Project to Strengthen Capacities in the Elaboration of Regional Master Plan for Mobility and Logistics for Sustainable Regional Development in the Framework of Central American Economic Integration

Appendix 10

Urban Logistics Sector

November 2023

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Project to Strengthen Capacities in the Elaboration of Regional Master Plan for Mobility and Logistics for Sustainable Regional Development in the Framework of Central American Economic Integration

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Urban Logistics Sector

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10.1 Regulation and Organization

10.1.1 Regulation and Technical Standards

International road freight transport within Central America is authorized to national carriers in the origin and destination countries. Central American agreement for road transport regulates the standard of dimension and weight of trucks.

Following the regional regulation and agreement, each country has been improving the regal and regulatory system. Table 10.1.1 shows the laws and regulations related to the urban logistics sector in each country.

It should be noted that truck cabotage is not allowed in Central America. To protect transport operators in each country, it is important. On the other hand, EU countries delegated those regulations to further efficient transport services. Honduras and Panama established the special organizations which facilitate cross-sectorial issues on urban logistics sector.

Table 10.1.1 Laws and Regulation Related to Urban logistics sector in Central America

Country	Instrument	Situation
GTM	Traffic Law (Decree No. 132-96)(1996)	This law covers the general aspects related to traffic control such as vehicle regulation, drivers' licenses, parking, signals, traffic regulation, public light and, etc. There are rules for cargo urban circulation that have been established to contain the congestion problems during the rush hour, but this increases the transportation costs because there is no beltway.
SLV	Land Transportation, Traffic and Road Safety Law (Decree No. 477)	This law covers traffic and road safety aspects which includes the dimension of vehicles.
HND	Road Transport Law (Decree 319-76)	Regulating the road cargo transport service including provisions on tariffs, operating permits and allocates powers for its regulation.
	Traffic Law (Decree 205-2005)	To regulate the use and circulation of motor vehicles in the national territory, including transport cargo terminals.
	Weights and Dimensions Regulation	In process of approval. Establishes regulations on weights and dimensions of vehicles for passenger and cargo transport through the official road network.
	Logistics Services Law (preliminary draft in preparation)	Defining cargo logistics, regulates management of cargo transport and logistics services, provides the institutional framework for the sector.
	National Logistics Council Law (Decree 053-2018)	Creating the National Logistics Council (CNL) which facilitate the relevant organizations related to the logistics activities.
NIC	General Land Transportation Law - LGTT (Law 524, Gazette No.72 of 04/22/2005)	Transport service standard land of people and goods. Establishes the MTI as a regulatory entity of the cargo transport sector.
	Reform of the General Land Transport Law - LGTT (Law 616, Gazette No.84 of 05/07/2007)	Reform provisions on cargo transportation, competition, concessions, certificates of operation, service fees and authorizations and sanctions.
	LGTT Regulation (Decree No. 42-2005)	Establishes administrative and technical dispositions for better understanding and application of the LGTT.

Country	Instrument	Situation
	Reform to LGTT Regulation (Decree No. 43-2006)	Modifies provisions for cargo transport vehicles, technical regulations on weights and measures, among others.
CRC	Regulation of the Automotive Transport of Local Cargo (No.15624-MOPT)	This regulation is covering the local freight transport services. Only Costa Rican nationals or enterprises may supply motorized transportation services between two points within the territory of Costa Rica besides the transit cargo.
	Road Traffic Regulations based on the Weight and Dimensions of Cargo Vehicles.(No. 31363-MOPT)	To regulate the technical and legal mechanisms for the control of cargo vehicles.
PNM	Regulation of Weight and Dimensions (No. 10 24/1/1989)	To regulate the dimension and weight of trucks and establish penalties.
	Regulation of Cargo Transport (No.51 28/6/2017, No.229 2018)	To regulate the cargo transportation by road and modifies the vehicle traffic regulations. Only vehicles with a Panamanian license plate can transport cargo of merchandise and / or materials, whose origin and destination is within the national territory (cabotage cargo).
	Creation of Logistics Cabinet (No. 90 18/5/2012)	Creating the Logistics Cabinet of Panama (LCP) which facilitate the relevant organizations related to the logistics activities.

Source: JST

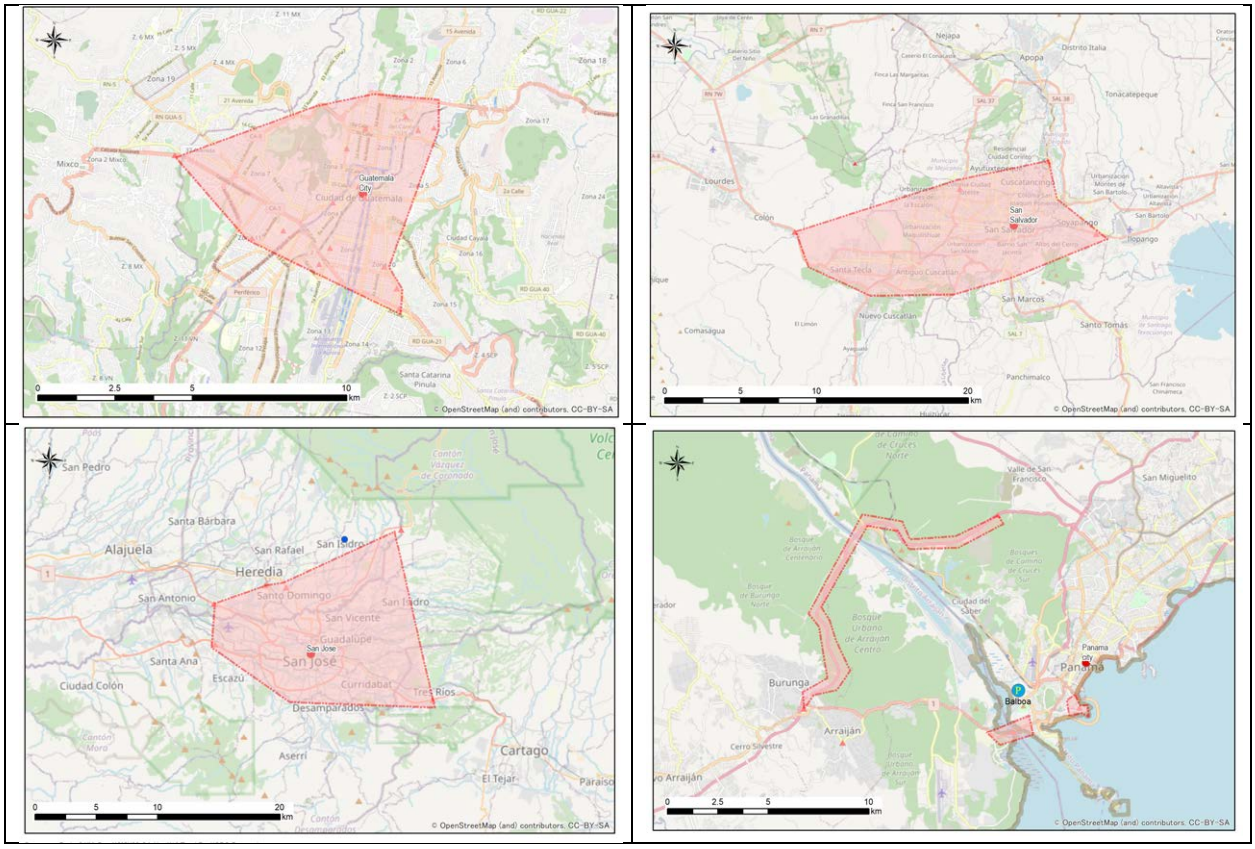
Besides the above national regulations, most of the countries ban trucks entering major cities during the peak hour (Table 10.1.2). The truck ban policy contributes to improve traffic safety and congestion in the urban area. However, trucks take a long time to pass through the city area since trucks have to wait until the non-regulated hour and there are no bypass routes in most of the cities.

Table 10.1.2 Truck Ban Regulation

Country	Location	Notes	Restriction detail
GTM (Metropolitan Area)	Bulevar los Próceres, Bulevar Liberación, Avenida La Castellana, 5a. calle, zona 9, 5a. avenida, zona 9, 6a. avenida, zona 9, 24 calle, zona 4, Avenida Bolívar, zona 1, 20 calle, zona 1, Avenida Elena, 2a. calle, zona 1, 3a. avenida, zona 1, 4a. calle, zona 1, Avenida Juan Chapín, entre zona 1 y zona 2, 12 avenida, zona 1, 6a. avenida, zona 10, Diagonal 6		Monday - Friday 5am - 9am and 4:30pm - 9 pm
SLV (San Salvador Metropolitan Area)	Los Chorros Highway (CA1) San Salvador Road to the West, Constitution Boulevard, El Ejercito Boulevard, Carretera Troncal del Norte, (CA4) San Salvador a Zona Norte		5am - 8am and 4pm - 8pm
CRC (San Jose Metropolitan Area)	Bernado Soto, General Canas, Florencio del Castillo, Radial de Heredia, Santo Domingo de Heredia-Tibas, Autopista Prospero Fernandez, Carretera Braulio Carrillo	During holidays and festivities: 2pm-9pm	Monday - Friday 6am - 8am and 4:30pm - 6:30pm

Country	Location	Notes	Restriction detail
PNM (Panama Metropolitan Area)	Freeway Arraiján-La Chorrera- Vía Centenario		5am - 8am
	Casco Antiguo (Old Town in Panama City)	Vehicles of more than 7 tons and with dimensions greater than seven (7) meters long, two (2) meters wide and two point seventy-five (2.75) meters high inside	Forbidden
		Loading and unloading of goods	9am - 11am and 3pm - 5pm
	Bridge of the Americas	Cargo vehicles and heavy equipment that exceed 10 tons	Forbidden

Source: JST



Source: JST

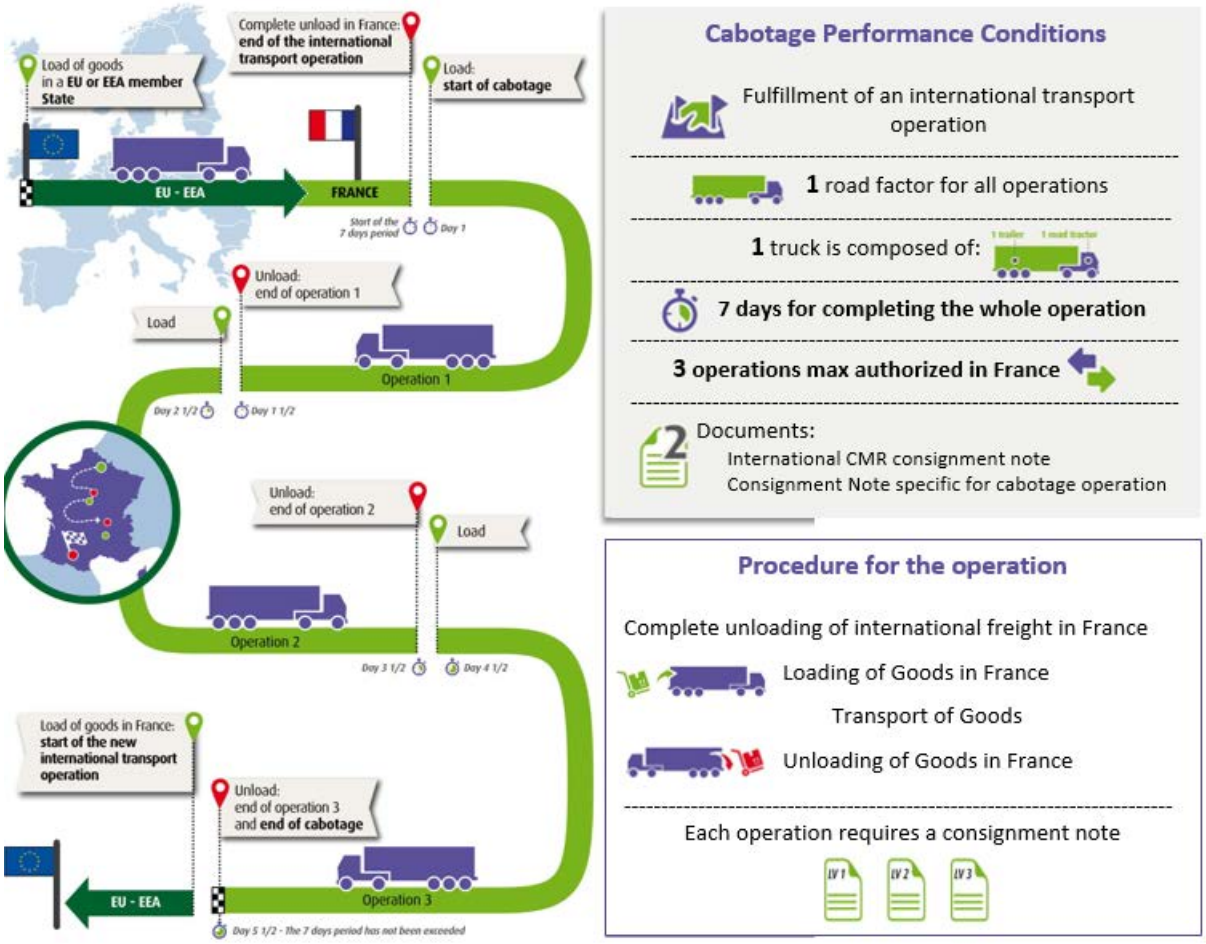
Figure 10.1.1 Truck Ban Area

Top Left: Guatemala, Top Right:San Salvador, Lower Left:Costa Rica, Lower Right: Panama city

BOX 1: Truck Cabotage in France

Cabotage is any type of road freight trans-port between two points within a given country, which is carried out by a non- resident foreign carrier. Foreign companies, legally established in a member state of the European Union or of the European Economic Area are authorised to carry out cabotage operations in France subject to certain conditions. The regulation‘s provisions aim to reduce the number of empty journeys by authorising cabotage operations as part of longer international transport operations.

In France, maximum 3 operations are authorized.



Source: Freight Cabotage Transport: the Franch Regulation (Ministry of the Einvironment, Energy and the Sea)

10.1.2 Organization and Human Resources

(1) Central America

a) CLI

Intersectoral Logistics Commission (CLI) consists of the Directors of Central American Economic Integration (COMIECO), the Directors of Public Credit and Investments (COSEFIN), the Directors of the Central American Customs Committee and the National Technical Mobility and Logistics Commissioners (COMITRAN), and the Regulatory Enhancement Agency (OMR) in each country. CLI coordinates the technical implementation of the Mobility and Logistics Regional Framework Policy (PMRML), while COMIECO was created to remove bureaucratic procedural obstacles and regulatory and administrative processes hindering both operations and the opening of new businesses in the country.

b) CCIE

Consultative Committee for Economic Integration (CCIE) is the representative body of the Central American private sector organized regionally, within the framework of the economic integration subsystem, linked to SIECA according to the provisions of Article 49 of the Guatemala Protocol and related to the Consultative Committee provided for in Article 12 of the Tegucigalpa Protocol.

The CCIE is made up of 19 Federations of the regional private sector such as Central American Transportation Federation (FECATRANS) and, Central American Federation of Freight and Logistics Agencies (FEDECARGA).

(2) Guatemala

The following table shows the institutions related to the logistics sector in Guatemala. These institutions were convened to formulate the PENLOG in Guatemala. It should be noted that there are no cross sectorial institutions on the urban logistics sector besides CLI such as a logistics cabinet in Panama, CNL in Honduras and AIML in El Salvador.

Table 10.1.3 Institutions Related to Urban logistics sector in Guatemala

Public Institutions	Private Institutions
Agencia Nacional de Allianz's para el Desarrollo de Infraestructura Económica (ANADIE)	Asociación de Azucareros de Guatemala (ASAZGUA)
Asociación Nacional de Municipalidades (ANAM)	Asociación para el Desarrollo Económico y Social de Aeropuertos y Puertos (COMBEX IM)
Congreso – Comisión Económica y Agrícola	Asociación de Exportadores de Guatemala (AGEXPORT)
Consejo Económico Social	Asociación de la Industria de Vestuario y Textiles (VESTEX)
Comisión Portuaria Nacional	Asociación Guatemalteca de Líneas Aéreas
Ferrocarriles (FEGUA)	Asociación Nacional del Café (ANACAFE)
Fundación para el Desarrollo de Guatemala (FUNDESA)	Asociación de Navieros (ASONAV)
Instituto Guatemalteco de Turismo (INGUAT)	Asociación de Transportistas Internacionales (ATI)
Invest in Guatemala	Asociación de Zonas Francas
Ministerio de Agricultura, Ganadería y Alimentación (MAGA)	BASC
M. de Comunicaciones, Infraestructura y Vivienda (MICIVI)	Cámara de Comercio de Guatemala
Ministerio de Economía (MINECO)	Cámara del Agro (CAMAGRO)
Ministerio de Gobernación	Cámara de Industria de Guatemala (CIG)
Ministerio de Relaciones Exteriores (MINEX)	Cámara de Transportistas Centroamericanos (CATRANSCA)
Ministerio de Salud Pública y Asistencia Social (MSPAS)	Cámara de Turismo de Guatemala (CAMTUR)
PRONACOM	Consejo de Usuarios del Transporte Internacional de Guatemala (CUTRIGUA)
Superintendencia de Administración Tributaria (SAT)	Comité Coordinador de Asociaciones Agrícolas, Comerciales, Industriales y Financieras (CACIF)
Ventanilla Única para las Exportaciones (VUPE)	Federación de Auxiliares de la Función Pública
	Gremial de Logística de la Cámara de Industria
	Programa de Agregados Comerciales De Guatemala (PACIT)

Source: JST

(3) El Salvador

Under the CLI in El Salvador, two organizations were created, namely, Integrated Mobility and Logistics Authority (AIML) and the Mobility and Logistics Advisory Committee (CCML). AIML is responsible for coordinating inter-institutional efforts and promoting consultation. The CCML will mainly work on technical advisory activities. This organization will report to the highest executive level in the country. The following table shows the institutions related to the urban logistics sector in El Salvador.

Table 10.1.4 Institutions Related to Urban logistics sector in El Salvador

Public Institutions	Private Institutions
Institution for the Promotion of Export and Investment of El Salvador (PROESA)	Sugar Association of El Salvador
Civil Aviation Authority (AAC)	Customs Agents Association of El Salvador (ASODAA)
Maritime Port Authority (AMP)	Asociación de Distribuidores de El Salvador (ADES)
Central Bank of the Reserve (BCR)	Asociación de lndustriales Químico-Farmacéuticos de El Salvador (INQUIFAR)
Autonomous Executive Port Comission (CEPA)	Asociación Salvadorena de Líneas Aéreas (ASLA)
Superior Council of Cargo Land Transport (in the process of creation)	Asociación del Transporte Internacional por Carretera (ASTIC)
Customs General Direction (DGA)	Asociación de Representantes de Empresas Navieras y Empresas Portuarias (ARENEP)
Migration and Foreign Affairs General Direction (DGME)	Asociación Nacional de la Empresa Privada (ANEP)
Road Preservation Fund (FOVIAL)	Asociación Salvadorena de Empresarios del Transporte de Carga (ASETCA)
Municipal Governments	Asociación Salvadorena de Industriales (ASI)
Ministry of Agriculture and Livestock (MAG)	Asociación Salvadorena de la Industria del Plástico (ASIPLASTIC)
Ministry of Environment and Natural Resources (MARN)	Cámara Americana de Comercio de El Salvador (AMCHAM)
Ministry of Economy (MINEC)	Cámara Cosmética Salvadorena (CCS)
Ministry of Interior and Territory Development (MINGOB)	Cámara de Comercio e Industria de El Salvador (CAMARASAL)
Ministry of the Treasury (MH)	Cámara de la Industria Textil, Confección y Zonas Francas de El Salvador (CAMTEX)
Ministry of Public Works, Transport, Housing and Urban Development (MOPTVDU)	Cámara Agropecuaria y Agroindustrial de El Salvador (CAMAGRO)
Technical and Planning Secretariat of the Presidency (SETEPLAN)	Comisión Intergremial para la Facilitación del Comercio (CIFACIL)
	Comisión Nacional de la Micro y Pequena Empresa (CONAMYPE)
	Consejo Salvadoreno del Café (CSC)
	Corporación de Exportadores de El Salvador (COEXPORT)
	Fondo del Milenio de El Salvador II (FOMILENIO)
	Fundación Salvadorena para el Desarrollo Económico y Social (FUSADES)

Source: JST

(4) Honduras

In Honduras, the National Logistics Council, CNL, was created under the office of Presidency with executive Decree PCM 053-2018. CNL is the governing body of the logistics development policy, contributing to the processes carried out with the private sector for the economic development and improvement of the competitiveness of the Country.

Besides the CNL, following institutions are related to the urban logistics sector in Honduras.

Table 10.1.5 Institutions Related to Urban logistics sector in Honduras

Public Institutions	Private Institutions
Office of the Presidency	Cargo Carriers Association of Honduras (ATCH)
Productive Infrastructure Cabinet Sectorial Secretariat (INSEP)	International Cargo and Logistics Agencies Association of Honduras (AHACI)
Economic Development Secretariat (ProHonduras)	Honduran Association of Shipping Companies and Agents (AHCORENA)
Office of the Presidency Secretariat	Maquila Honduran Association (AHM)
Merchant Marine General Directorate	National Association of Couriers of Honduras
Land Use General Directorate (DGOT)	Tegucigalpa Chamber of Commerce and Industry (CCIT)
Presidential Commission for Customs Systems and Trade Operators Comprehensive Reform (COPRISAO)	CATRACHO Transport Chamber
Customs Revenue Deputy Director	Private Enterprise Honduran Council (COHEP)
National Port Company (ENP)	DINANT Corporation
Industry and Trade Secretariat (SIC)	DOLE
Agriculture and Livestock Secretariat	Agricultural Exporters Association of Honduras (FPX)
Revenue Administration Service	Customs Agents National Federation of Honduras (FENADUANAH)
Roads General Directorate	Central American Port Operator - Honduras (OPC)
Honduras Land Transport Institute (IHTT)	Seaboard Honduras
Transit National Directorate (DNT)	TRANYCOP
Honduras National Railroad	
National Defense Secretariat (SEDENA)	
Civil Aviation General Directorate	

Source: JST

(5) Nicaragua

The following table shows the institutions related to the urban logistics sector in Nicaragua. It should be noted that there are no cross sectorial institutions on the urban logistics sector besides CLI such as a logistics cabinet in Panama.

