54	54	53	43
<u>Champerico</u>	55	61	50	84	107	96
Exports	19	21	27	54	54	60
Imports	36	40	23	30	53	36

Table 27 (cont'd): CENTRAL AMERICA: TRAFFIC AT PRINCIPAL PORTS, 1960-1965
(Thousand Metric Tons)

Ports	1960	1961	1962	1963	1964	1965
<u>San Jose</u>	<u>306</u>	<u>321</u>	<u>366</u>	<u>379</u>	<u>480</u>	<u>527</u>
Exports	21	25	35	52	149	72
Imports	285	296	331	327	331	455
<u>Acajutla</u>	<u>83</u>	<u>87</u>	<u>164</u>	<u>758</u>	<u>946</u>	<u>1,045</u>
Exports	31	28	52	252	276	357
Imports	52	59	112	506	670	688
<u>Cutuco</u>	<u>294</u>	<u>309</u>	<u>301</u>	<u>317</u>	<u>284</u>	<u>215</u>
Exports	87	113	113	144	138	115
Imports	207	196	188	173	146	100
<u>Amapala</u>	<u>55</u>	<u>68</u>	<u>73</u>	<u>80</u>	<u>102</u>	<u>n.a.</u>
Exports	42	55	56	62	85	n.a.
Imports	13	13	17	18	17	n.a.
<u>Corinto 2/</u>	<u>339</u>	<u>377</u>	<u>483</u>	<u>526</u>	<u>509</u>	<u>684</u>
Exports	156	154	237	261	286	442
Imports	59	87	115	159	206	227
Petroleum Imports	124	136	131	106	17	15
<u>Puntarenas</u>	<u>221</u>	<u>218</u>	<u>232</u>	<u>278</u>	<u>434</u>	<u>429</u>
Exports	32	23	15	22	94	45
Imports	117	107	107	136	167	234
Petroleum Imports	72	88	110	120	173	150
<u>Golfito</u>	<u>211</u>	<u>219</u>	<u>270</u>	<u>251</u>	<u>285</u>	<u>286</u>
Exports	175	174	204	187	219	218
Imports	22	28	49	44	44	38
Petroleum Imports	14	17	17	20	22	30

Table 27 (cont'd): CENTRAL AMERICA: TRAFFIC AT PRINCIPAL PORTS, 1960-1965
(Thousand Metric Tons)

Footnotes:

1/ Imports include petroleum unless otherwise listed. Considerable discrepancies exist between official Government import and export statistics and figures supplied by the ports themselves. For ports operated by private railroads, the information covers only the railroad's traffic which omits such items as banana and bulk petroleum movements through the ports. The most accurate information on traffic movements was obtained from the autonomous port authorities of Acajutla, Matias de Galvez and Corinto. Detailed statistics are also available for Puerto Cortes stemming from recent work of Bank appraisal missions investigating the need for expanding the facilities at that port.

2/ Fiscal years.

3/ Eleven months only.

Source : Port authorities and Government statistical offices.

Table 28: AIR TRAFFIC, LOAD FACTORS AND EARNINGS, 1960-1965

<u>1/</u> Airline	1960	1961	1962	1963	1964	1965
<u>AVIATECA (Guatemala)</u>						
Domestic Operations						
Passenger miles (million)	4.7	5.0	6.3	6.6	6.8	6.9
Passenger load factor (percent)	60.0	60.0	58.0	60.0	60.0	60.0
Freight ton miles (million)	1.2	0.6	0.5	0.4	0.5	0.6
International Operations						
Passenger miles (million)	12.1	11.1	8.4	10.1	11.3	25.2
Passenger load factor (percent)	55.0	55.0	53.0	55.0	58.0	58.0
Freight ton miles (million)	2.1	1.4	2.0	1.8	2.4	2.6
Profit (loss) (\$ thousand)	(197.0)	(177.0)	(17.0)	9.0	n.a.	n.a.
<u>2/</u> <u>TACA (El Salvador)</u>						
International Operations						
Passenger miles (million)	64.5	68.5	72.3	77.3	85.7	104.7
Passenger load factor (percent)	66.0	52.0	50.0	55.0	52.0	54.0
Freight carried (thousand tons)	2.8	2.4	2.7	3.0	3.3	3.4
Profit (loss) (\$ thousand)	(421.0)	(230.0)	(59.3)	281.7	525.2	623.7
<u>SAHSA (Honduras)</u>						
Domestic Operations						
Passenger miles (million)	17.2	17.2	17.6	18.5	20.4	21.8
Passenger load factor (percent)	42.0	44.0	48.0	50.0	51.0	46.0
Freight ton miles (million)	1.2	1.2	1.3	1.2	1.2	1.1