Table 10.1.6 Institutions Related to Urban logistics sector in Nicaragua

Public Institutions	Private Institutions
National Planning, Investments, Budget, and Cooperation Commission	Association of Producers and Exporters of Nicaragua (APEN)
Institutional Planning, Investments, Budget, and Cooperation Committees	Export Office (OFEX)
Institute of Rural Development	Nicaraguan Chamber of Commerce and Services (CCSN)

Public Institutions	Private Institutions
National Institute for Territorial Studies (INETER)	Nicaraguan Chamber of Industry (CADIN)
Nicaraguan Institute of Municipal Development (INIFOM)	Higher Council of Private Business (COSEP)
Ministry of Finance and Public Credit	Nicaraguan National Chamber of Tourism (CANATUR-Nicaragua)
General Directorate of Public Investments	Nicaraguan Chamber of Micro, Small and Medium Tourist Company (CANTUR)
Secretariat of the Presidency	Nicaraguan Association of the Textile and Clothing Industry (ANITEC)
Directorate-General of Planning	National Corporation for Free Zones (CNZF)
Nicaraguan Investment and Export Promotion Agency (Pro Nicaragua)	National Reforestation Association (CONFOR)
Production Development Bank (BFP)	Arlen Siu Port Administration
Export Processing Center (CETREX)	Sandino Port Administration
Ministry of Promotion, Industry and Trade	Port Administration of San Juan del Sur
National Institute of Agricultural Technology (INTA)	Nicaraguan Association of Shipping Agents
Nicaraguan Institute of Fisheries and Aquaculture (INPESCA)	Nicaraguan Courier Association (ASCONIC)
Nicaraguan Institute of Agricultural Technology (INTA)	Association of Airlines (ALA)
Ministry of Transport and Infrastructure (MTI) - General Planning Directorate	International Airport Management Company (EAAI)
Road Maintenance Fund (FOMAV)	Association of Customs Agents and Managers of Nicaragua
General Directorate of Land Transport (DGTT) Private sector	Nicaraguan Association of Cargo Agencies (ANAC)
Nicaraguan Carriers Association (ATN)	Nicaraguan Association of Shipping Agents (ANAN)
Federation of Cargo Carriers of Nicaragua (FETRACANIC)	Nicaraguan Chamber of Customs Agents and Warehousemen (CADAEN)
National Port Enterprise (EPN)	Universities and private education and training centers
Autonomous Region of the North Caribbean Coast (RACCN)	Regional Authorities
Autonomous Region of the South Caribbean Coast (RACCS)	Association of Professional Customs Agents of the Americas (ASAPRA)
Nicaraguan Institute of Civil Aeronautics (INAC)	Central American Federation of Cargo Carriers (FECATRANS)
National Commission of Free Zones (CNZF)	Organismo Internacional Regional de Sanidad Agropecuaria (OIRSA)

Source: JST

(6) Costa Rica

The following table shows the institutions related to the urban logistics sector in Costa Rica. These institutions were convened to formulate the PNLOG in Costa Rica. It should be noted that there are no cross sectorial institutions on the urban logistics sector besides CLI such as a logistics cabinet in Panama.

Table 10.1.7 Institutions Related to Urban logistics sector in Costa Rica

Public Institutions	Private Institutions
Presidential Council for Competitiveness and Innovation (CPCI)	Costa Rican Logistics Association (ACL)
Ministry of Agriculture and Livestock (MAG)	Costa Rican Chamber of Importers, Distributors and Agents (CRECEX)
Ministry of Foreign Trade (COMEX)	Cargo Carriers National Chamber (CANATRAC)

Public Institutions	Private Institutions
Ministry of Economy, Industry, and Trade (MEIC)	Competitiveness Promotion Council (CPC)
Ministry of Public Education (MEP)	Costa Rican Union of Chambers and Associations of the Private Business Sector (UCCAEP)
Ministry of Finance (Customs General Directorate)	
Ministry of National Planning and Economic Policy (MIDEPLAN)	
Ministry of Public Works and Transportation (MOPT)	
Foreign Trade Promotion Agency (PROCOMER)	
Costa Rican Railroad Institute (INCOFER)	
Pacific Ports Costa Rican Institute (INCOP)	
Port Administration and Economic Development Board for the Atlantic Coast (JAPDEVA)	

Source: JST

(7) Panama

In Panama, Logistics Cabinet, the intersectorial institution on logistics, was formulated in 2012 based on presidential degree No. 90. The following table shows the institutions related to the urban logistics sector in Panama. The listed institutions for the public sector are the members of the Logistics Cabinet.

Table 10.1.8 Institutions Related to Urban logistics sector in Panama

Public Institutions	Private Institutions
Ministry of the Presidency	Association of Cargo Agents of Panama
National Maritime Authority (AMP)	Exporters Panamanian Association
Customs National Authority (ANA)	Association of Cargo Carriers of Panama
Transit and Land Transport Authority of Panama (ATTT)	Panama Maritime Chamber
Panama Canal Authority (ACP)	International Cargo National Chamber
Ministry of Foreign Affairs	Panamanian Chamber of Technology and Communications
Ministry of Trade and Industry (MICI)	Competitiveness National Council
Ministry of Public Work (MOP)	Business Logistics Council
Ministry of Economy and Finance	Copa Airlines
Colon Free Zone Administration Office	Crowley
Tocumen, S.A.	Manzanillo International Terminal
Ministry of Housing and Land Management (MIVIOT)	Panamá Pacífico (London Regional)
Civil Aviation Authority (AAC)	Panama Ports Company (PPC)
National Secretariat for Science, Technology and Innovation (SENACYT)	University of the Caribbean
Secretary of Metro	Pontificia Universidad de Valparaíso
	Colon Free Zone User Association
	Colliers International
	U.S.-Panama American Chamber of Commerce (AMCHAM)
	Association of Free Zones of Panama
	Customs Brokers National Union of Panama

Source: JST

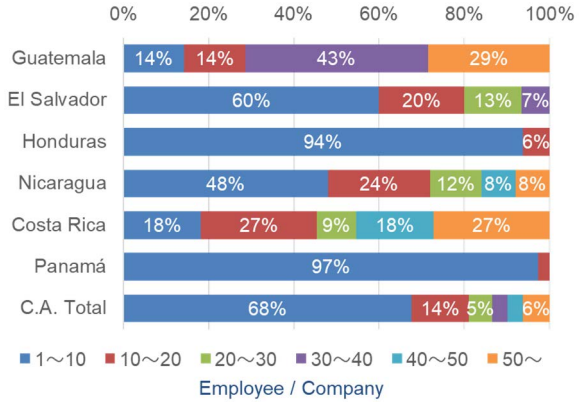
(8) Transport Operators (Trucking Companies)

To understand the current business condition of cargo transport operators in Central America, an interview survey has conducted to private trucking companies in this study. The following sections describe the preliminary result of the survey as of June 2021.

a) Employment

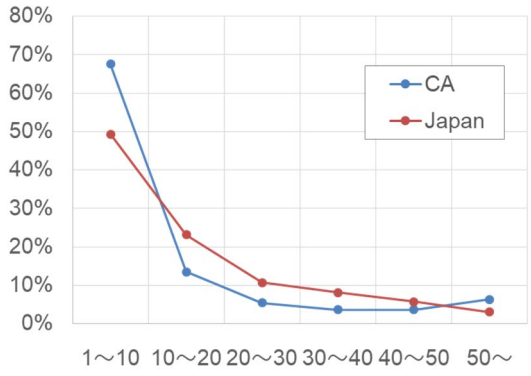
Figure 10.1.2 shows the distribution of number of employees in each company by country, 68% of interviewed companies are small companies which have less than 10 employees.

Compared with Japan, the share of small companies is high.



Source: JST based on the interview survey for transport operators

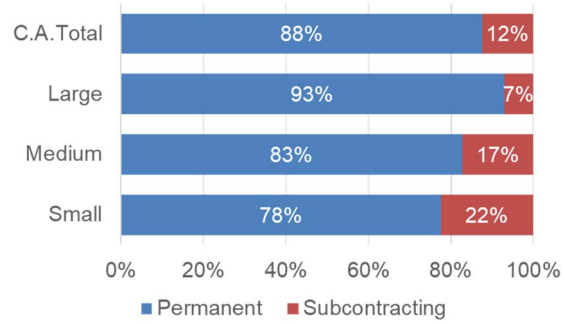
Figure 10.1.2 Distribution of Number of Employees by Country



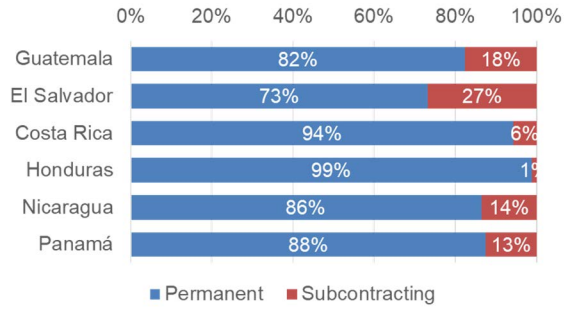
Source: JST based on the interview survey for transport operators

Figure 10.1.3 Comparison of Numer of Employees between Central America and Japan

The following figures show distribution of drivers by employment status. 88% of drivers are directly employed. Outsourcing rate of small companies[1] is slightly higher than medium and large companies (Figure 10.1.4). The outsourcing rate is slightly lower in Honduras (Figure 10.1.5).



Source: JST based on the interview survey for transport operators



Source: JST based on the interview survey for transport operators

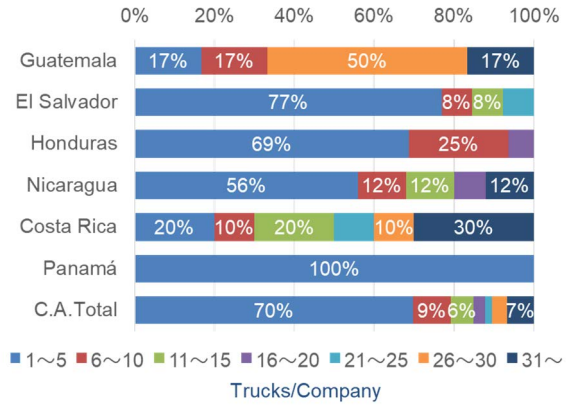
[1] Large firms: More than 20 vehicles. Medium firms: between 5 and 20 vehicles. Small firms: less than 5 vehicles

Figure 10.1.4 Distribution of Drivers by Employment Status by Company Size

Figure 10.1.5 Distribution of Drivers by Employment Status by Country

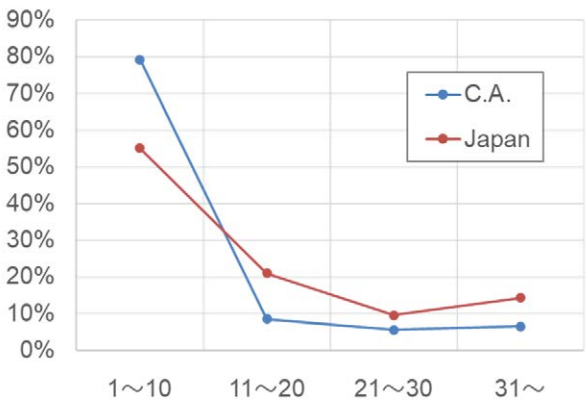
b) Company Size

70% of interviewed companies are small companies which own less than 6 trucks as shown in Figure 10.1.6. Compared with Japan, the share of small companies is high (Figure 10.1.7).



Source: JST based on the interview survey for transport operators

Figure 10.1.6 Distribution of Number of Trucks of Each Company by Country

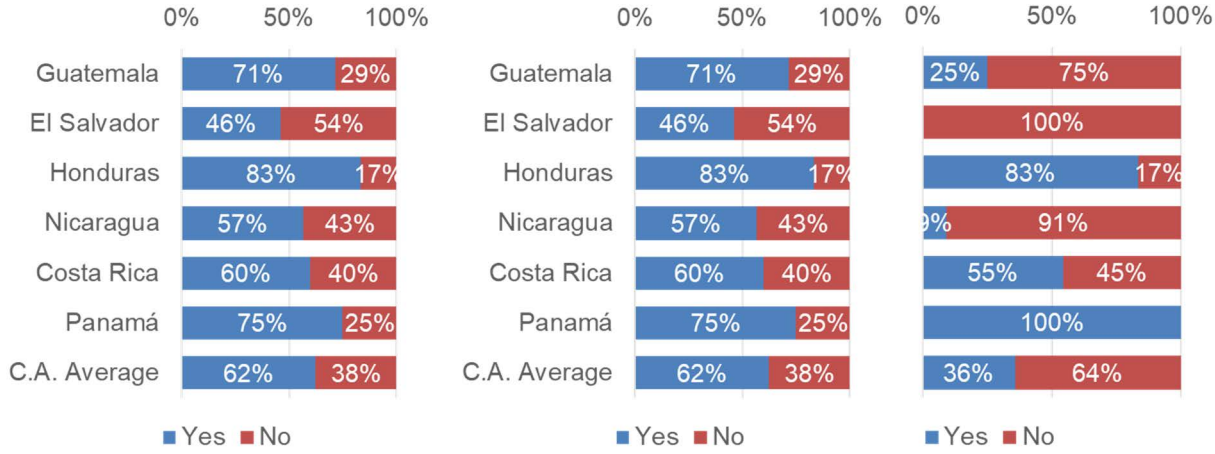


Source: JST based on the interview survey for transport operators

Figure 10.1.7 Comparison of Number of Trucks in Each Company between Central America and Japan

c) Training

To improve the skills and knowledges of drivers on driving and customs procedures, trucking companies are providing training programs. Figure 10.1.8 shows the status of training implementation by subject by country. Driving safety is the primary training program by trucking companies. Training for custom clearance and quarantine is popular in Honduras and Panama.



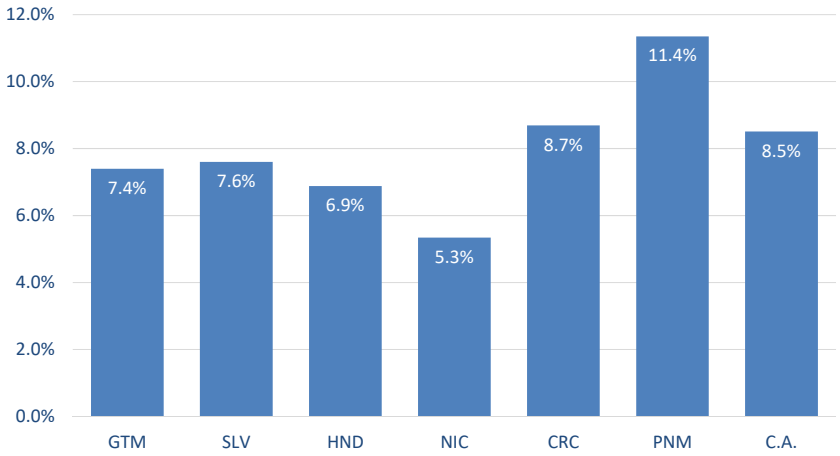
Source: JST based on the interview survey for transport operators

Figure 10.1.8 Implementation Status of Training Program for Driving Safety(Left), Custom Clearence (Middle) and Quarantine (Right)

10.2 Transport Business

10.2.1 General

Figure 10.2.1 shows the contribution of the transport sector in the national GDP in each country. As shown, the transport sector is playing a key role in economic activities in Central America.

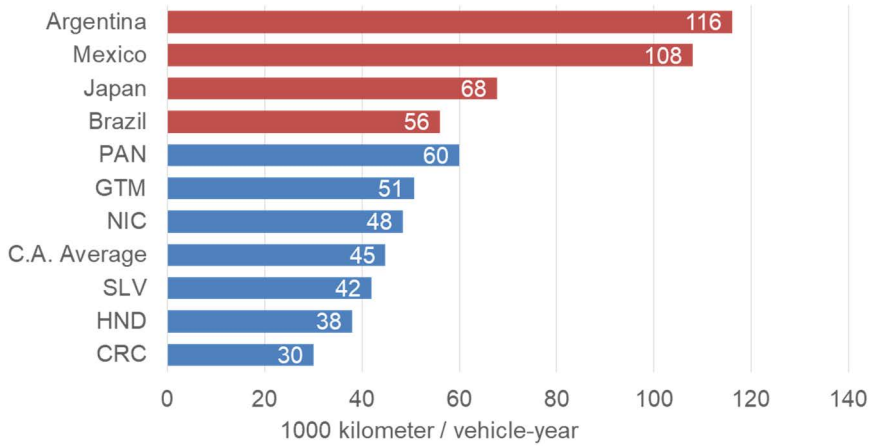


Source: CECMCA
*Remarks: Including transport, storage and communications as of 2017

Figure 10.2.1 Contribution of Transport Sector in GDP

10.2.2 Freight Transport Cost

Figure 10.2.2 shows the annual average transport distance per vehicle in each country. Compared to other countries, the average transport distance in Central America is short. It implies that there is room to improve the operational efficiency.



Source: Automotive Freight Transportation in Latin America and MLIT Japan

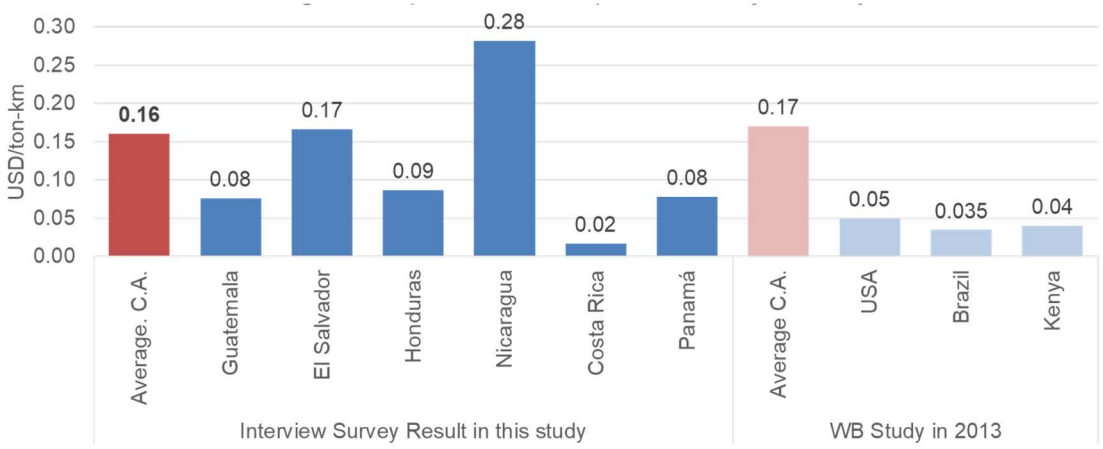
Figure 10.2.2 Annual Average Freight Transport Distance per Vehicle

(1) Average Freight Transport Price

A World Bank (WB) study in 2013 pointed out the transport cost in Central America is higher than other regions (17 cent/ton-km). Also, it is pointed out that the key issue is the time to cross the border points.

In this study, an interview survey on the cost was conducted for trucking companies. As a result, the average

freight transport price in C.A. is estimated at 16 cent/ton-km, which is similar to the cost in the WB study as shown in Figure 10.2.3.

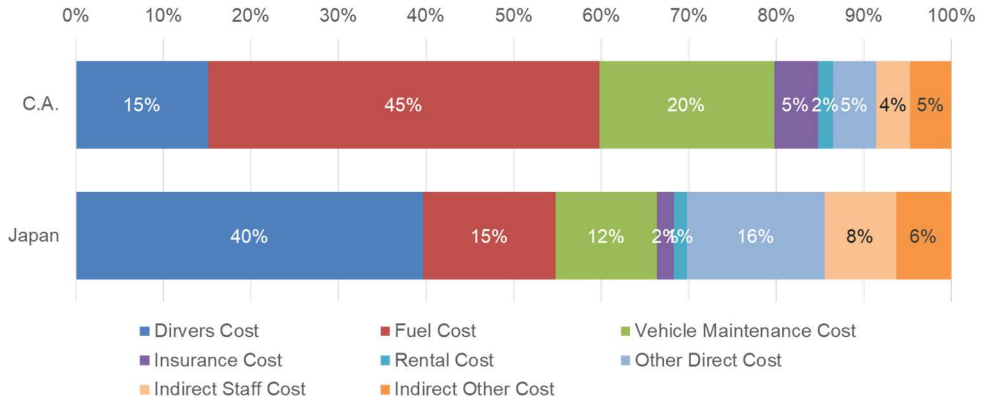


Source: What drives the high price of road freight transport in Central America? (WB 2013) and JST based on the interview survey for transport operators

Figure 10.2.3 Average Transportation Price per ton-km by Country

(2) Freight Transport Cost Structure

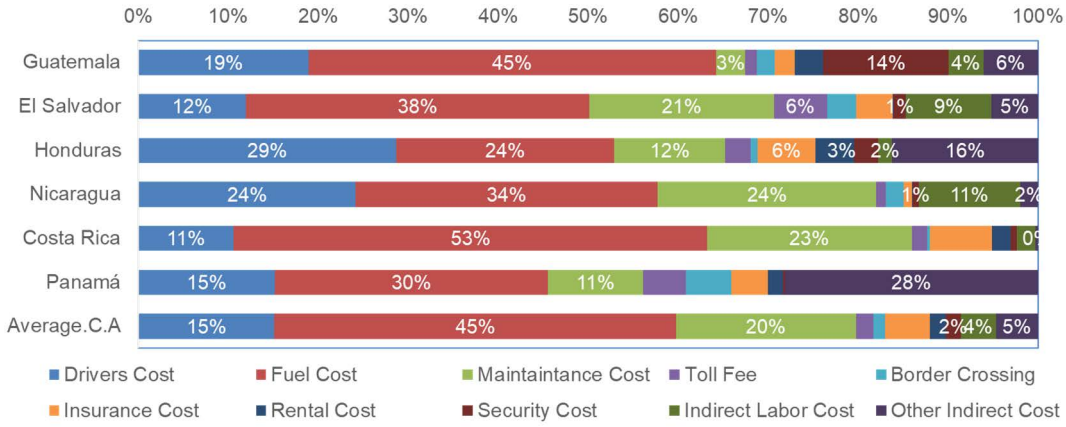
Figure 10.2.4 shows the comparison of the freight cost structure between Central America and Japan. Direct cost and indirect cost shares 91% and 9% in total expense of each company in Central America. Fuel cost and vehicle maintenance cost share 65% of the total expense in Central America. It is much higher than the share in Japan.



Source: JST based on the interview survey for transport operators

Figure 10.2.4 Comparison of Freight Cost Structure between Central America and Japan

Figure 10.2.5 shows the cost structure by country in Central America. Compared to other countries, the share of fuel cost is high in Guatemala and Costa Rica. The share of drivers cost is high in Honduras and Nicaragua.