Table 28 (cont'd): AIR TRAFFIC, LOAD FACTORS AND EARNINGS, 1960-1965

<u>Airline</u> ^{1/}	1960	1961	1962	1963	1964	1965
<u>SAHSA (Honduras)</u>						
International Operations						
Passenger miles (million)	5.67	4.4	3.3	4.3	5.6	15.5
Passenger load factor (percent)	18.0	22.0	35.0	36.0	35.0	50.0
Freight ton miles (million)	0.3	0.3	0.2	0.2	0.3	0.6
Profit (loss) (\$ thousand)	(45.6)	(18.7)	153.6	196.0	203.0	263.9
<u>LANICA (Nicaragua)</u>						
Domestic Operations						
Passenger miles (million)	3.3	3.7	n.a.	4.0	n.a.	4.4
Passenger load factor (percent)	50.0	52.0	-	43.0	-	45.0
Freight ton miles (million)	0.3	0.3	n.a.	0.3	n.a.	0.3
International Operations						
Passenger miles (million)	4.1	6.8	n.a.	13.3	n.a.	16.8
Passenger load factor (percent)	28.0	28.0	-	44.0	-	50.0
Freight ton miles (million)	1.1	1.1	n.a.	7.5	n.a.	0.4 ^{3/}
Profit (loss) (\$ thousand)	288.4	274.8	102.6	n.a.	252.0	n.a.
<u>LACSA, (Costa Rica)</u>						
Domestic Operations						
Passenger miles (million)	9.8	9.0	8.4	8.6	7.9	7.3
Passenger load factor (percent)	58.0	-	53.0	54.0	46.0	54.0
Freight ton miles (million)	1.4	1.3	1.2	1.3	1.1	0.9

Table 28 (cont'd): AIR TRAFFIC, LOAD FACTORS AND EARNINGS, 1960-1965

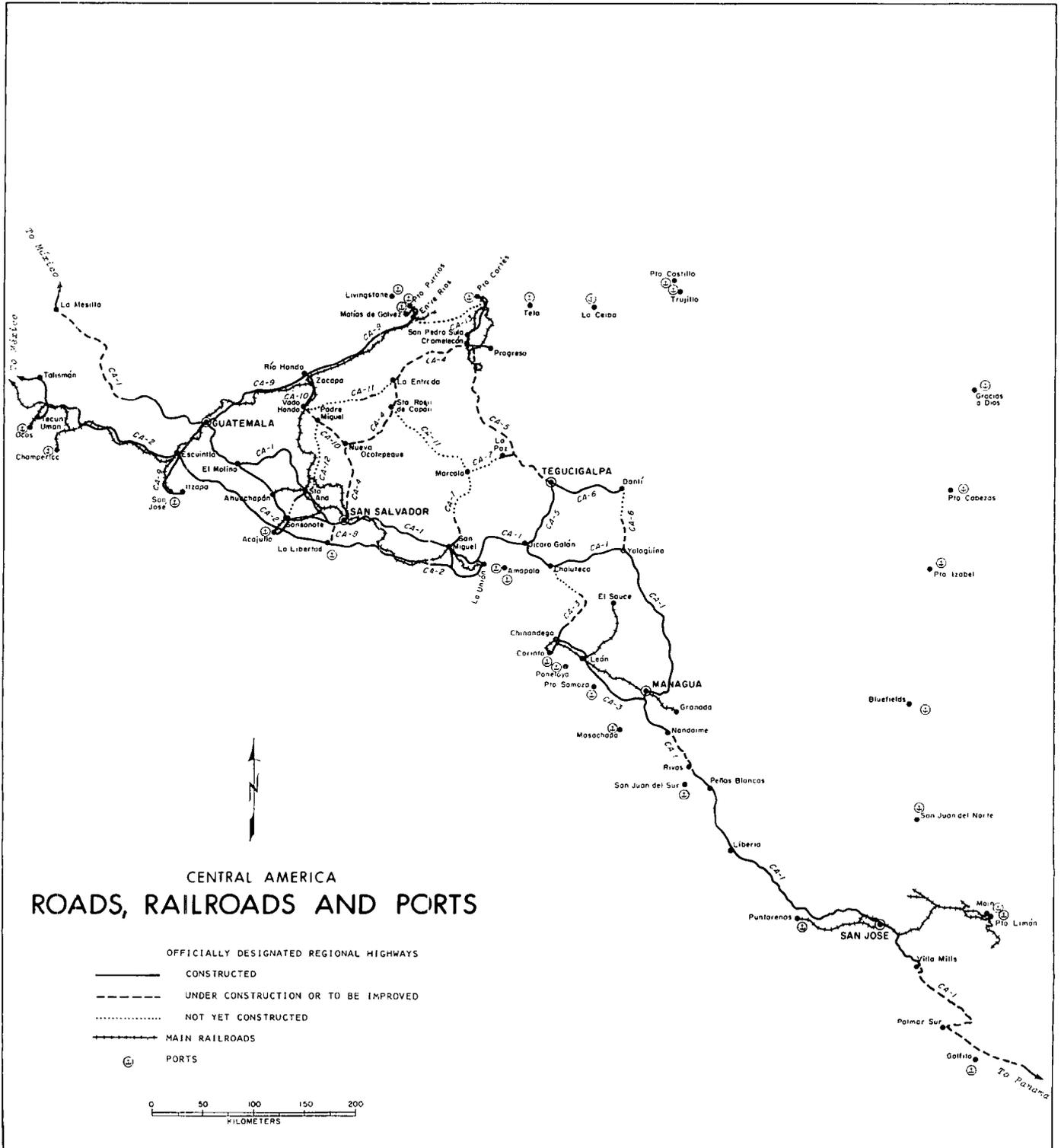
<u>1/</u> Airline	1960	1961	1962	1963	1964	1965
<u>LACSA, (Costa Rica)</u>						
International Operations						
Passenger miles (million)	20.2	21.5	24.6	30.0	31.4	40.0
Passenger load factor (percent)	50.0	-	55.0	55.0	56.0	65.0
Freight ton miles (million)	4.6	4.8	6.0	6.6	6.9	6.7
Profit (loss) (\$ thousand)	183.4	118.2	4.0	(13.3)	n.a.	n.a.

1/ Airline statistics are computed using nautical miles and short tons unless otherwise noted.