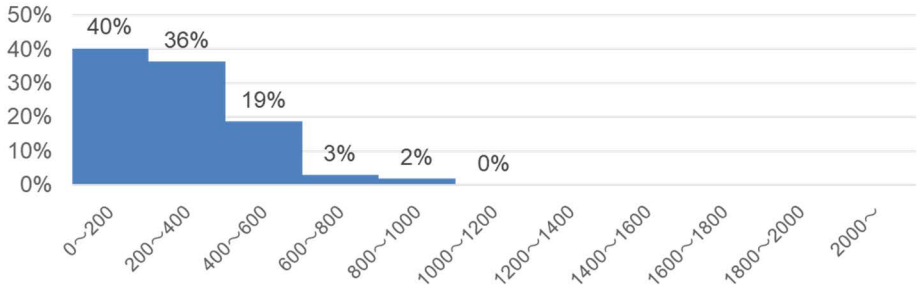
Source: JST based on the interview survey for transport operators

Figure 10.2.5 Freight Cost Structure by Country

10.2.3 Transport Service

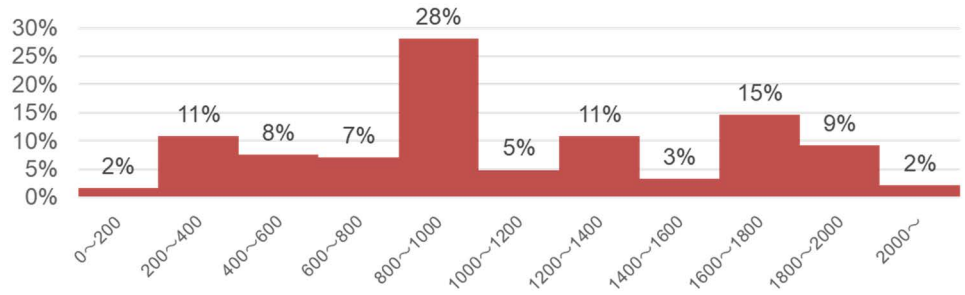
(1) Transport Distance

Figure 10.2.6 and Figure 10.2.7 describe the distribution of transport distance of each truck in Central America for domestic cargo and international cargo. The average transport distance on domestic and international routes are 290 km and 1,120 km, respectively.



Source: JST based on the interview survey for transport operators

Figure 10.2.6 Distribution of Transport Distance for Round Trip (Domestic route: km)

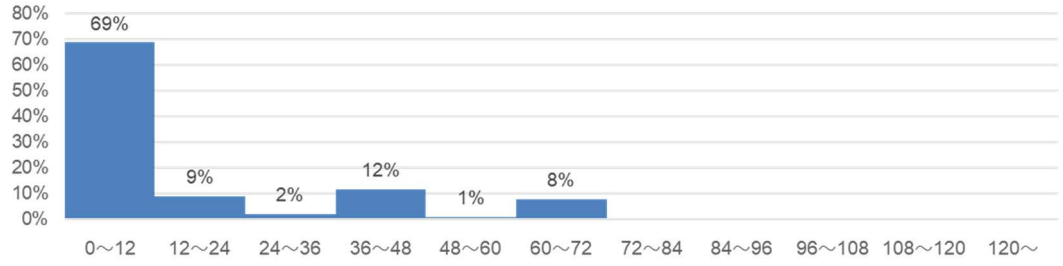


Source: JST based on the interview survey for transport operators

Figure 10.2.7 Distribution of Transport Distance for Round Trip (International route: km)

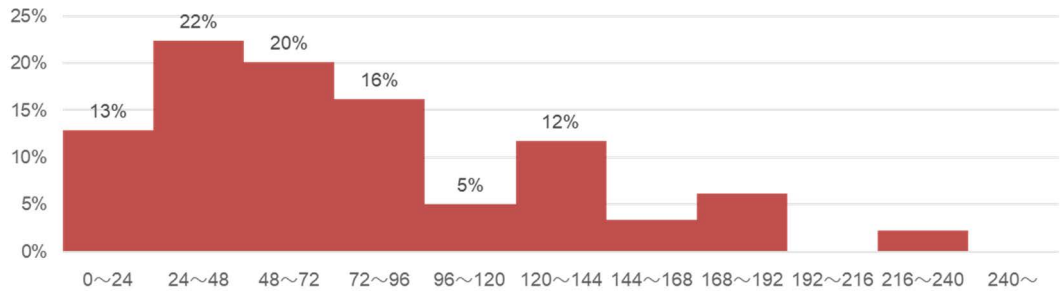
(2) Transport Time

Average transport time for domestic and international routes are 18hrs and 95hrs as shown in Figure 10.2.8 and Figure 10.2.9. With the information on transport time and the transport distance which is mentioned in Figure 10.2.6 and Figure 10.2.7, the average travel speed on domestic and international routes can be estimated at 16.0 km/h and 11.8km/h.



Source: JST based on the interview survey for transport operators

Figure 10.2.8 Distribution of Transport Time for Round Trip (Domestic route: hour)



Source: JST based on the interview survey for transport operators

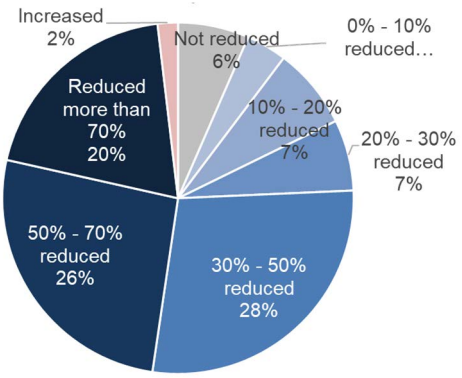
Figure 10.2.9 Distribution of Transport Time for Round Trip (International route: hour)

10.2.4 COVID-19's Impact and Countermeasures

COVID-19's pandemic seriously affected trucking companies. In this study, the impact on trucking business was investigated. A similar interview survey has been conducted in Japan by MLIT Japan as well. To understand the impact on Central America, some results are compared between Japan and Central America.

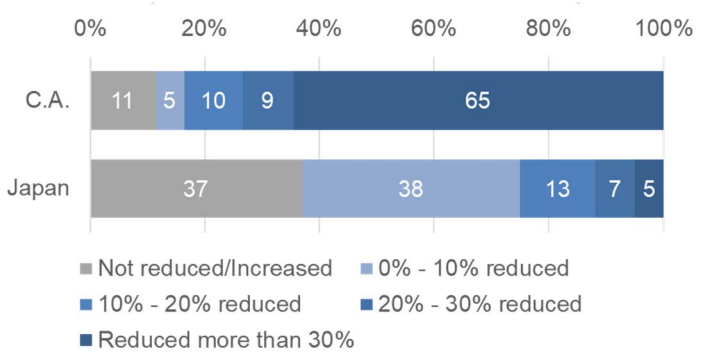
(1) Financial Impact

COVID-19 has reduced trucking companies' turnover seriously. 65% of companies reduced turnover more than 30% (Figure 10.2.10). Compared to Japan, the impact in Central America is much bigger (Figure 10.2.11).



Source: JST based on the interview survey for transport operators

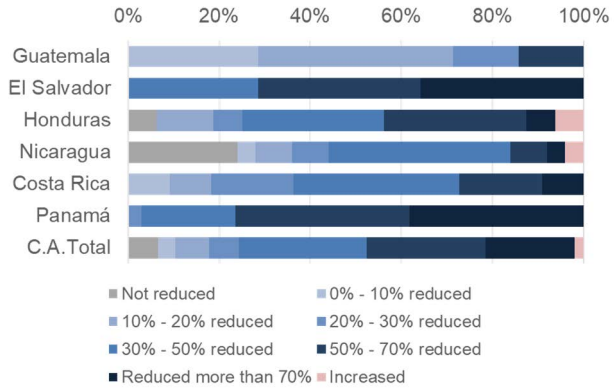
Figure 10.2.10 COVID-19's Impact on Turnover for Trucking Companies in Central America



Source: JST based on the interview survey for transport operators and MLIT survey report in Dec. 2020.

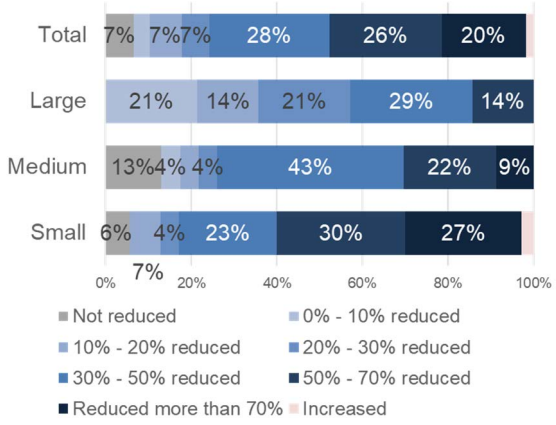
Figure 10.2.11 Comparison of Impact on Turnover for Central America and Japan

Compared to other countries, Nicaragua's impact is limited (Figure 10.2.12). Impact on small companies is bigger than large companies (Figure 10.2.13).



Source: JST based on the interview survey for transport operators

Figure 10.2.12 COVID-19's Impact on Turnover by Country



Source: JST based on the interview survey for transport operators

Figure 10.2.13 COVID-19's Impact by Company Size

(2) Countermeasures

Trucking companies have made several efforts to protect their drivers and staff from COVID-19. Figure 10.2.14 shows the actions taken against COVID-19. Disinfecting vehicles and facilities is the major countermeasure taken by companies.

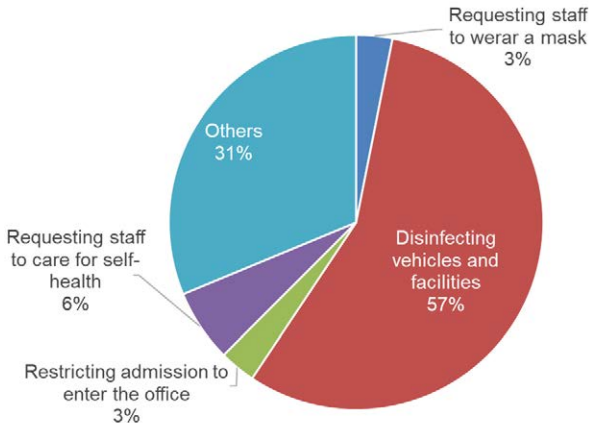
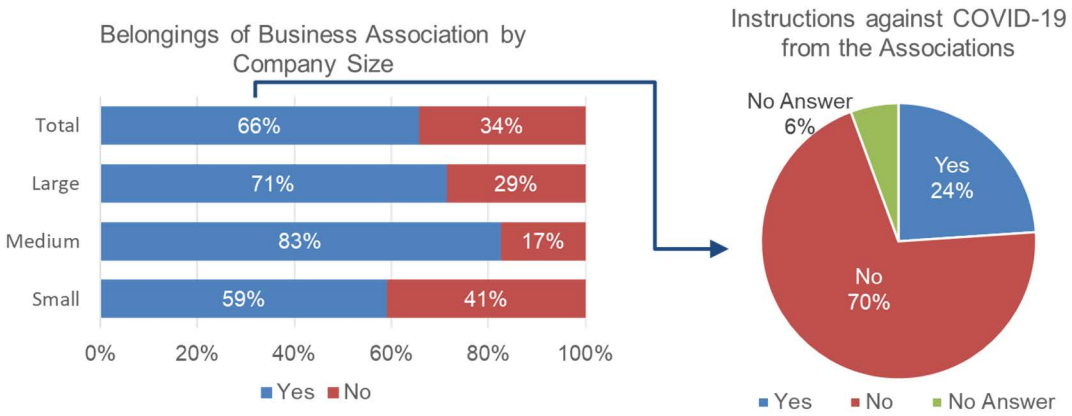


Figure 10.2.14 Countermeasures against COVID-19

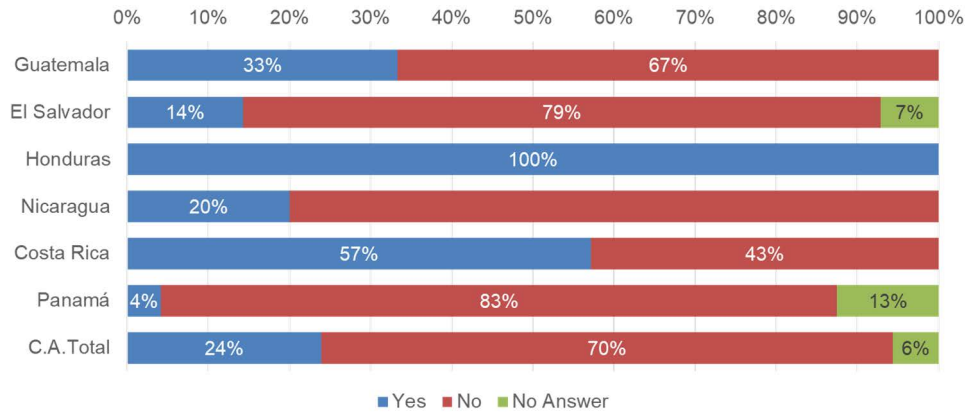
Some business associations are providing instructions to trucking companies to counteract COVID-19 such as a disinfection method. 66% of trucking companies belong to business associations such as Catransca, ASTIC. However, only 24% of the member companies received the instructions against COVID-19 (Figure 10.2.15).



Source: JST based on the interview survey for transport operators

Figure 10.2.15 Status of Instructions against COVID-19 from Business Association

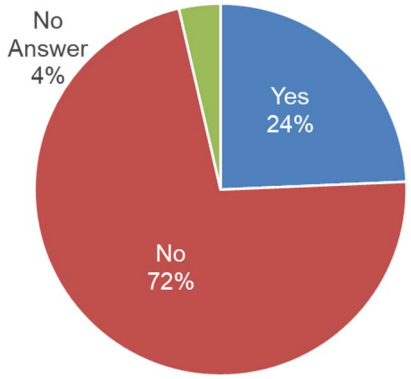
Figure 10.2.16 shows the status by country. Truck companies in Honduras received the instructions against COVID-19 from the associations.



Source: JST based on the interview survey for transport operators

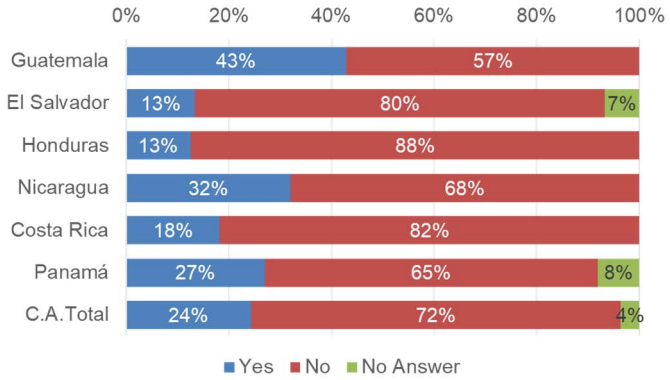
Figure 10.2.16 Status of Instructions against COVID-19 from Business Associations by Country

The government is also providing instructions to trucking companies to counteract COVID-19 such as a disinfection manual. However, only 24% of trucking companies answered that they received the instructions against COVID-19 from the government.



Source: JST based on the interview survey for transport operators

Figure 10.2.17 Status of Instructions against COVID-19 from Government



Source: JST based on the interview survey for transport operators

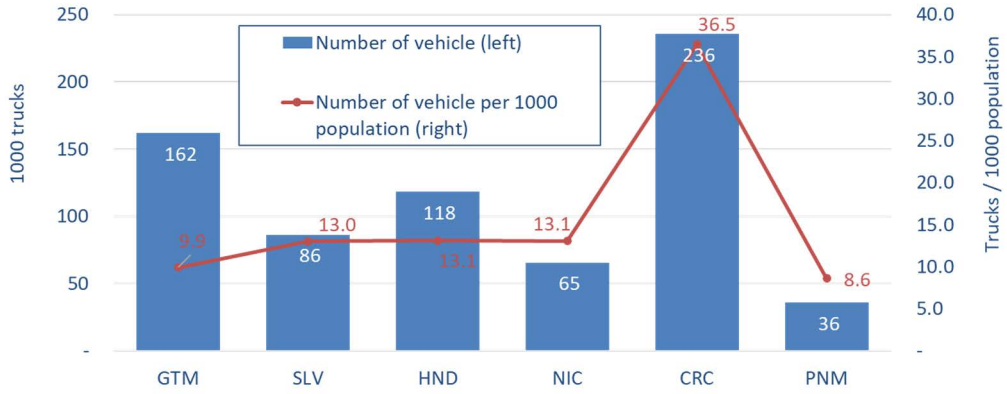
Figure 10.2.18 Status of Instructions against COVID-19 from Government by Country

10.3 Logistics Facilities

10.3.1 Truck

(1) Number of Trucks

According to the vehicle registration statistics, 750 thousand trucks are registered in Central America. It means 14.8 trucks per 1000 population. The number of trucks in Japan it reported at 7.5 million trucks, 60.5 trucks/1000 population. It can be expected that economic growth will bring a further increase of trucks in Central America.



Source: GTM: INE, SLV: Vice ministry of Transportation, HND: Instituto de la Propiedad (IP), NIC: Annual statistic of transport sector, CRC: INEC, PNM:INEC

Figure 10.3.1 Number of Registered Trucks

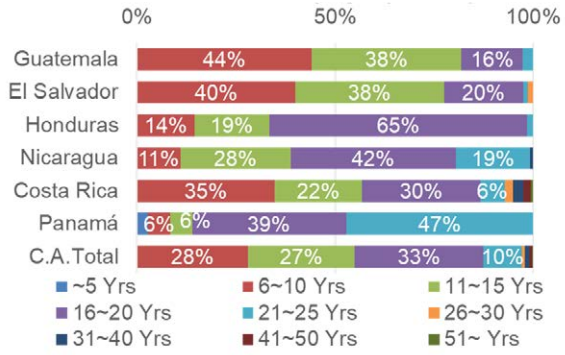
(2) Age of Vehicles

The average age of trucks in Central America is 14.4 years. Compared to the age in Japan which was 11.44 years in 2019[2], the age in Central America is higher. Especially, the share of aged vehicles is higher in Honduras and Nicaragua (Figure 10.1.2).

The truck age for small companies, medium companies and large companies are 15.9 years, 15.0 years and 13.9 years, respectively. It implies that it is difficult to replace aged vehicles in small companies. It should be noted that the average usable year of trucks in Japan was 15.17 years in 2019[3].

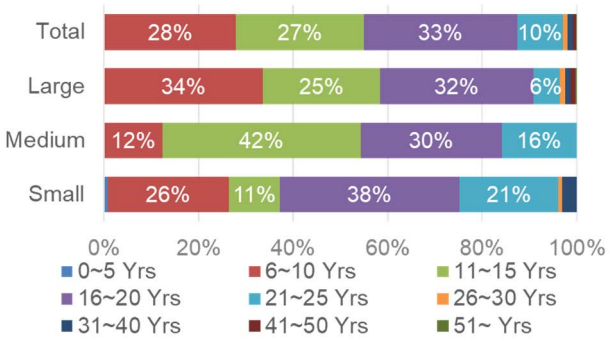
[2] Automobile Inspection & Registration Information Association (AIRIA) in Japan

[3] Automobile Manufacturers Association, Inc., (JAMA) in Japan



Source: JST based on the interview survey for transport operators

Figure 10.3.2 Distribution of Trucks by Age by Country



Source: JST based on the interview survey for transport operators

Figure 10.3.3 Distribution of Trucks by Age by Company Size

10.3.2 Truck Terminal

Truck terminals are mainly managed by the private sector except in Nicaragua. In Nicaragua, there is a public truck terminal, Punta Icoca IP near Corinto port (Figure 10.3.4). Due to the lack of parking space near Corinto Port, punta Icoca II terminal was constructed in 2018. It should be noted that a public truck terminal provides parking and rest space not only to large transport companies but also small and medium size transport companies which is lacking funds. It enhances the general economic level of transport companies in the region. Also, the public truck terminal plays important role to handle relief goods during a natural disaster.

The agricultural and livestock sector is also poorly served in terms of the supply of specialized infrastructure. The existing collection centers are small private developments, which are poorly equipped, with low service quality standards.

Source: JST

Figure 10.3.4 Public Truck Terminals in Nicaragua

10.4 On-going and Planned Projects

10.4.1 Development Projects in PNLOG

Table 10.4.1 shows the development projects in the urban logistics sector which was listed up in the PNLOG of each country. Most of the countries have a development plan of Logistic Activity Zone (LAZ) at major hubs of logistics. However, the details of LAZ are still not clear.