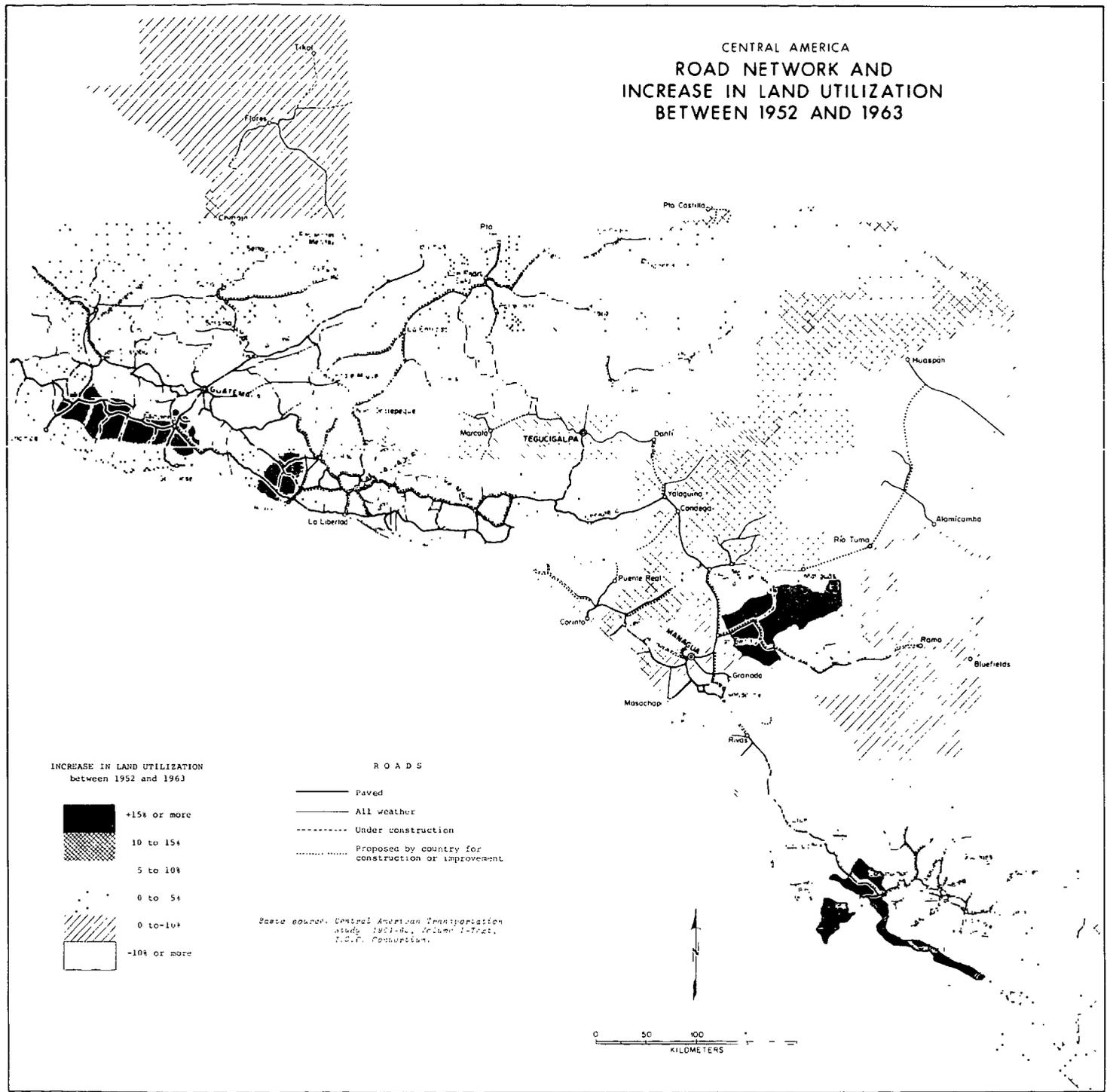
2/ TACA does not report Passenger or Freight ton miles to ICAO.

3/ Taken from ICAO statistics. Obviously this figure is not current.

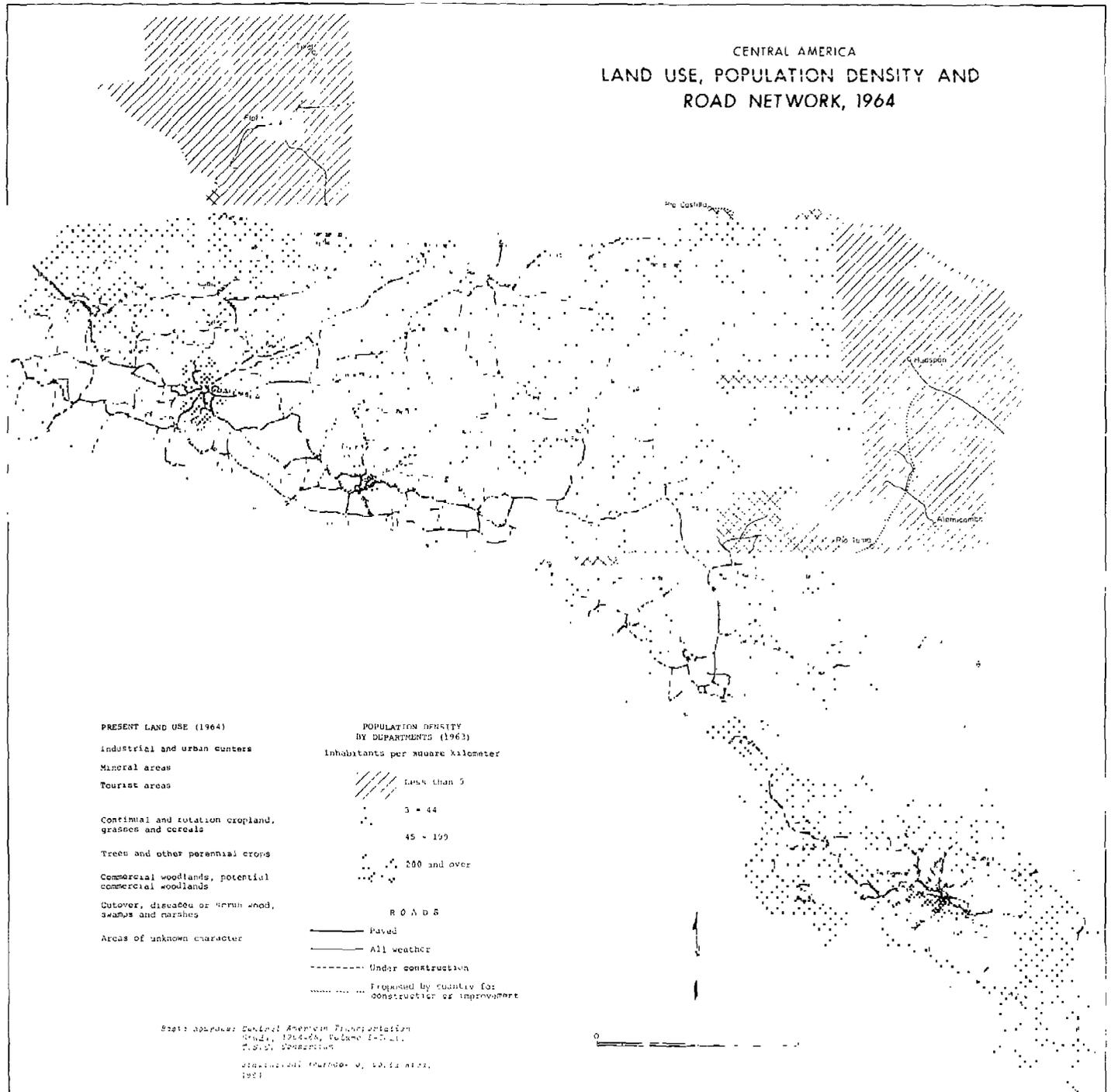
Source: Airlines and ICAO Statistics, Bulletin 113.



CENTRAL AMERICA
 ROAD NETWORK AND
 INCREASE IN LAND UTILIZATION
 BETWEEN 1952 AND 1963



CENTRAL AMERICA
 LAND USE, POPULATION DENSITY AND
 ROAD NETWORK, 1964



PRESENT LAND USE (1964)

- Industrial and urban centers
- Mineral areas
- Tourist areas
- Continual and rotation cropland, grasses and cereals
- Trees and other perennial crops
- Commercial woodlands, potential commercial woodlands
- Cutover, diseased or burnt wood, swamps and marshes
- Areas of unknown character

POPULATION DENSITY
 BY DEPARTMENTS (1963)

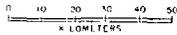
- Inhabitants per square kilometer
- Less than 5
 - 5 - 44
 - 45 - 199
 - 200 and over

- R O A D S
- Paved
 - All weather
 - Under construction
 - Proposed by country for construction or improvement