Table 10.4.1 Development Projects on Urban logistics sector

Country	Project	Responsible Organization	Cost (Mil. USD)
Guatemala	Development of LAZ (Logistic Activity Zone) (S.T.Castilla Port/Barrios Port)	CPN	162.8
	Development of LAZ (Guatemala City)	Municipality	38.5
	Development of LAZ (Quetzal Port)	CPN	40.3
	Development of LAZ (Tecún Umán)	DGA / DGME	40.3
El Salvador	Logistics Conglomerate Master Plan (La Unión)	AIML	N/A
	Strategic Plan to Develop a Distribution Center (El Salvador)	AIML	N/A
	Agriculture and Fishing Logistics Platform (Usulután)	AIML	N/A
	Agriculture and Fishing Logistics Support Zone (La Unión/ Punta Chiquirín)	AIML, MAG	N/A
	Development of LAZ (El Amatillo)	AIML, MAG	N/A
	Livestock Sector Support Center	MAG	N/A
	Development of LAZ (Acajutla Port)	CEPA, AIML, MOPVDU	N/A
	Cargo and Passenger Terminals (San Salvador)	MOPVDU, AIML, Municipio	N/A
	Logistics Services Information System and Cargo Exchange	AIML, MAG	N/A
	Self-Sufficiency and Cold Chain Program	AIML	N/A
	Collaborative Logistics Technical Assistance for the Coffee Chain	AIML, MAG	N/A
	Technical Assistance in Collaborative Logistics for Fishing and Sea Products, including Cold Chain	AIML, MAG	N/A
	Technical Assistance for Regional Logistics Services Providers	AIML	N/A
	Logistics Human Resources Training Program	AIML	N/A
Honduras	LAZ, Cross-Docking Center, and Management Model (Puerto Cortés)	N/A	172.8
	LAZ (La Barca dry dock)	N/A	160.5
	LAZ (La Alianza – Goascorán)	N/A	213.2
	Air Cargo Center (San Pedro Sula)	N/A	22.2
	Distribution LAZ (San Pedro Sula)	N/A	50.2
	Distribution LAZ (Tegucigalpa)	N/A	50.2
	Economic Corridor Support (Cortes Port – San Lorenszo)	N/A	3.0
Nicaragua	Logistics Park (East of Managua)	MAGFOR	5.0
	Logistics Park (West of Managua)	MAGFOR	5.0
	Logistics Park (Chinandega)	MAGFOR	5.0
	Logistics Park (Bluefields)	MAGFOR	5.0
	Carrier Service Center (El Crucero)	Private Sector	3.5
	Carrier Service Center (Nadaime)	Private Sector	3.5
	Carrier Service Center (Cruce PLC1 (Carretera 2) – Carretera 16)	Private Sector	1.5
	Carrier Service Center (Sébaco)	Private Sector	1.5

Country	Project	Responsible Organization	Cost (Mil. USD)
	Carrier Service Center (Yalagüina)	Private Sector	2.0
	Carrier Service Center (Siuna)	Private Sector	1.5
	Carrier Service Center (Acoyapa)	Private Sector	1.5
	Carrier Service Center (Chinandega)	Private Sector	3.5
	Carrier Service Center (MalIAPsillo)	Private Sector	2.0
	Carrier Service Center (San Carlos)	Private Sector	2.0
	Pacific Logistics Conglomerate, urban distribution logistics Area (Managua)	ALMA	5.0
	North Caribbean Logistics Conglomerate: Agrocentres (Mulukukú)	MAGFOR	5.0
	Logistics Development (Juigalpa)	Private Sector	10.0
	Logistics Training Plan	N/A	0.4
	Pilot Logistics Collaboration Programs in Priority Subsystems	N/A	0.4
	Comprehensive Design of Incentives for Logistics Operators in Priority Subsystems	N/A	0.2
Costa Rica	Development of Logistic Activities Platforms (PAL) (Moin)	N/A	N/A
	Development of PAL (Puerto Caldera & Central Valley)	N/A	N/A
	Urban Distribution LAZ (GAM)	MOPT	35.0
	Cargo Traffic Management Plan (San José A.M.)	MOPT/Municipality	2.0
Panama	Development of LAZ (Balboa)	N/A	N/A
	Development of LAZ (Colon)	N/A	N/A
	Urban Distribution LAZ (Balboa)	N/A	N/A
	Cargo Center Modernization (Tocumen Airport)	N/A	N/A
	Airport Logistic Zone Broadband Network	N/A	N/A
	Development of LAZ (Paso Canoas)	N/A	N/A
	Truck Centers Development (Pacific Corridor)	N/A	N/A

Source: Compiled by JST from PNLOG each country

10.4.2 Reform Program of the Transportation and Freight Urban logistics sector for Honduras

(1) Outline

To implement the proposed projects in PNLOG, regulatory and institutional framework should be established. IDB has supported to reform the regulatory and institutional framework for transportation and freight urban logistics sector for Honduras.

The objective of the program is to contribute to the improvement of the logistics performance of Honduras through sector reforms in the regulatory, institutional, planning and trade facilitation fields, which brings competitiveness and regional integration. The specific objectives of the program are: (i) to consolidate a normative framework with specific regulations for the improvement of cargo logistics services with a long-term vision; (ii) the strengthening of the institutional framework of the urban logistics sector through the creation of the National Logistics Council (CNL) and instance at the technical level; (iii) improvement of comprehensive planning in the sector and the provision of associated services; and (iv) modernization and simplification of processes and technological systems for trade facilitation.

(2) Components

Component I: Macroeconomic stability

The objective of this component is to ensure a macroeconomic context consistent with the objectives of the program as established in the Policy Matrix and in the Sector Policy Letter.

Component II: Reform of the regulatory framework for cargo logistics and trade facilitation.
The component will support the consolidation of a regulatory framework for logistics that introduces the adoption of a long-term vision and establishes the strategic guidelines of the Sector, as well as the modernization of the legal framework for land freight transport, covering aspects related to transport security. and cargo transportation services. Additionally, the component will consolidate the normative agreements of the commitments assumed by Honduras within the framework of the Central American AU, contributing to the positioning of the country ashub regional. The first operation will support the: (i) approval of government priorities 2018-2022 that include the urban logistics sector as a strategic axis within the framework of preparing the PEG 2018-2022; (ii) approval of PNLOG by the CNL, which reflects an inter-institutional and multisectoral public-private agreement; (iii) updating the Institutional Framework of the National Road Safety Council to the current legal framework, including the institutions with competence in the Sector; (iv) elaboration of

Component III: Consolidation of the institutional framework for cargo and transport logistics.
The component will support the strengthening of the institutional framework of the cargo urban logistics sector through the creation of a high-level decision-making body, made up of key institutions linked to the cargo urban logistics sector; an instance of coordination and execution; and mechanisms for monitoring the impact of policies and projects on the performance of the cargo urban logistics sector. To achieve this, the first operation includes the approval of the institutional design of the organizational structure for the management of cargo logistics which will include: (i) a high-level decision-making body made up of the main public and private institutions with responsibilities in the cargo urban logistics sector; (ii) a technical body made up of the executing agencies responsible for project management and coordination among the different agencies; (iii) permanent mechanisms for monitoring and analysis and market intelligence; and (iv) the mechanism for annual budget allocation and financing for the sustainability of the CNL.

Component IV: Establishment and modernization of comprehensive planning processes, transport and logistics services, and commercial facilitation.
The component will contribute to strengthening the comprehensive planning of the sector and the promotion of measures that contribute to improving the quality of the transportation service. It will also support the interoperability of the systems of the agencies involved in foreign trade, and their adaptation to international and regional standards.

(3) Synergy Effect

The reform program supported by IDB is mainly focused on the unique issues on transportaton and urban logistics sector in Honduras. In this study, the regulatory and institutional framework on transportation and logositics sector in Central America shall be establised considering the unique issues in each country. Therefore, close coordination between this study and the reform program is required.

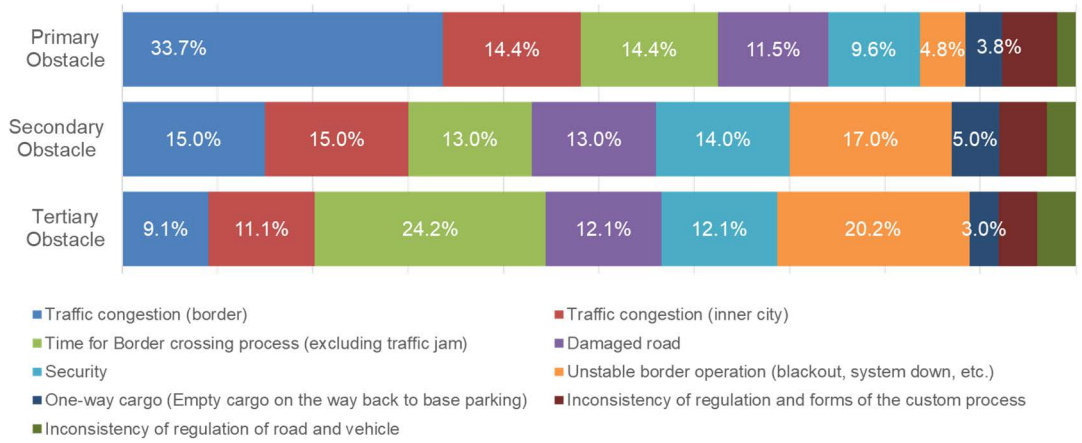
10.5 Issues and Recommendation on Urban Logistics Sector

10.5.1 Traffic Congestion

(1) General

Figure 10.5.1 shows the interview survey result with trucking companies regarding the main obstacles to transport cargo. 62% of companies regard the traffic congestion as a primary issue. Especially, congestion at the border is the most pressing issue (34%). The next pressing issue is the traffic congestion in the city area.

As it is mentioned in Figure 10.2.6 and Figure 10.2.7 in Section 10.2.3, the average freight transport speed on domestic and international routes are 16.0 km/h and 11.8km/h.



Source: JST based on the interview survey for transport operators

Figure 10.5.1 Obstacles to Transport Cargo

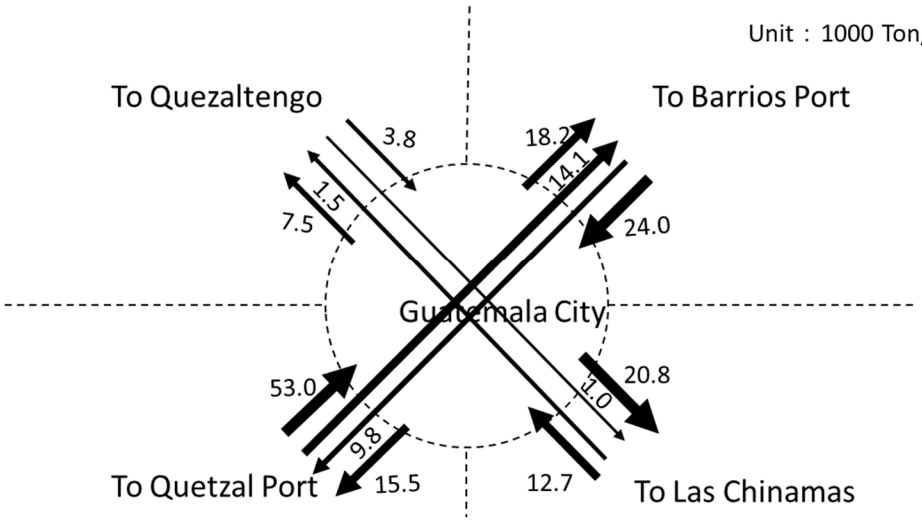
To improve the border crossing time, the development of passing lanes and waiting areas is required besides the improvement of custom procedures. To shorten the passing time around the city area, bypass roads or flyovers can be countermeasures. Also, development of distribution centers near the bypass roads can reduce unnecessary truck movement.

(2) Traffic congestión in Urban Areas

a) Guatemala City

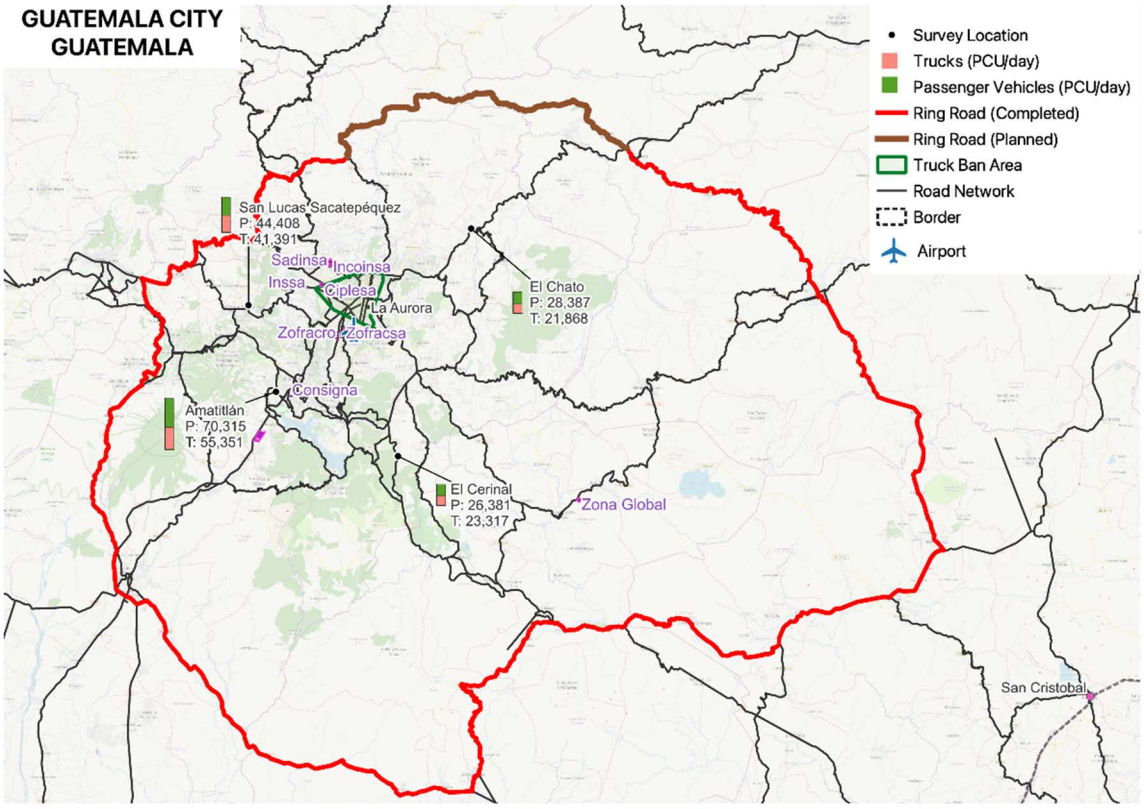
In the major radial roads of Guatemalan metropolitan areas, the largest cargo volume and truck movement were observed between the Guatemala City area and the southwest direction on CA9, which is the way to Quetzal Port, as shown in Figure 10.5.2. The largest through traffic was observed from the southwest direction to the northeast direction. To avoid the traffic congestion in the city area, truck ban regulation is set in the peak hour of weekdays in the heart of the city. It increases the transport time of cargo which crosses the Guatemala metropolitan area. To divert the through traffic, a bypass road is required.

Figure 10.5.3 shows the regional ring road plan and the traffic volume on major radial roads of the Guatemalan metropolitan area. A metropolitan ring road planned in Guatemala has been discussed for more than 25 years. However, it wasn't constructed by 2005 due to several reasons such as a land acquisition issue. After 2005, the ring road plan was changed to the regional ring road plan whose length is 350 km. It has been constructed except for the northwest section between Xenacoj and Sanarate whose length is 53.8 km.



Source: JST based on traffic count and OD interview survey result

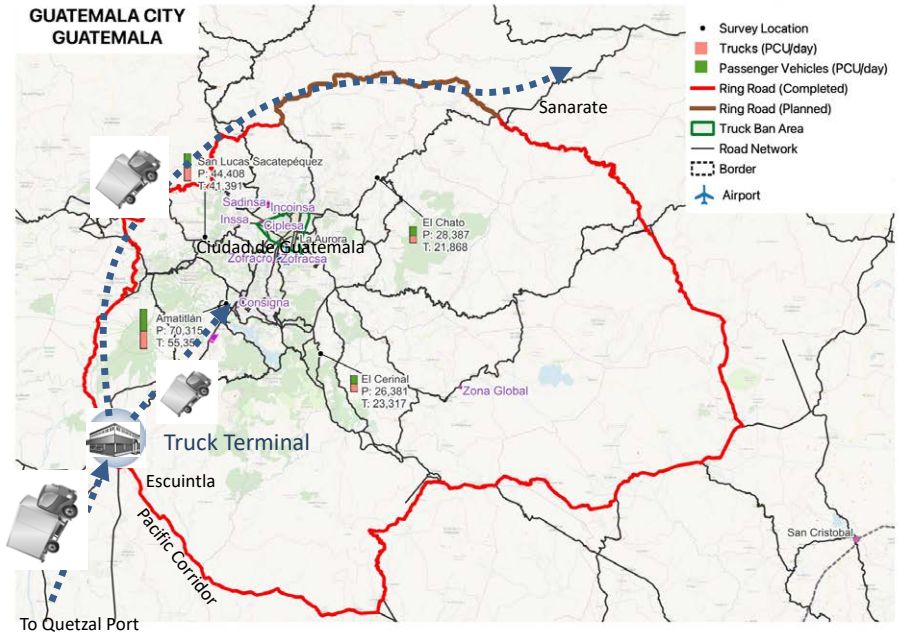
Figure 10.5.2 Cargo Flow of Guatemala Metropolitan Area by Direction



Source: JST

Figure 10.5.3 Traffic Volume of Guatemala Metropolitan Area and Regional Ring Road Plan

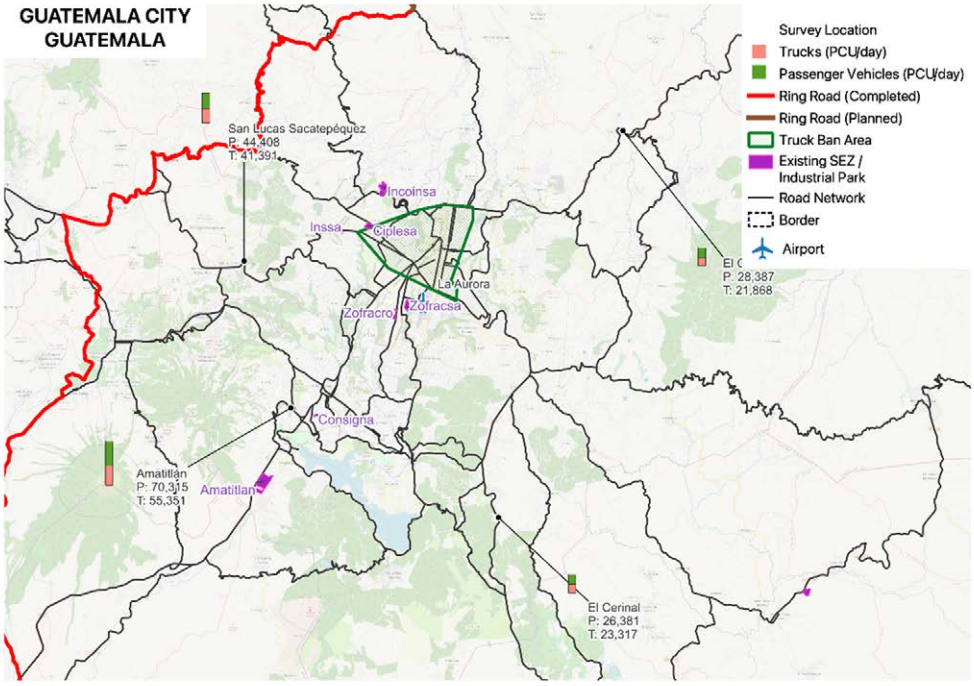
It should be noted that south alternative expressway (VAS: Vía Alterna del Sur), connecting between Villa Canales and Villa Nueva, opened in October, 2022. To mitigate urban congestion, the completion of the regional ring road is required. Also, the public truck terminal in Escuintla, the junction point of the CA9 and regional ring road, is recommended as shown in Figure 10.5.4. The public truck terminal can transship the cargo to Guatemala City and northern area.



Source: JST

Figure 10.5.4 Regional Ring Road and Public Truck Terminal Plan in Guatemalan Metropolitan Area

On the other hand, most of the SEZs, Special Economic Zones, and industrial parks are already located inside of the regional ring road as shown in Figure 10.5.5. The regional ring road can partially mitigate the congestion issue. However, it is recommended to discuss the change of land use control policy inside of the regional ring road, or construct bypass roads in the city area with elevated or underground structures which requires a huge budget in the future.

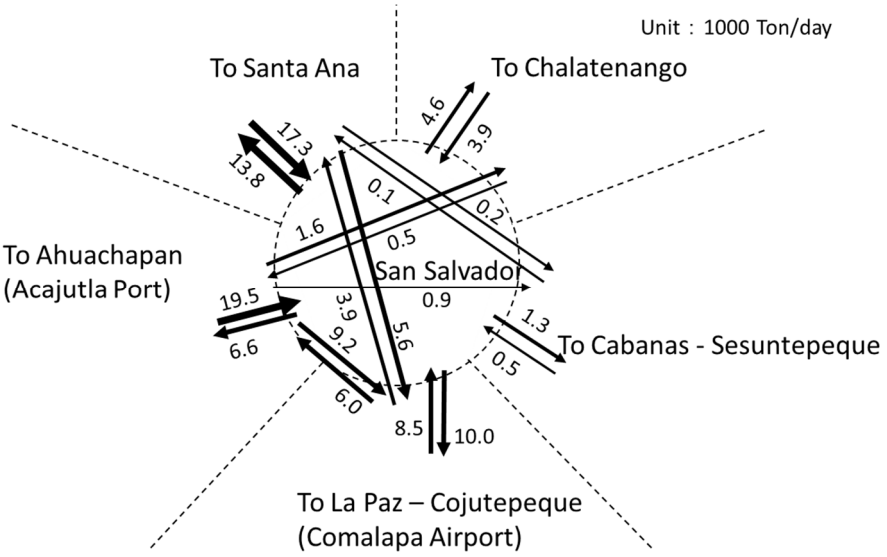


Source: JST

Figure 10.5.5 Industrial Area and Road Network in Guatemala Metropolitan Area

b) San Salvador

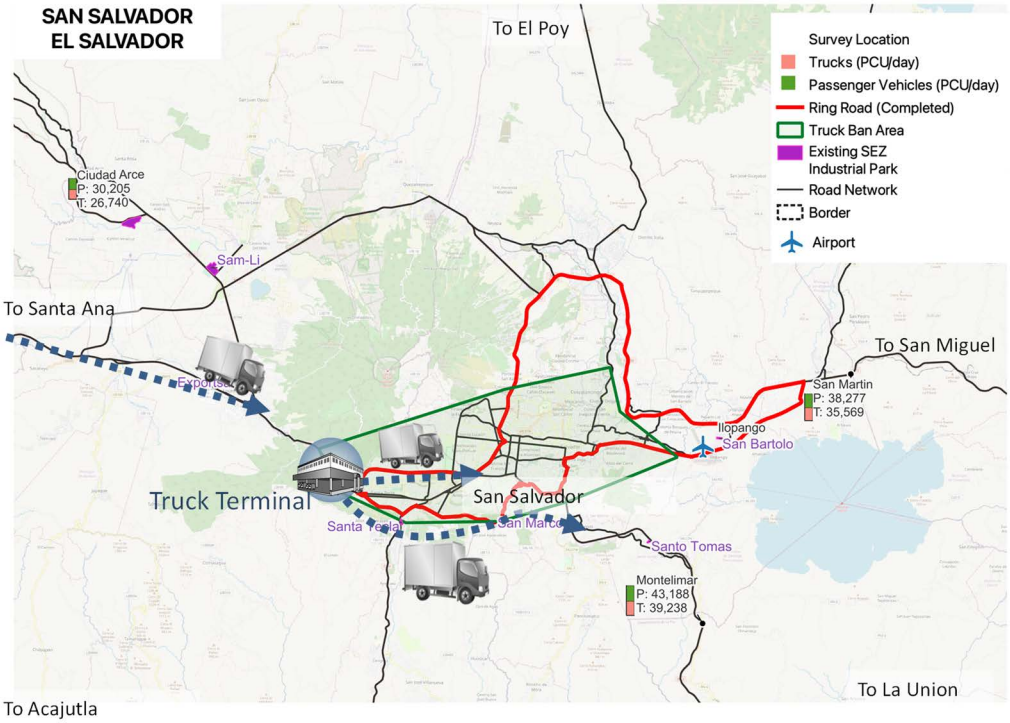
In the major radial roads of San Salvador metropolitan area, largest cargo volume was observed between San Salvador area and northwest direction on CA1, the way to Santa Ana as shown in Figure 10.5.6.