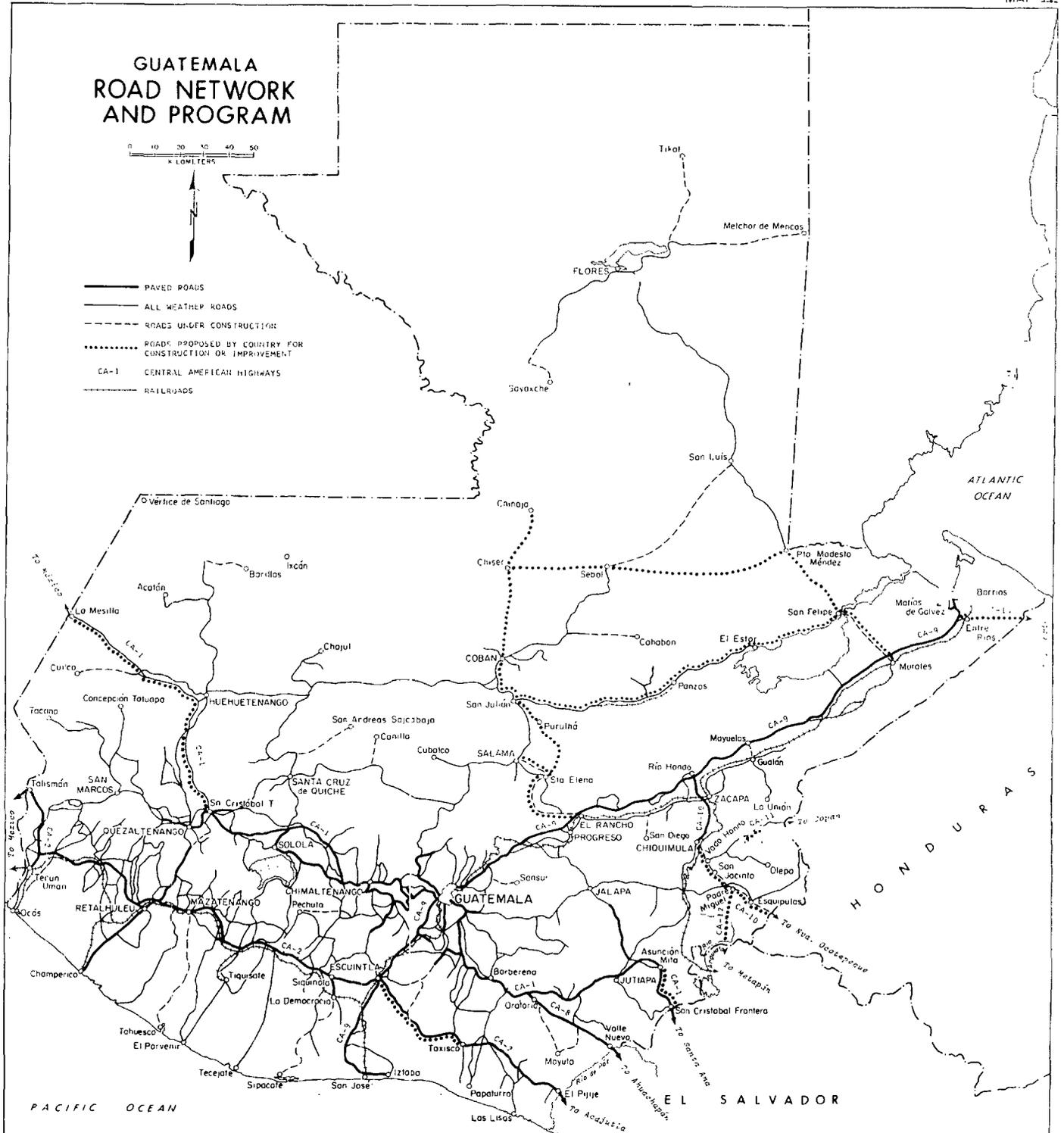
Scale: based on Central American Transportation Study, 1954-56, Volume I-1-1, T.O.S. Organization
 International Institute of Statistics, 1961