Source: JST based on traffic count and OD interview survey result

Figure 10.5.6 Cargo Flow of San Salvador Metropolitan Area by Direction

To mitigate the road congestion, the public truck terminal in west Santa Tecla, the junction point of the CA1 and RN21, is recommended as shown in Figure 10.5.7. The public truck terminal can transship the cargo to San Salvador and other area.



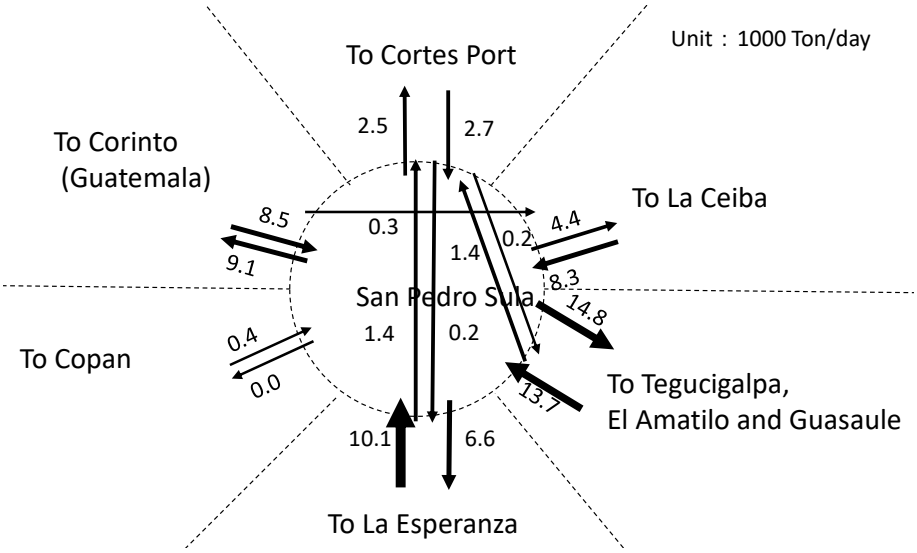
Source: JST

Figure 10.5.7 Ring Road and Public Truck Terminal Plan in San Salvador Metropolitan Area

c) San Pedro Sula

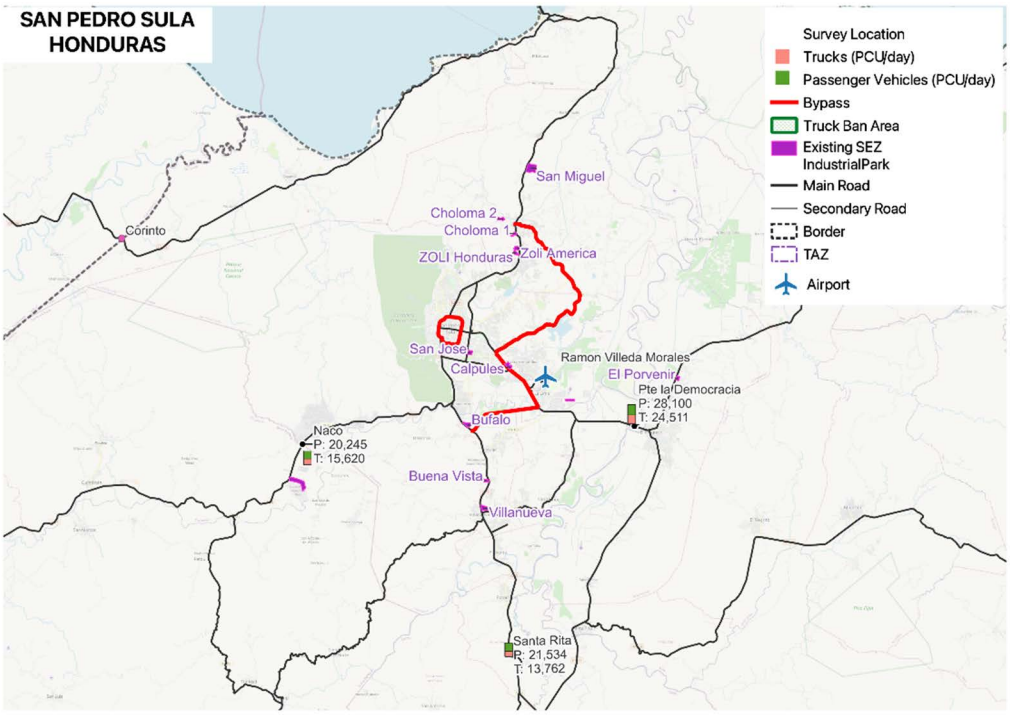
In the major radial roads of the San Pedro Sula metropolitan area, the largest cargo volume was observed between the San Pedro Sula area and the southeast direction on CA5, which is the way to Tegucigalpa and other southern countries, as shown in Figure 10.5.8. On the other hand, the largest truck movement was observed between the San Pedro Sula area and the east direction on CA13. SEZs and industrial parks are located in the north and south areas of San Pedro Sula.

The largest through traffic was observed from the south direction to the north direction. Figure 10.5.9 shows the bypass road plan and the traffic volume on major radial roads of the San Pedro Sula metropolitan area.



Source: JST based on traffic count and OD interview survey result

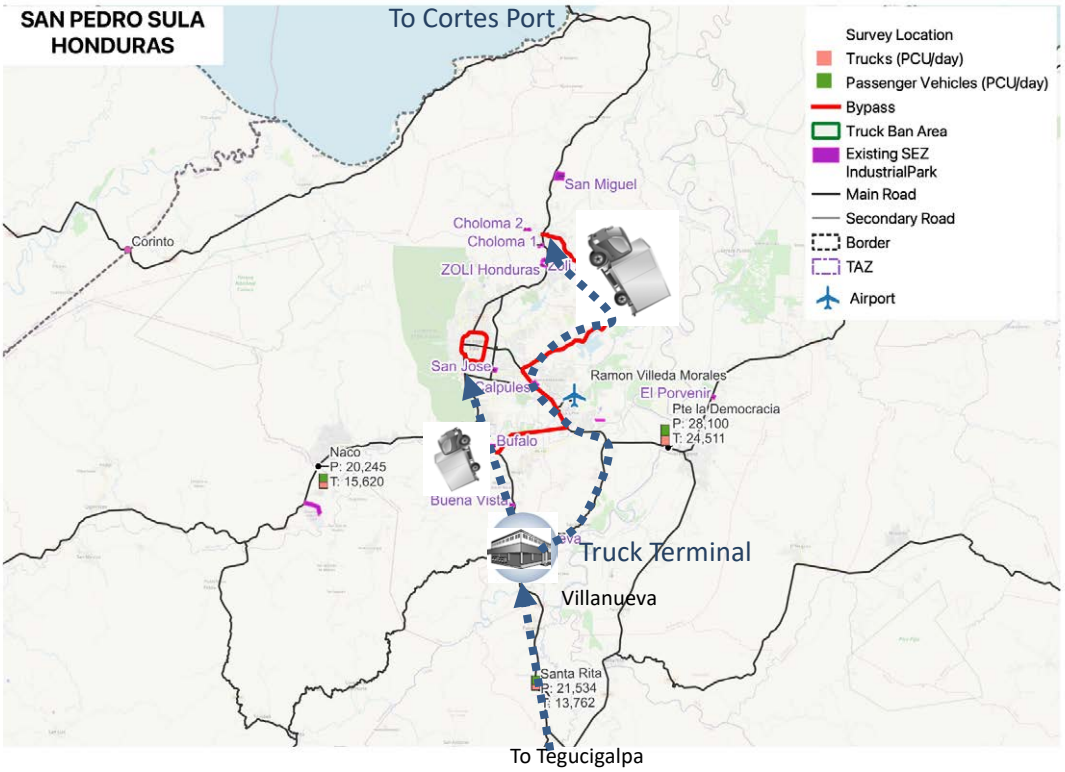
Figure 10.5.8 Cargo Flow of San Pedro Sula Metropolitan Area by Direction



Source: JST

Figure 10.5.9 Traffic Volume of San Pedro Sula Metropolitan Area and Bypass Road Plan

To mitigate the road congestion, the public truck terminal in Villanueva, the junction point of the CA5 and bypass road, is recommended as shown in Figure 10.5.10. The public truck terminal can transship the cargo to San Pedro Sula and Cortes Port.



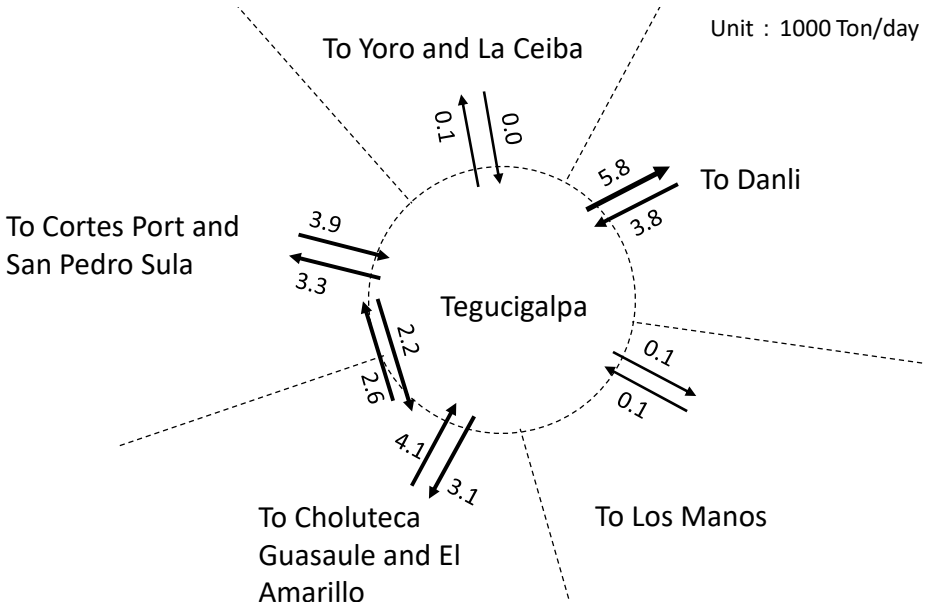
Source: JST

Figure 10.5.10 Bypass Road and Public Truck Terminal Plan in San Pedro Sula Metropolitan Area

d) Tegucigalpa

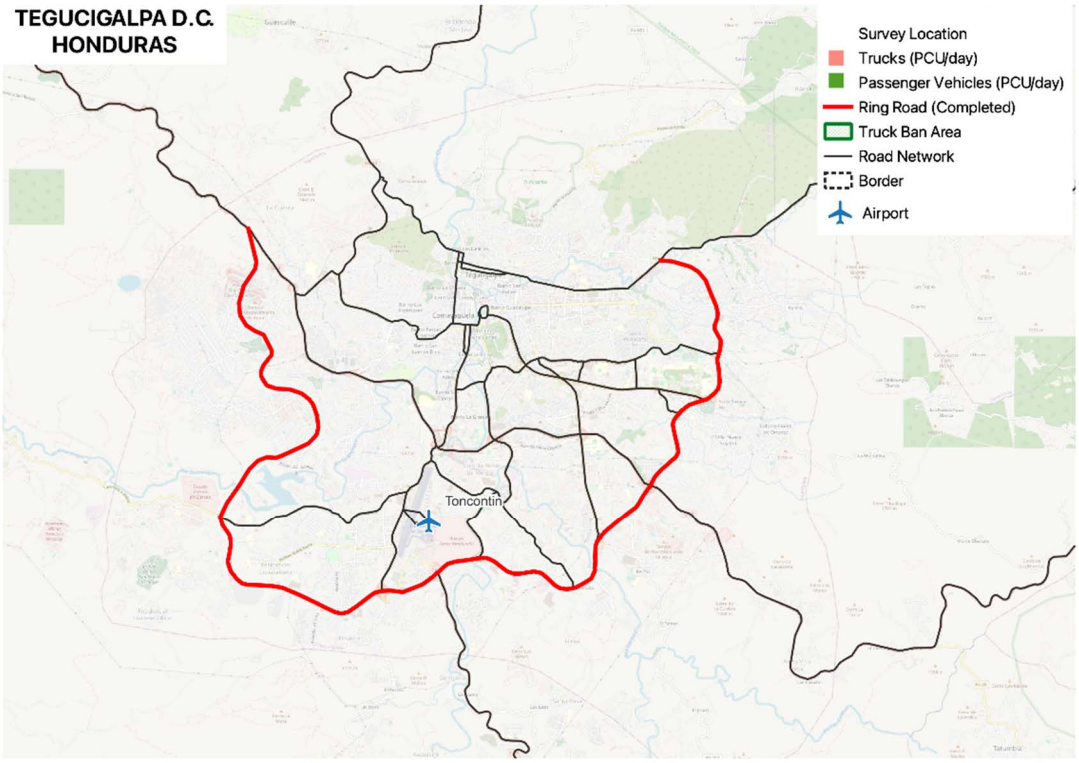
In the major radial roads of the Tegucigalpa metropolitan area, the largest cargo volume was observed between the Tegucigalpa area and the northwest direction on CA5, which is the way to San Pedro Sula as shown in Figure 10.5.11.

Figure 10.5.12 shows the ring road network of the Tegucigalpa metropolitan area.



Source: JST based on traffic count and OD interview survey result

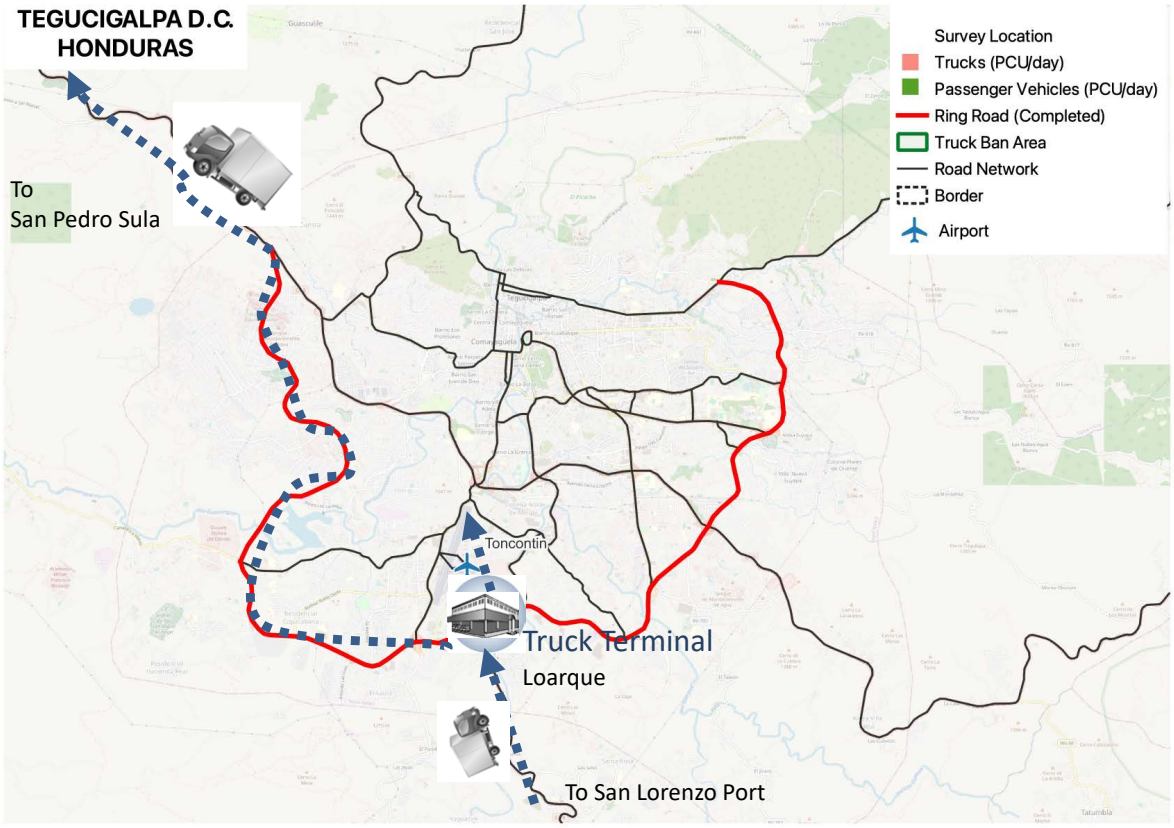
Figure 10.5.11 Cargo Flow of Tegucigalpa Metropolitan Area by Direction



Source: JST

Figure 10.5.12 Ring Road in Tegucigalpa Metropolitan Area

To mitigate the road congestion, the public truck terminal in Loarque, the junction point of the CA5 and ring road, is recommended as shown in Figure 10.5.13. The public truck terminal can transship the cargo to San Pedro Sula and Tegucigalpa.



Source: JST

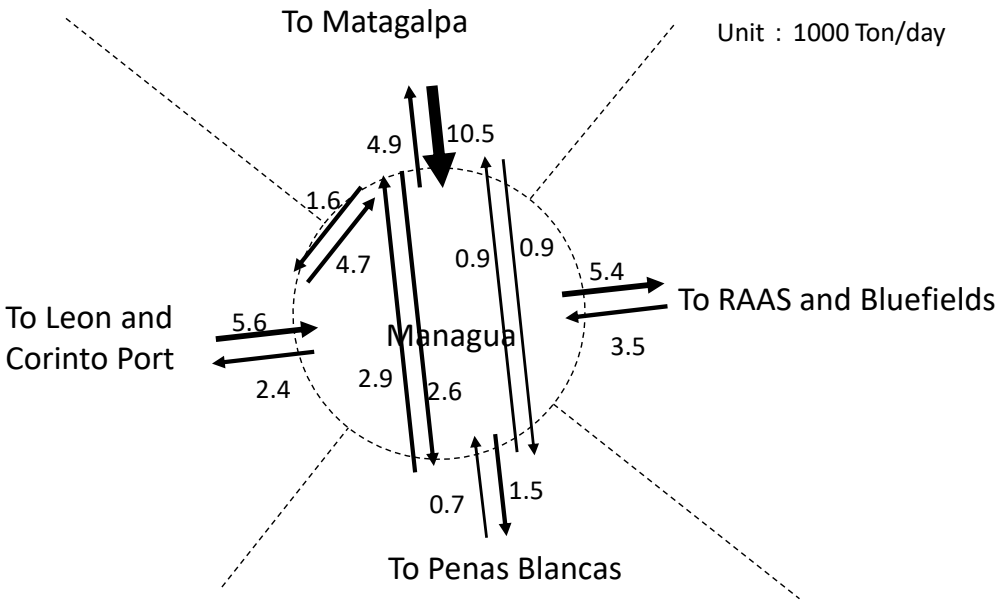
Figure 10.5.13 Ring Road and Public Truck Terminal Plan in Tegucigalpa Metropolitan Area

e) Managua

In the major radial roads of the Managua metropolitan area, the largest cargo volume was observed between the Managua area and the northeast direction on national highway1, which is the way to Matagalpa as shown in Figure 10.5.14.

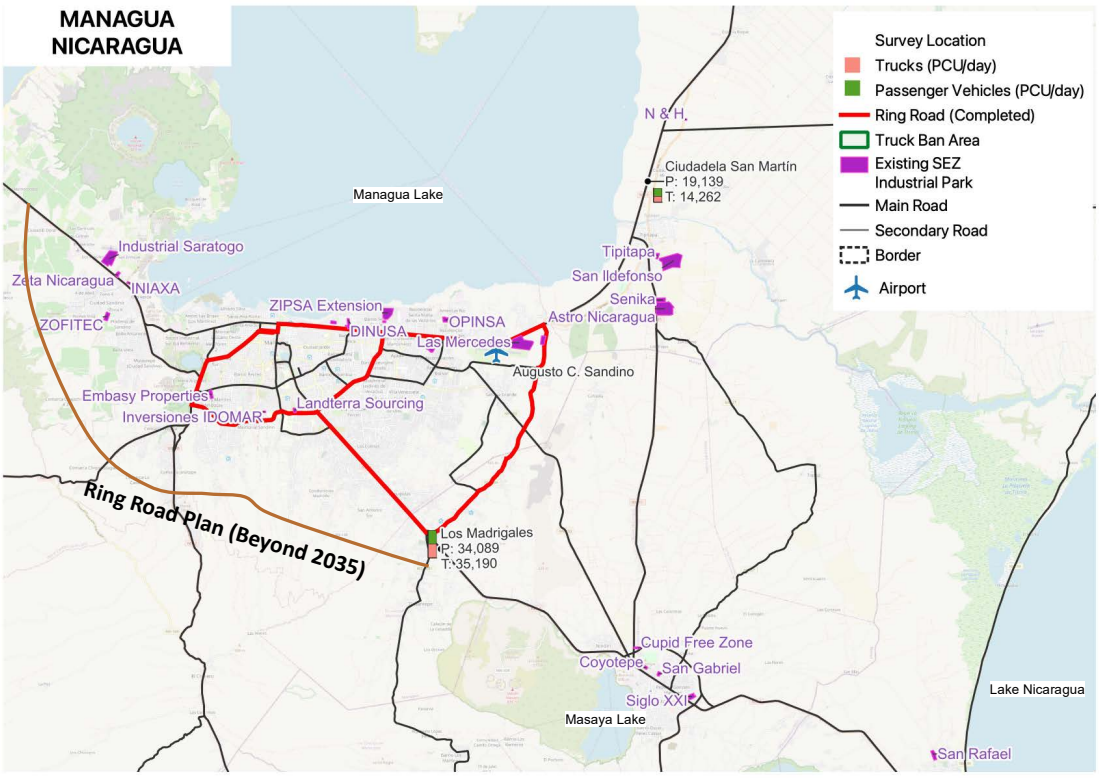
The largest through traffic was observed from the south to north direction[4]. Figure 10.5.15 shows the ring road plan and the traffic volume on major radial roads of the Managua metropolitan area. Most of the industrial park and SEZs are located along Managua Lake and Masaya.

[4] Trucks between Matagalpa and Leon take national highway 26 and don't need to go through the Managua Metropolitan Area.



Source: JST based on traffic count and OD interview survey result

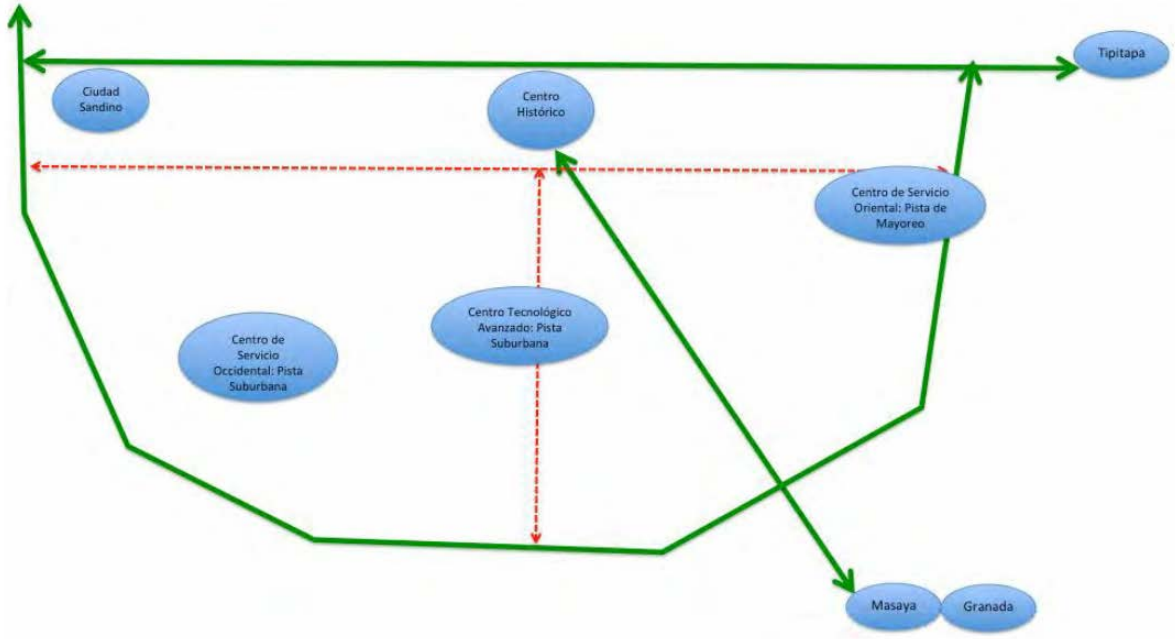
Figure 10.5.14 Cargo Flow of Managua Metropolitan Area by Direction



Source: JST

Figure 10.5.15 Traffic Volume of Managua Metropolitan Area and Ring Road Plan

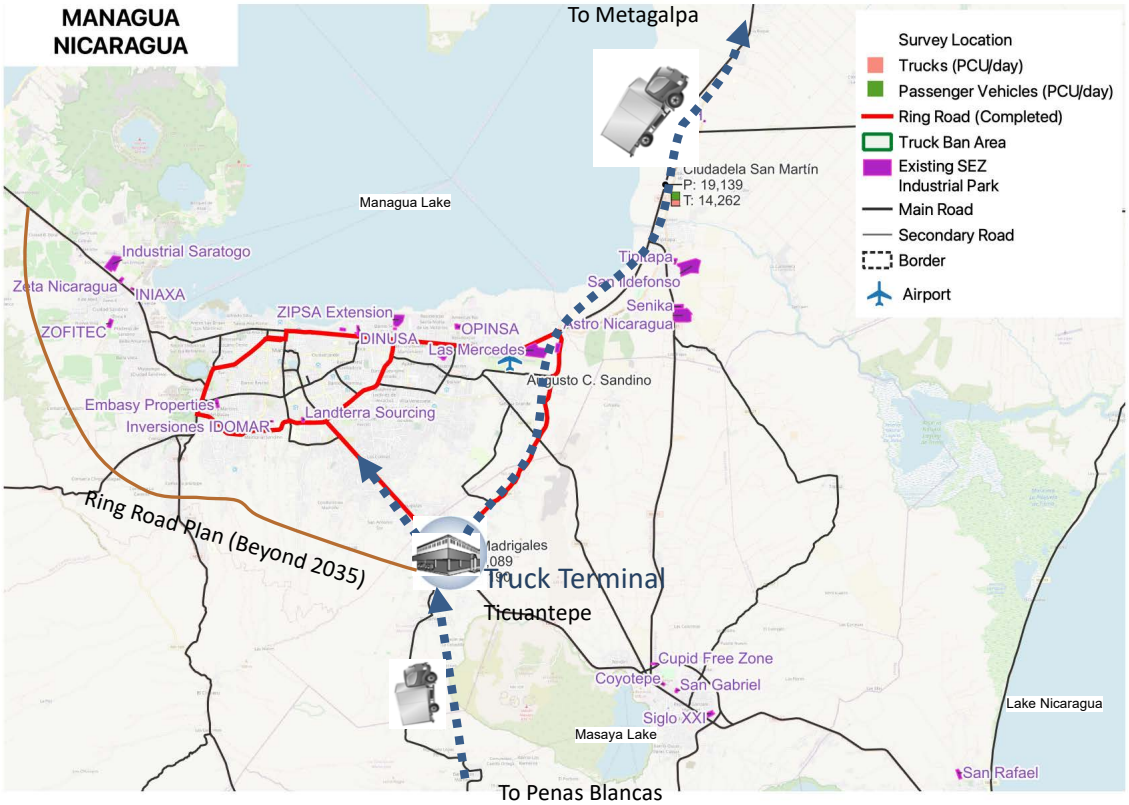
The following figure shows the conceptual plan for truck diversion in Managua that was proposed by the JICA study team for Urban Development Master Plan for Managua City in 2017. To mitigate the road congestion by trucks, a ring road plan with 6 lanes roads with an atrial road between the center of Managua and Masaya was proposed. In the Master Plan, the east section of the ring road was prioritized. The west section of the ring road was planned to be constructed by 2040.



Source: JICA, Project for Urban Development Master Plan for Managua City, 2017

Figure 10.5.16 Conceptual Plan for Truck Diversion in Managua

To transship the cargo to the Managua area and other northern areas in Nicaragua, the public truck terminal in Ticuantepe, the junction point of the national highway 4 and the ring road, is recommended as shown in Figure 10.5.17.



Source: JST

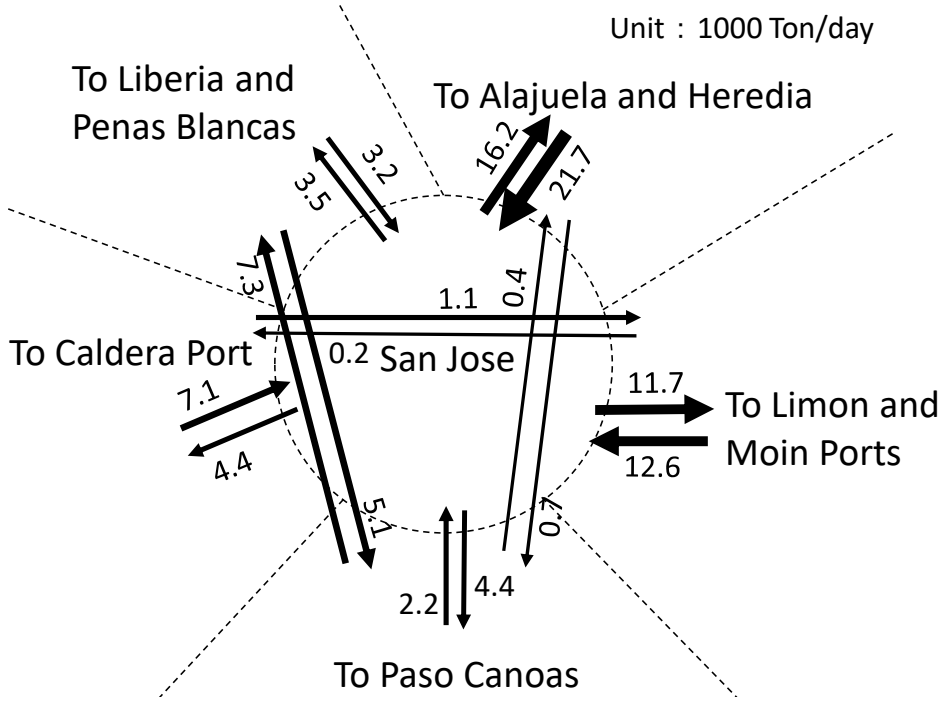
Figure 10.5.17 Ring Road and Public Truck Terminal Plan in Managua Metropolitan Area

f) Costa Rica

In the major radial roads of the San Jose metropolitan area, the largest cargo volume was observed between the San Jose area and the north direction to Alajuela as shown in Figure 10.5.18. The largest through traffic was observed from the northwest to east direction[5]. To avoid traffic congestion in the city area, a truck ban regulation is set in the peak hour of weekdays in the center of the city. It increases the transport time of cargo which crosses the San Jose metropolitan area. To divert the through traffic, a bypass road is required.

Figure 10.5.19 shows the ring road plan and the traffic volume on major radial roads of the San Jose metropolitan area. A ring road has been constructed except for the northwest section that is under construction. Most of the industrial park and SEZs are located in northwest area and outside of the truck ban area of the San Jose Metropolitan Area. There are gaps between the industrial area zone and ring road, approximately 10 km.

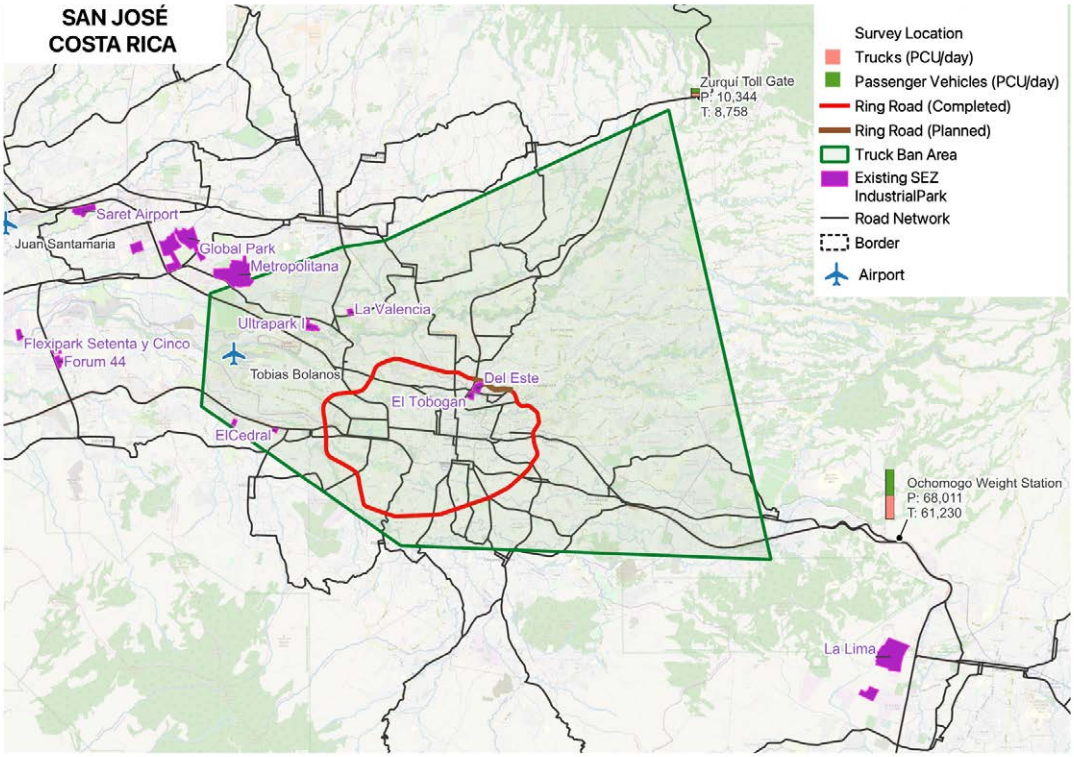
The ring road can partially mitigate the congestion issue. However, it is recommended to discuss changing the area of the truck ban, or construct an outer ring road in the future.



Source: JST based on traffic count and OD interview survey result

Figure 10.5.18 Cargo Flow of San Jose Metropolitan Area by Direction

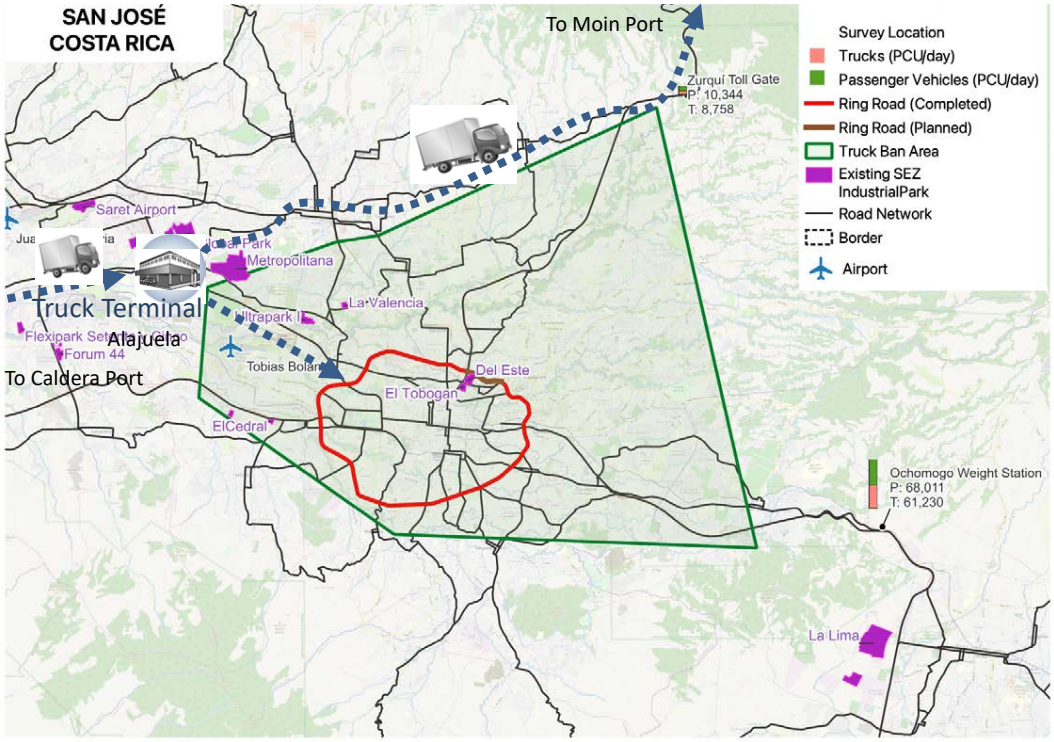
[5] Trucks between Nicaragua via Penas Blancas and Panama via Paso Canoas take national highway 34 and don't need to go through San Jose Metropolitan Area.



Source: JST

Figure 10.5.19 Traffic Volume of Managua Metropolitan Area and Ring Road Plan

To transship the cargo to San Jose area and Moin / Limon Ports, the public truck terminal in Alajuela, the northeast edge of the truck ban area, is recommended as shown in Figure 10.5.20.



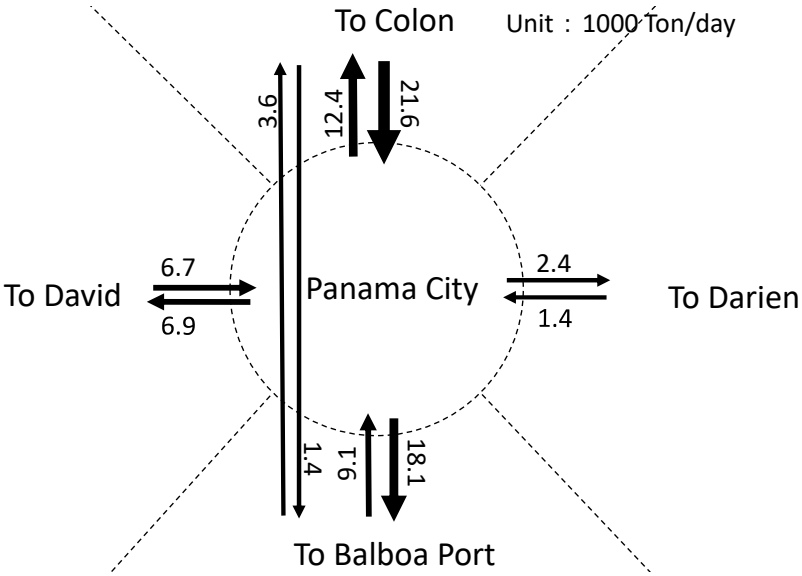
Source: JST

Figure 10.5.20 Public Truck Terminal Plan in San Jose Metropolitan Area

g) Panama City

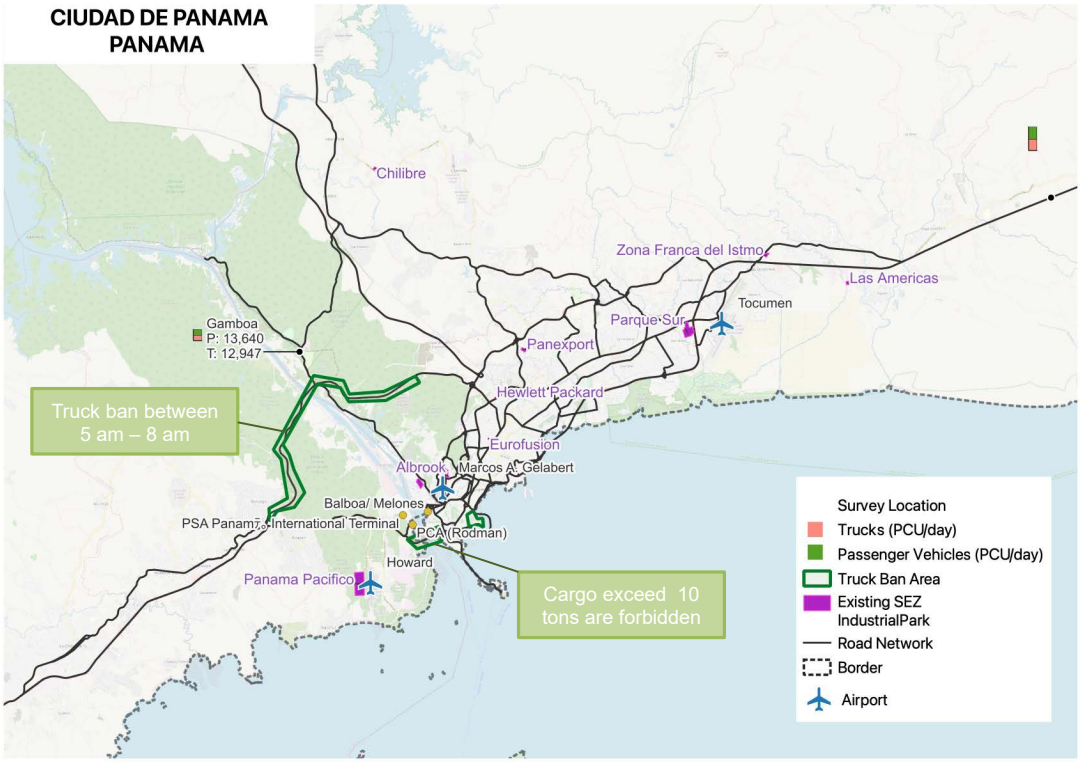
In the major radial roads of the Panama City metropolitan area, the largest cargo volume was observed between the Panama City area and Colon that is connected by ab expressway as shown in Figure 10.5.21. The largest through traffic was observed from the northwest to east direction.

To avoid traffic congestion on two major bridges connecting the east and west sides of the Panama Canal, namely Bridges of the Americas and Centennial Bridge, a truck ban regulation is set. Basically, trucks from the west region are required to avoid the morning peak hour or transship cargo to small trucks.



Source: JST based on traffic count and OD interview survey result

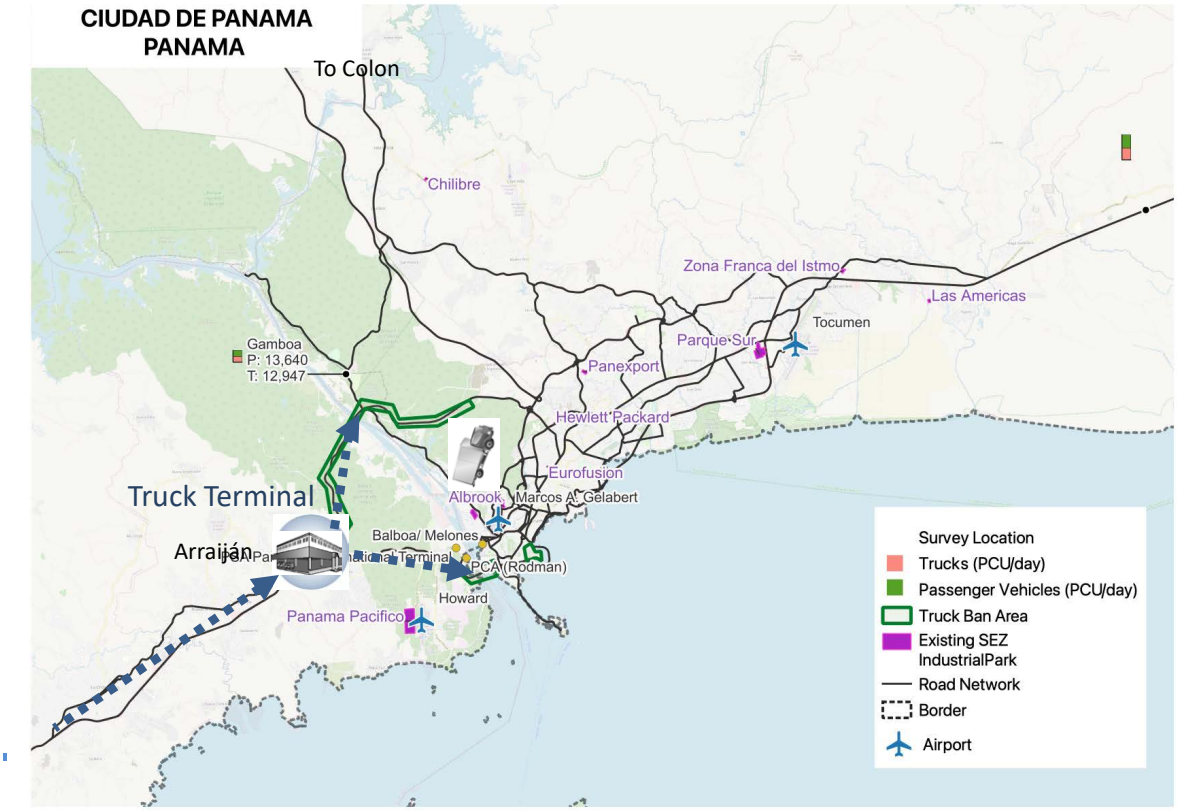
Figure 10.5.21 Cargo Flow of Panama City Metropolitan Area by Direction



Source: JST

Figure 10.5.22 Truck Ban Area and Traffic Volume of Panama City Metropolitan Area

To adjust the transport time and transship the cargo, the public truck terminal in Arraijan is recommended as shown in Figure 10.5.23.