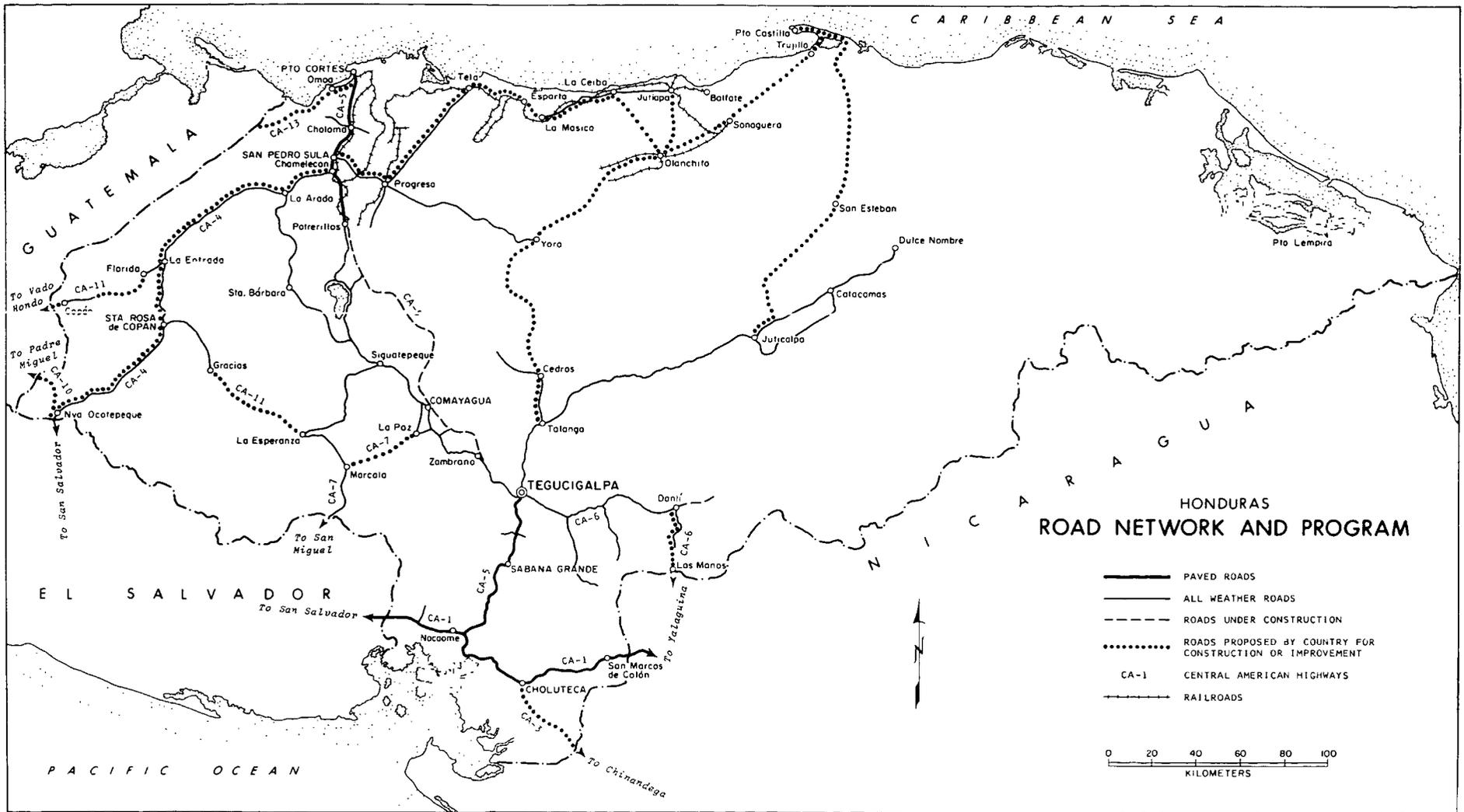


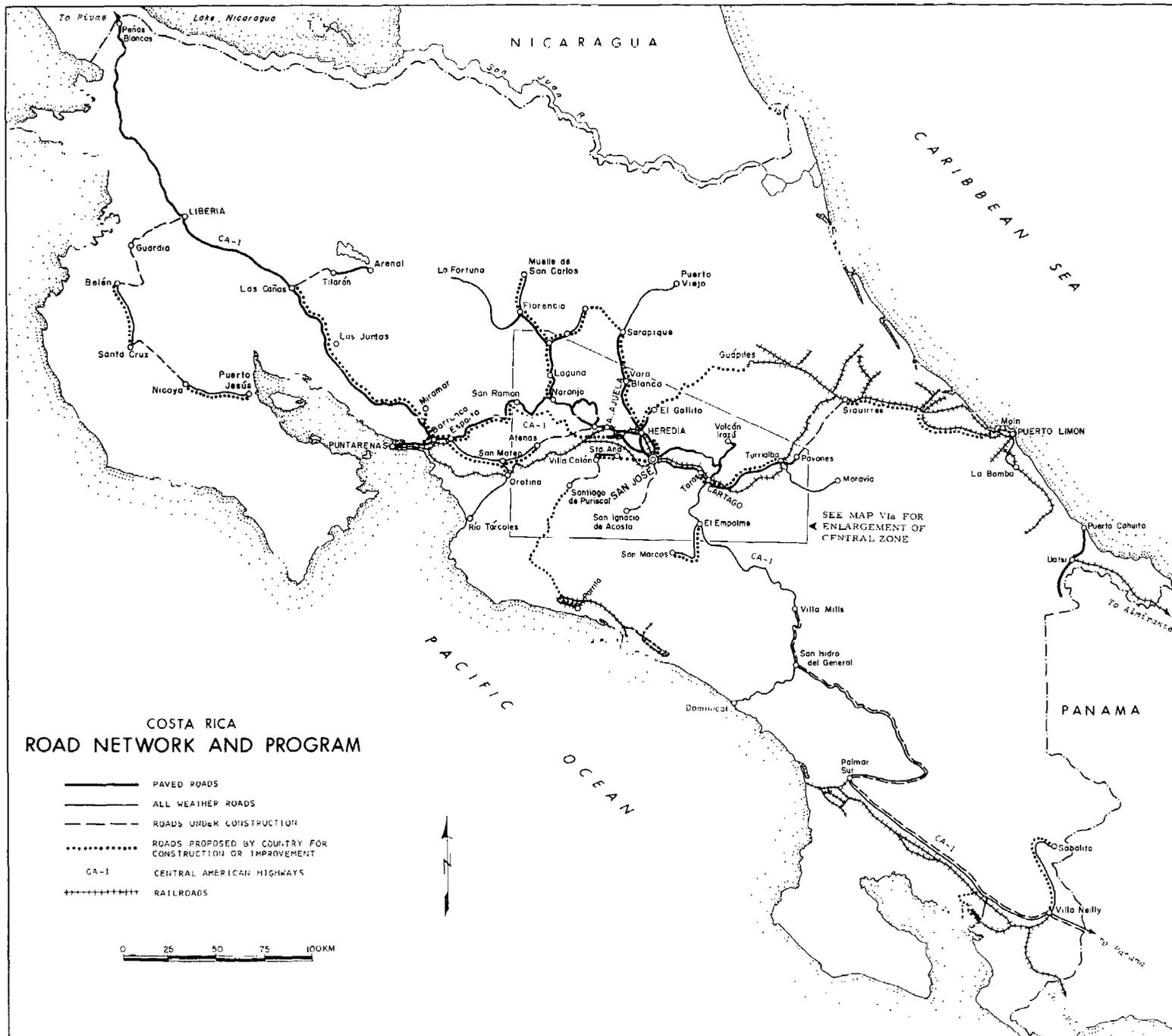
GUATEMALA ROAD NETWORK AND PROGRAM



- PAVED ROADS
- ALL WEATHER ROADS
- ROADS UNDER CONSTRUCTION
- ROADS PROPOSED BY COUNTRY FOR CONSTRUCTION OR IMPROVEMENT
- CA-1 CENTRAL AMERICAN HIGHWAYS
- RAILROADS







**COSTA RICA
ROAD NETWORK AND PROGRAM
CENTRAL ZONE & METROPOLITAN SAN JOSE**

- PAVED ROADS
- ALL WEATHER ROADS
- - - ROADS UNDER CONSTRUCTION
- ROADS PROPOSED BY COUNTRY FOR CONSTRUCTION OR IMPROVEMENT
- CA-1 CENTRAL AMERICAN HIGHWAYS
- +—+—+ RAILROADS