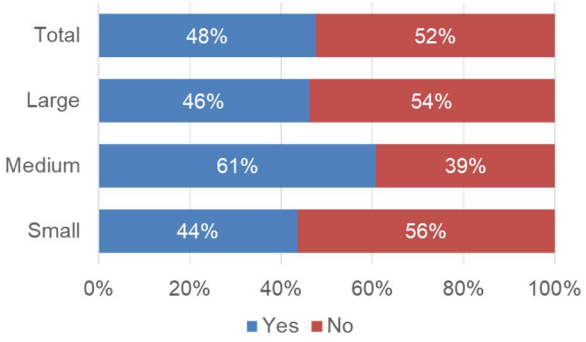
Source: JST

Figure 10.5.23 Public Truck Terminal Plan in Panama City Metropolitan Area

10.5.2 Aged Vehicle

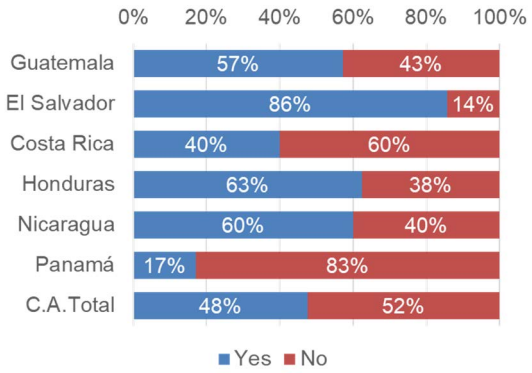
As it is mentioned above related to Figure 10.3.2 in Section 10.3.1, the average age of trucks in Central America is 14.4 years. Compared to the age of trucks in Japan which was 11.44 years in 2019, the age in Central America is higher. The aged trucks cause heavy maintenance cost and high fuel cost due to low fuel efficiency. Toward the sustainable transport business, it is important to use efficient vehicles considering the financial aspect of vehicle cost.

Figure 10.5.24 and Figure 10.5.25 show the interview survey result with trucking companies regarding the willingness to buy Eco-friendly trucks with a 10% subsidy by company size and by country. 48% of companies have an interest to renew the aged vehicles, if 10% of the cost was subsidized. Especially, companies in El Salvador are interested.



Source: JST based on the interview survey for transport operators

Figure 10.5.24 Willingness to Buy Eco-friendly Truck with 10% Subsidy by Company Size

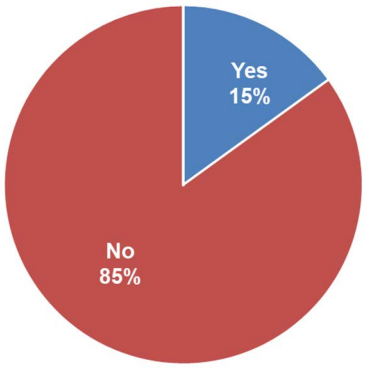


Source: JST based on the interview survey for transport operators

Figure 10.5.25 Willingess to Buy Eco-friendly Truck with 10% Subsidy by Country

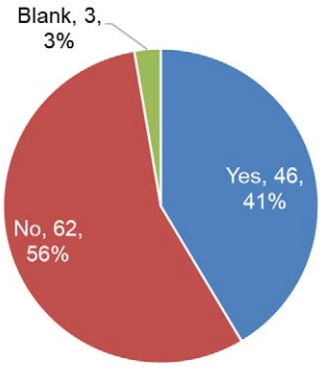
10.5.3 Imbalanced Cargo Flows (Empty Run)

According to the interview survey result with trucking companies, only 15% of trucks transport the cargo on the way back (Figure 10.5.26). This imbalanced cargo flow makes freight transport cost high. Theoretically, the cost can be almost half if trucks run with fully loaded cargo on the way back. Matching Apps for consigner and transport operators are becoming popular in other countries such as Japan. A similar service named "CARAVANA" was tried in Costa Rica in the past. However, it was not continued. 46% of trucking companies answered that there is a possibility to use the matching Apps between cargo owners and trucking companies (Figure 10.5.27). To improve the loading rate of trucks, it is also one of the strategies to allow truck cabotage like as seen in the EU. If truck cabotage is allowed, trucks can pick up cargo in the country of the 1st destination. However, it needs to consult with truck associations since it may affect their business activities.



Source: JST based on the interview survey for transport operators

Figure 10.5.26 Transporting Cargo in Round Trip



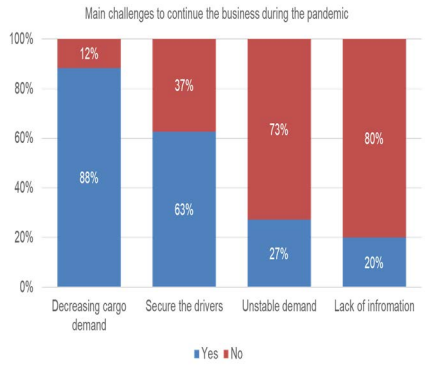
Source: JST based on the interview survey for transport operators

Remarks: It is assumed 10% of transport cost is charged for the apps service

Figure 10.5.27 Possibility to Use the Matching Apps for Cargo Owners and Trucking Companies

10.5.4 Financial Support against COVID-19

As it is mentioned in Section 10.2.4, 10.3.1, more that 65% of trucking companies reduced their turnover more than 30% due to the COVID-19 pandemic. 88% of the companies are suffering from the low cargo demand (Figure 10.5.28). 63% of the companies struggle to secure drivers. To continue the business, financial support from the government is required (Figure 10.5.29).



Source: JST based on the interview survey for transport operators

Figure 10.5.28 Main Challenges to Continue the Business During the Pandemic

Source: JST based on the interview survey for transport operators

Figure 10.5.29 Request for the Government against COVID-19

10.5.5 Coordination between Pubilic Sector and Private Sector

As it shown in Figure 10.2.17 in 10.2.4, most of the truck companies answered that they have not received instructions against COVID-19, even though SICA formulated the biosafety guideline for transport operators against COVID-19. It is recommended to coordinate between the public sector and private sector to maximize the effects of several actions taken by each side. Honduras and Panama established the special entities to facilitate actions taken by several actors on the urban logistics sector.

Project to Strengthen Capacities in the Elaboration of Regional Master Plan for Mobility and Logistics for Sustainable Regional Development in the Framework of Central American Economic Integration

Appendix 11

Transport Surveys and Demand Forecast

November 2023

Japan International Cooperation Agency
Oriental Consultants Global Co., Ltd.
Nippon Koei Co., Ltd.
ALMEC Corporation
Overseas Coastal Area Development Institute of Japan
International Development Center of Japan Inc.

Project to Strengthen Capacities in the Elaboration of Regional Master Plan for Mobility and Logistics for Sustainable Regional Development in the Framework of Central American Economic Integration

Appendix 11
Transport Surveys and Demand Forecast

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Appendix 11 Transport Surveys and Demand Forecast

11.1 Transport Surveys

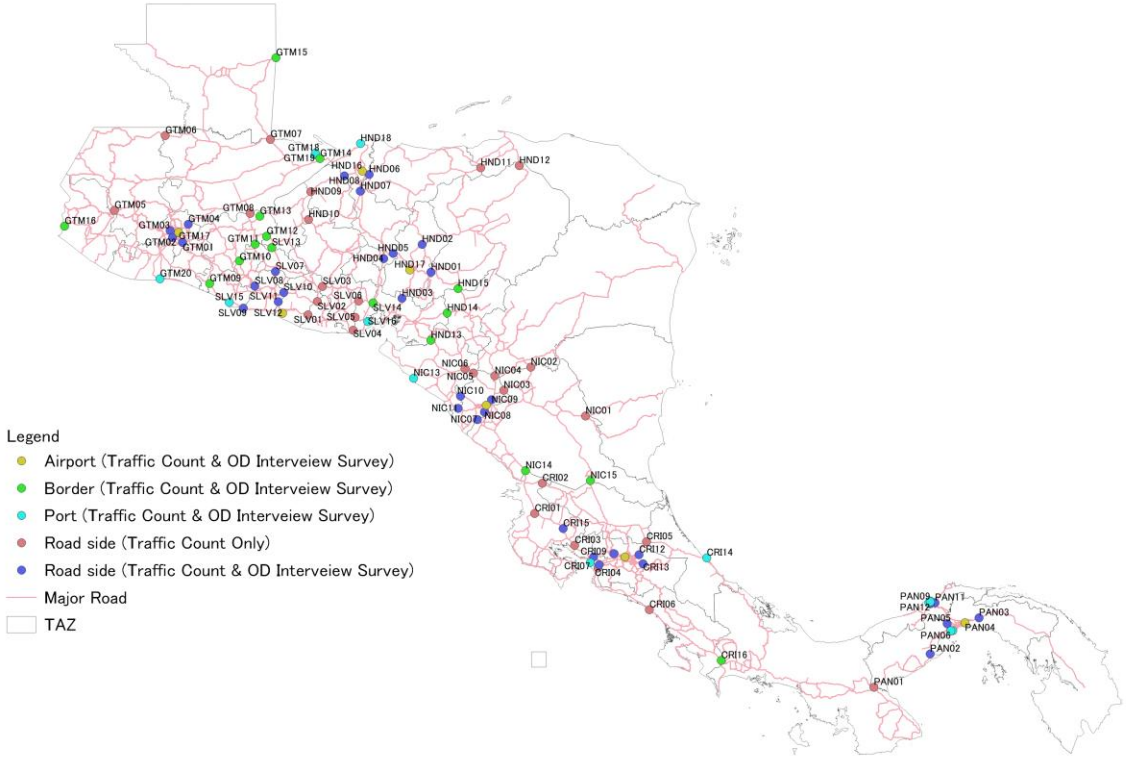
11.1.1 Trafic count survey

(1) Objective

To capture traffic volumes by type of vehicle on major highways in the region. The collected data will be used to understand the characteristics of vehicular traffic, and to estimate expansion factors of roadside OD interview survey data.

(2) Survey Location

Traffic count and OD interview survey was conducted as shown in Figure 11.1.1.



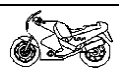
Source: JST

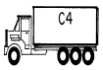
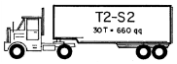
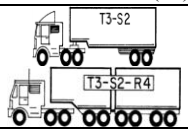
Figure 11.1.1 Survey Location

(3) Vehicle Classification

Vehicle classification used in this survey is presented below:

Table 11.1.1 Survey Vehicle Classification

Type1	Type2	Type3	Type4	Type5	Type6	Type7
Motorcycle / Three Wheeler	Car/Jeep	Passenger Van	Micro Bus	Large Bus	Pickup / Three-Wheeled Truck	Head Only
						

Type8	Type9	Type10	Type11	Type12	Type13
Light Truck	Heavy Truck (C3)	Heavy Truck (C4)	Container Trailer (T2)	Container Trailer (T3)	Others
					-

Source: JST

In consideration of vehicle size, road condition and traffic flow, traffic volume was converted from vehicle based to Passenger Car Unit (PCU) based, and utilized for analysis. The PCU values for above modes are shown in the table below.

Table 11.1.2 PCU Values

Vehicle Classification			PCU
Type1	Passenger Vehicle	Motorcycle	0.5
Type2		Car/Jeep	1.0
Type3		Passenger Van	1.0
Type4		Micro Bus	2.0
Type5		Large Bus	2.0
Type13		Others	1.0
Type6	Truck	Pickup / Three-Wheeled Truck	1.0
Type7		Head Only	1.0
Type8		Light Truck	2.0
Type9		Heavy Truck (C3)	2.0
Type10		Heavy Truck (C4)	3.0
Type11		Container Trailer (T2)	4.0
Type12		Container Trailer (T3)	4.0

Source: JST in reference to Highway Capacity Manual (2000), Transportation Research Board (USA)

(4) Survey Result

From this survey, pcu values at each survey point were calculated as shown in Table 11.1.3.

Table 11.1.3 PCU value at each survey point

Survey Type	Location Type	Country	Location ID	Location Name	PCU
Traffic count survey and Truck and cargo OD interview survey	National land border	Guatemala	GTM01	El Cerinal	25,152
			GTM02	Amatitlan	63,266
			GTM03	San Lucas Sacatepequez	44,269
			GTM04	El Chato	31,773
		El Salvador	SLV07	Quitasol	21,497
			SLV08	Ciudad Arce	35,798
			SLV09	Mizata	4,204
			SLV10	San Martin	33,122
			SLV11	Montelimar	50,605
		Honduras	HND01	Guayabias	6,050
			HND02	Talanga	9,676
			HND03	San Antonio de Flores	6,438
			HND04	Lanami	5,371
			HND05	45 Km	12,402
			HND06	Pte la Democracia	29,182
			HND07	Santa Rita	19,043
			HND08	Naco	23,387
		Nicaragua	NIC07	Pacaya	10,901
			NIC08	Los Madrigales	35,551
			NIC09	Ciudadela San Martin	18,679
			NIC10	Nagarote	13,031
			NIC11	El Quebracho	8,616
		Costa Rica	CRI08	Naranjo Toll Gate	20,604
			CRI09	Esparza Weight Station	5,653
			CRI10	Pozon Toll Gate	14,866
			CRI12	Zurqui Toll Gate	16,799
			CRI13	Ochomogo Weight Station	52,103
			CRI15	Canas Weight Station	12,282
		Panama	PAN02	Panama Oeste (Chame)	31,422
			PAN03	Pacora (Las Garzas)	29,001
			PAN05	Gamboa	15,283
			PAN11	Sabanitas (Transistmica)	40,723
			PAN12	Autopista Madem Colon	39,798
	Airport	Guatemala	GTM17	La Aurora	15,957
		El Salvador	SLV12	Compala	16,932
		Honduras	HND16	Ramon Villeda Morales	1,035
			HND17	Toncontin	254
		Nicaragua	NIC12	Augusto C. Sandino	44,987
		Costa Rica	CRI11	Juan Santamaria	748
		Panama	PAN04	Tocumen	5,183
	Port	Guatemala	GTM18	Barrios	14,775
			GTM19	Sto. Tomas	41,515
			GTM20	Quetzal	23,412
		El Salvador	SLV15	Acajutla	24,952
			SLV16	La Union	5,413
		Honduras	HND18	Cortes	9,539
		Nicaragua	NIC13	Corinto	9,445
		Costa Rica	CRI07	Caldera	7,880
			CRI14	R4 Mobile Weight Station	12,627

Survey Type	Location Type	Country	Location ID	Location Name	PCU
		Panama	PAN06	PCA (Rodman)	8,954
			PAN07	Balboa	6,221
			PAN08	Cristobal	5,484
			PAN09	Manzanllo	8,422
			PAN10	Colon	7,378
	Provincial boundary	Guatemala	GTM09	Pedro de Alvarado	5,548
			GTM10	San Cristobal Frontera	8,185
			GTM11	La Ermita	653
			GTM12	Agua Caliente	1,253
			GTM13	El Florido	10,083
			GTM14	Corinto	8,782
			GTM15	Melchor de Mencos	3,738
			GTM16	Tecun Uman	14,039
		El Salvador	SLV13	El Poy	3,701
			SLV14	El Amatillo	8,570
		Honduras	HND13	El Guasaule	6,352
			HND14	El Fraternidad	378
			HND15	Las Manos	446
		Nicaragua	NIC14	Penas Blancas	5,895
			NIC15	Las Tabillas	1,140
		Costa Rica	CRI16	Paso Canoas	9,744
Traffic count survey only	Provincial boundary	Guatemala	GTM05	Salcaja	14,770
			GTM06	Ixcan	5,963
			GTM07	Modesto Mendez	4,808
			GTM08	Aldea El Ingeniero	14,560
		El Salvador	SLV01	San Nicolas Lempa	19,026
			SLV02	Puente Cuscatian	6,701
			SLV03	Nvo.Eden de San Juan	1,443
			SLV04	El Carao	3,837
			SLV05	San Antonio Silva	8,126
			SLV06	Corinto	16,926
		Honduras	HND09	Macuefizo	13,069
			HND10	San Juan de Opoa	2,798
			HND11	Saba	5,983
			HND12	San Esteban	897
		Nicaragua	NIC01	La Gateada	3,041
			NIC02	Tierra Azul	2,006
			NIC03	Las Banderas	3,395
			NIC04	Las Angeles	11,450
			NIC05	Las Mojarras	1,149
			NIC06	Dos Montes	2,340
		Costa Rica	CRI01	Santa Ana	8,669
			CRI02	Santa Cecilia	2,259
			CRI03	Lapita	13,995
			CRI04	San Jeronimo	11,493
			CRI05	Sarapiqui	7,356
			CRI06	Savegre Puntarenas	6,263
		Panama	PAN01	Cocle (Aguadulce)	19,928

Source: JST

11.1.2 Truck and Cargo OD Interview Survey

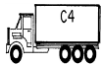
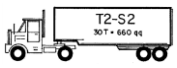
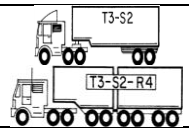
(1) Objective

To capture movement patterns of truck vehicles and carried cargo in the region at the national land borders, airports, ports, and provincial boundaries.

(2) Vehicle Classification of Target Vehicles

Vehicle classification used in this survey is presented below:

Table 11.1.4 Vehicle Classification

Type1	Type2	Type3	Type4	Type5	Type6
Head Only	Light Truck	Heavy Truck (C3)	Heavy Truck (C4)	Container Trailer (T2)	Container Trailer (T3)
					

Source: JST

(3) Survey Location and Sample Size

Truck and cargo OD interview survey was carried out at 69 locations as shown in Table 11.1.5. The average number of target vehicle volume at each location and interviewed samples are shown in Table 11.1.5. In total, 35,355 vehicles were interviewed in this survey. The analysis result is presented in subsection 2.2.

Table 11.1.5 List of Survey Locations and Valid Sample Size

Location Type	Country	Name	Average Traffic Volume of Target Vehicle (veh/day)	Interviewed Samples (veh/2day)	Sampling Rate (%)
National land border	Guatemala	Pedro de Alvarado	1,562	699	44.8%
		San Cristobal Frontera	600	649	108.2%
		La Ermita	497	385	77.5%
		Agua Caliente	118	186	157.6%
		El Florido	486	370	76.1%
		Corinto	919	682	74.2%
		Melchor de Mencos	271	281	103.7%
		Tecun Uman	1,611	844	52.4%
	El Salvador	El Poy	529	217	41.0%
		El Amatillo	1,203	490	40.7%
	Honduras	El Guasaule	787	346	44.0%
		El Fraternidad	149	173	116.1%
		Las Manos	221	225	101.8%
	Nicaragua	Penas Blancas	984	355	36.1%
		Las Tabillas	230	94	40.9%
	Costa Rica	Paso Canoas	728	184	25.3%
Airport	Guatemala	La Aurora	971	272	28.0%
	El Salvdor	Compala	596	133	22.3%
	Honduras	Ramon Villeda Morales	206	166	80.6%
		Toncontin	191	139	72.8%

Location Type	Country	Name	Average Traffic Volume of Target Vehicle (veh/day)	Interviewed Samples (veh/2day)	Sampling Rate (%)
	Nicaragua	Augusto C. Sandino	5,485	52	0.9%
	Costa Rica	Juan Santamaria	261	90	34.5%
	Panama	Tocumen	750	201	26.8%
Port	Guatemala	Barrios	2,487	923	37.1%
		Sto. Tomas	5,072	225	4.4%
		Quetzal	5,094	976	19.2%
	El Salvador	Acajutla	4,215	663	15.7%
		La Union	403	212	52.6%
	Honduras	Cortes	2,687	790	29.4%
	Nicaragua	Corinto	1,750	386	22.1%
	Costa Rica	Caldera	1,452	93	6.4%
		R4 Mobile Weight Station	2,081	313	15.0%
	Panama	PSA (Rodman)	1,134	579	51.1%
		Balboa	1,518	790	52.0%
		Cristobal	913	331	36.3%
		Manzanllo	1,397	226	16.2%
		Colon	1,960	831	42.4%
Provincial boundary	Guatemala	El Cerinal	2,766	588	21.3%
		Amatitlan	11,404	820	7.2%
		San Lucas Sacatepequez	3,431	726	21.2%
		El Chato	6,732	619	9.2%
	El Salvador	Quitasol	2,263	455	20.1%
		Ciudad Arce	4,100	666	16.2%
		Mizata	1,022	286	28.0%
		San Martin	4,032	567	14.1%
		Montelimar	3,760	711	18.9%
	Honduras	Guayabias	1,340	596	44.5%
		Talanga	1,635	639	39.1%
		San Antonio de Flores	1,450	740	51.0%
		Lanami	,952	690	72.5%
		45 Km	2,638	737	27.9%
		Pte la Democracia	3,682	885	24.0%
		Santa Rita	4,722	710	15.0%
		Naco	3,353	636	19.0%
	Nicaragua	Pacaya	1,352	619	45.8%
		Los Madrigales	1,277	669	52.4%
		Ciudadela San Martin	4,606	611	13.3%
		Nagarote	2,385	491	20.6%
		El Quebracho	845	330	39.1%
	Costa Rica	Naranjo Toll Gate	5,131	372	7.3%
		Esparza Weight Station	1,253	497	39.7%
		Zurqui Toll Gate	4,106	439	10.7%
		Ochomogo Weight Station	8,081	476	5.9%
		Canas Weight Station	2,551	416	16.3%

Location Type	Country	Name	Average Traffic Volume of Target Vehicle (veh/day)	Interviewed Samples (veh/2day)	Sampling Rate (%)
	Panama	Panama Oeste (Chame)	3,525	1,298	36.8%
		Pacora (Las Garzas)	1,940	1,039	53.6%
		Gamboa	396	465	117.4%
		Sabanitas (Transistmica)	1,773	968	54.6%
		Autopista Madem Colon	3,289	1,023	31.1%
Total			153,310	35,355	23.1%

Note: Sampling rates of some locations could not be met the target due to survey difficulties under COVID-19. Thus, this result might be corrected by secondary data in the next step.
Source: JST

11.1.3 Cargo Transport Service Providers Interview Survey

(1) Objective

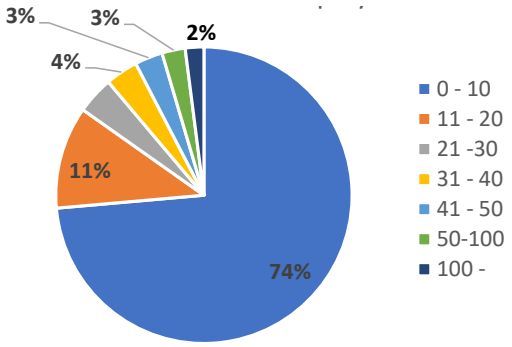
To understand the existing services especially focusing on the service level of cargo transport, the issues on the cargo transport based on the opinions from cargo transport service provider, the issues on the cargo transport due to the impact of COVID-19.

(2) Trucking Companies

a) Characteristics of Interviewed Companies (Employee and Trucks)

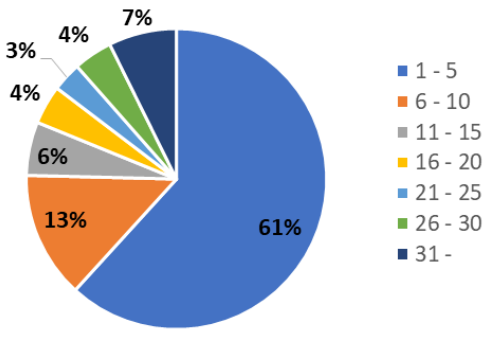
In total, complete answers were provided from 199 companies.

Figure 11.1.2 shows the number of employees in each company. 74 % of interviewed companies were small companies which have less than 10 employees. Figure 11.1.3 shows the distribution of the number of trucks in each company. 74 % of interviewed companies were small companies which have less than 10 trucks. The company has 1 – 5 trucks are dominant.



Source: JST, based on the interview survey for transport operators

Figure 11.1.2 Distribution of Trucking Company by Number of Employee (Trucking Company)



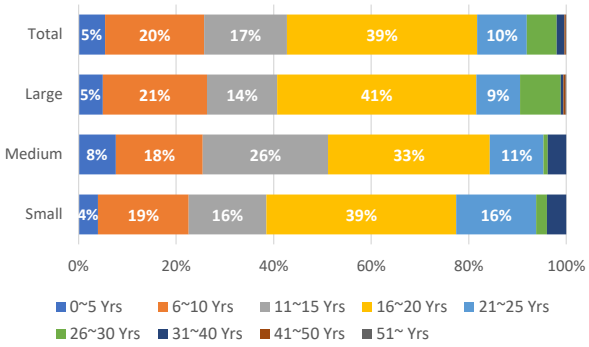
Source: JST, based on the interview survey for transport operators

Figure 11.1.3 Distribution of Trucking Company by Number of Trucks

b) Vehicle Condition

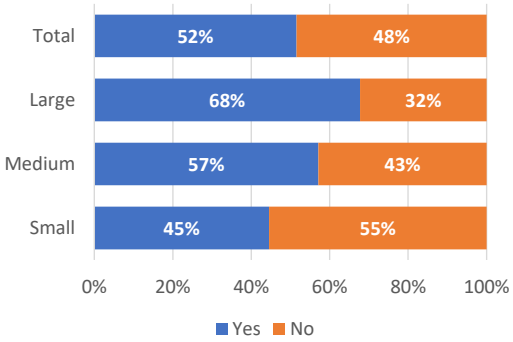
The average age of trucks in Central America is 15.3 years. Compared to the age of trucks in Japan, which

was 11.44 years in 2019, this is higher. Figure 11.1.5 shows the result of interview survey (by company size and by country) for trucking companies regarding the willingness to buy eco-friendly trucks with a 10% subsidy. 45% of the companies have interest to renew the aged vehicles, if 10% of the cost is subsidized.



Source: JST, based on the interview survey for transport operators

Figure 11.1.4 Distribution of Trucks (by Age and Company Size)

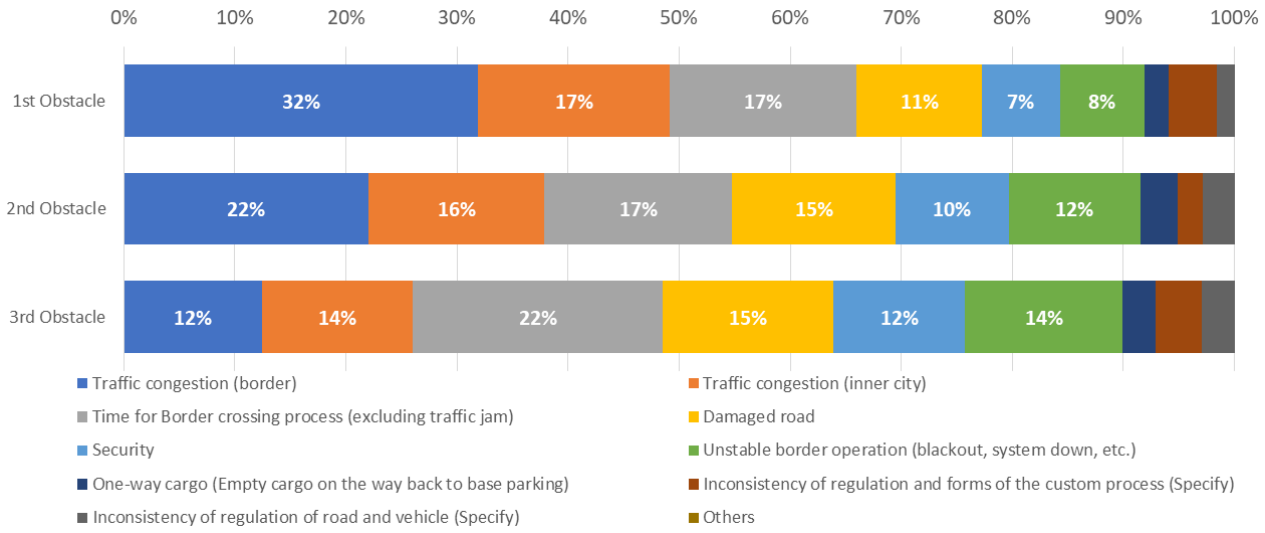


Source: JST, based on the interview survey for transport operators[1]

Figure 11.1.5 Willingness to Buy Eco-Friendly Truck with 10% Subsidy (by Company Size)

c) Obstacles

Figure 11.1.6 shows the interview survey result with trucking companies regarding the main obstacles to transport cargo. As shown, 49% of companies regard traffic congestion as a primary issue; especially, congestion at the border is the most pressing issue (32%). The next pressing issue is the traffic congestion in the city area.



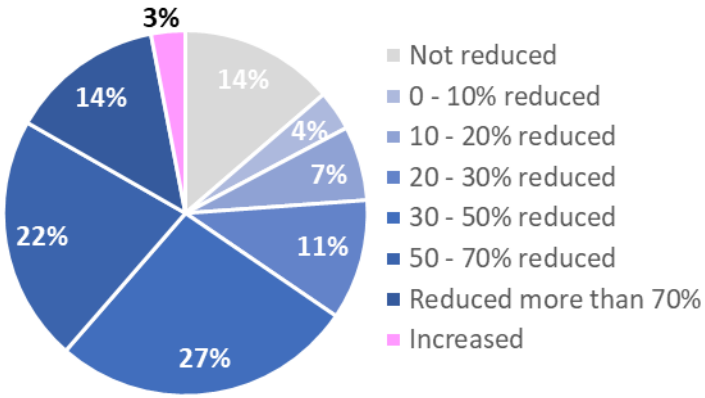
Source: JST based on the interview survey for transport operators

Figure 11.1.6 Obstacle

[1] Large firms: More than 20 vehicles. Medium firms: between 5 and 20 vehicles. Small firms: less than 5 vehicles

d) COVID-19's Impact

COVID-19 has reduced trucking companies' turnover. 63% of companies reduced turnover more than 30% (Figure 11.1.7).



Source: JST based on the interview survey for transport operators

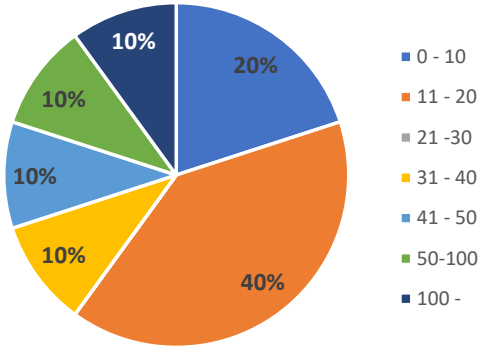
Figure 11.1.7 COVID-19's Impact on Turnover

(3) Air Cargo Service Providers

a) Characteristics of Interviewed Companies (Employee)

In total, complete answers were provided from 11 companies.

Figure 11.1.8 shows the distribution of the number of employees in each company. 20 % of interviewed companies were small companies which have less than 10 employees. The company has 11 – 20 staffs are dominant.



Source: JST based on the interview survey for consigner companies

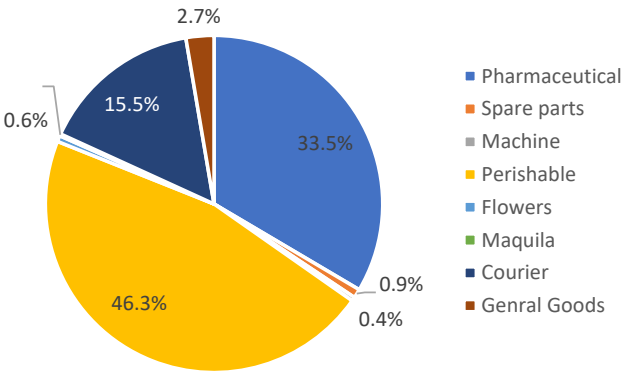
Figure 11.1.8 Distribution of the Number of Employee (Air Cargo Service Company)

b) Air Cargo Distribution

Figure 11.1.9 shows the distribution of commodity of air cargo in weight. Mainly, high value and light cargo and the cargo required freshness are transported by airplane. Perishable products share and 46 % of air cargo, followed by Pharmaceutical products, 33.5 %.

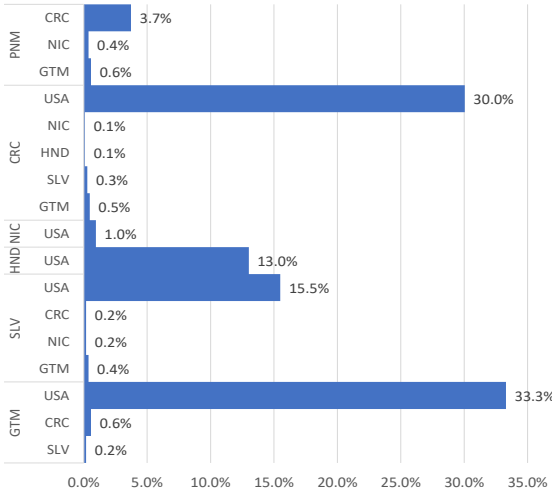
Figure 11.1.10 shows the distribution of the origin and destination of air cargo in weight. Most of the destination is USA. Especially, the cargo from Guatemala and Costa Rica to the USA shares 33.3% and

30% of all the air cargo.



Source: JST based on the interview survey for transport operators

Figure 11.1.9 Commodity of Air Cargo in Weight

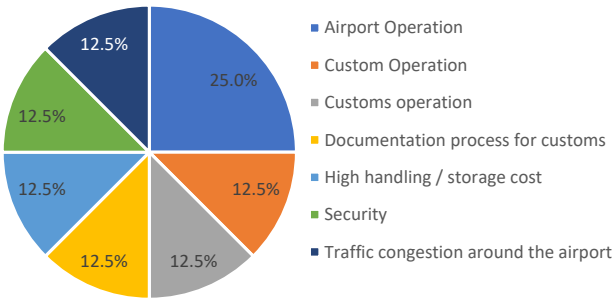


Source: JST based on the interview survey for transport operators

Figure 11.1.10 Origin-Destination of Air Cargo in Weight

c) Obstacles

Following figure shows the primary obstacle to transport the cargo. Airport operation is the main obstacle and shares 25 %.

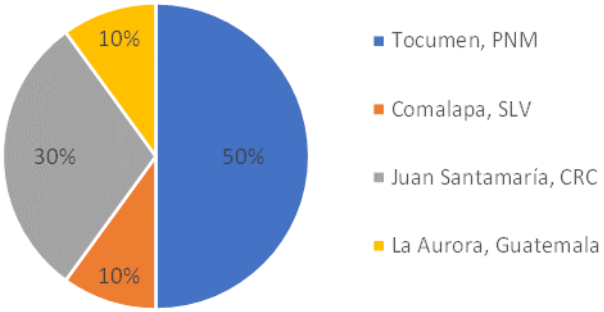


Source: JST based on the interview survey for transport operators

Figure 11.1.11 Primary Obstacle

d) Regional Hub Airport of Air Cargo

50% of the interviewed companies recognizes the Tocumen International Airport in Panama City is the regional hub of the air cargo, followed by the Juan Santamaria International Airport in San Jose sharing 30%.

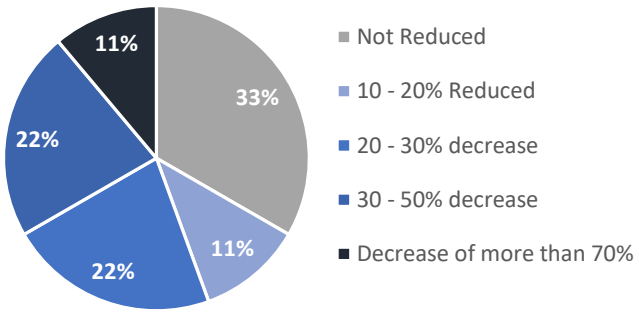


Source: JST based on the interview survey for transport operator

Figure 11.1.12 Regional Hub Airport of Air Cargo

e) COVID-19's Impact

COVID-19 has reduced some air cargo companies' turnover. 33% of companies reduced turnover more than 30% (Figure 11.1.13). On the other hand, 33% of the interviewed companies answered there are limited impact on turnover.



Source: JST based on the interview survey for transport operators

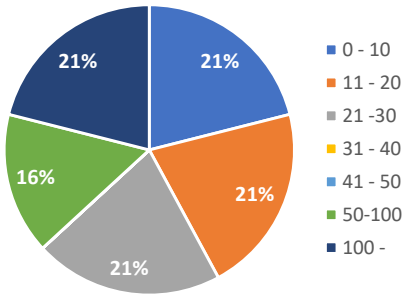
Figure 11.1.13 COVID-19's Impact on Turnover

(4) Sea Cargo Service Providers

a) Characteristics of Interviewed Companies (Employee)

In total, 21 companies provided the answer of the interview.

Figure 11.1.14 shows the distribution of the number of employees in each company. 21 % of interviewed companies were small companies which have less than 10 employees.

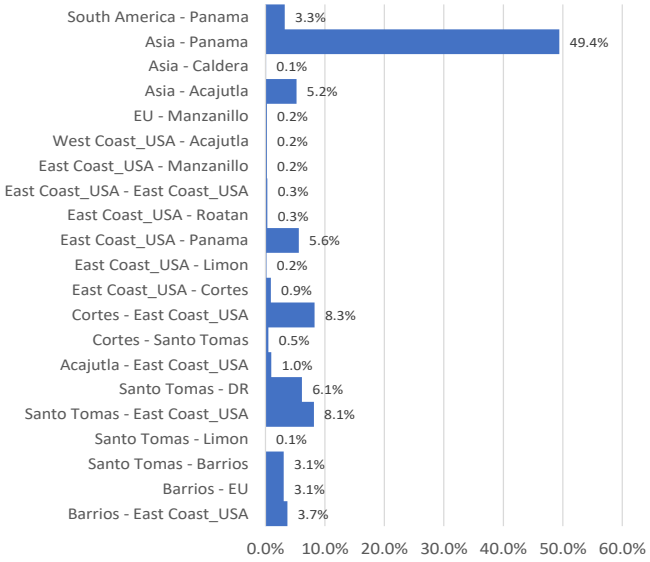


Source: JST based on the interview survey for consigner companies

Figure 11.1.14 Distribution of the Number of Employee (Sea Cargo Service Company)

b) Sea Cargo Distribution (Container)

Figure 11.1.15 shows the distribution of the origin and destination of container sea cargo in TEU. Import from Asian country to Panama share almost half of the cargo handled by the interviewed companies.

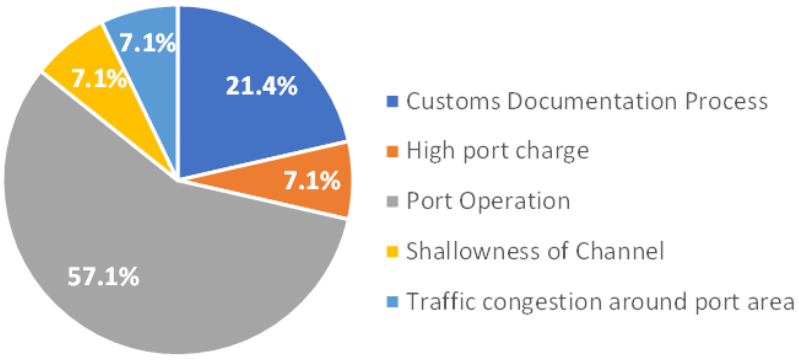


Source: JST based on the interview survey for transport operators

Figure 11.1.15 Origin-Destination of Sea Cargo in TEU

c) Obstacles

Following figure shows the primary obstacle to transport the cargo. Port operation is the main obstacle and shares 57.1 %, followed by customs documentation process sharing 21.4%.

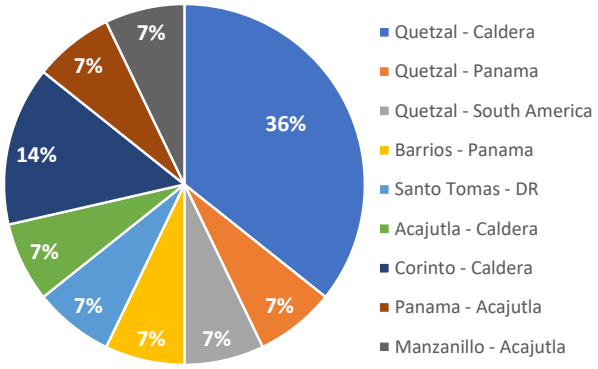


Source: JST based on the interview survey for transport operators

Figure 11.1.16 Primary Obstacle

d) Desirable Route for Short Sea Shipping (TMCD)

Central American countries have made an effort to open the coastal shipping service. Desirable route of short see shipping was interviewed in this study. The section between Quetzal port in Guatemala and Caldera port in Costa Rica shares 36 % of the desirable route of interviewed companies.

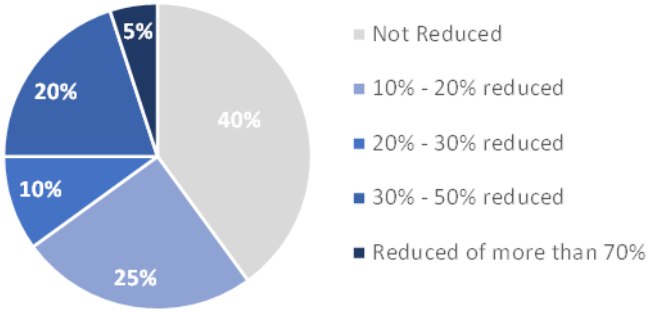


Source: JST based on the interview survey for transport operators

Figure 11.1.17 Desirable Route of Short-sea shipping (TMCD)

e) COVID-19's Impact

COVID-19 has reduced some sea cargo companies' turnover. 25% of companies reduced turnover more than 30% (Figure 11.1.18). On the other hand, 40% of the interviewed companies answered there are limited impact on turnover.



Source: JST based on the interview survey for transport operators

Figure 11.1.18 COVID-19's Impact on Turnover

11.1.4 Consignor (Owner) Interview Survey

(1) Objective

To understand the needs of cargo transportation (quantity and quality) for major commodities (export and import) in the region and major determinants in selecting transport service providers.

(2) Characteristics of Interviewed Companies

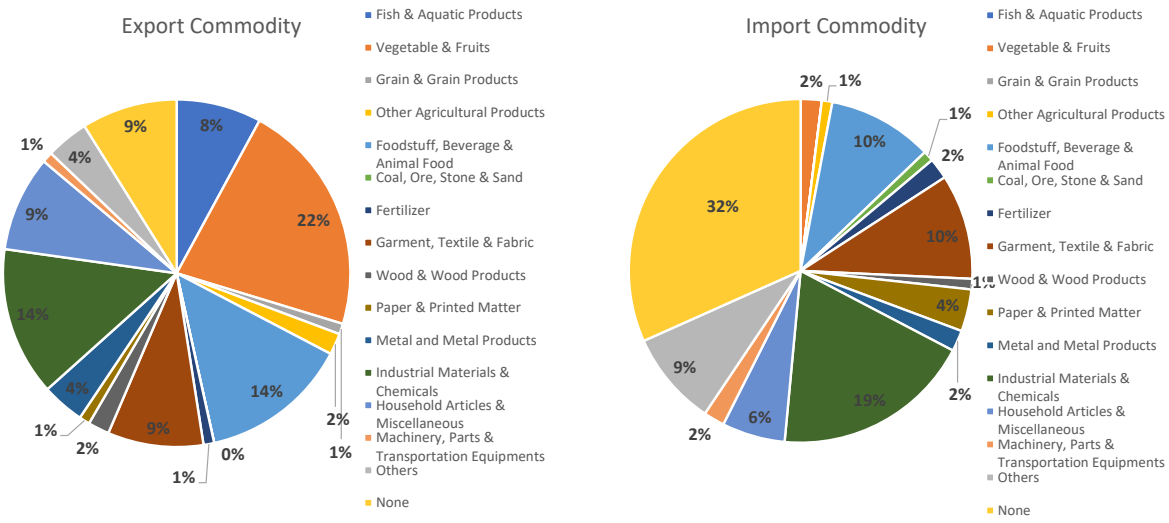
In total, complete answers were provided from 101 companies.

a) Handling Commodity

Following figure shows the distribution of the commodity that interviewed companies mainly handle.

22 % of the interviewed companies exporting vegetable and fruits including passion fruits. The companies export metal and metal products shares 14%. Similarly, the companies export foodstuff share 14%. Textile companies and miscellaneous companies share 9%, respectively.

As for the import, 32% of the interviewed companies don't import goods. 19% of the interviewed companies mainly import industrial materials and chemicals.

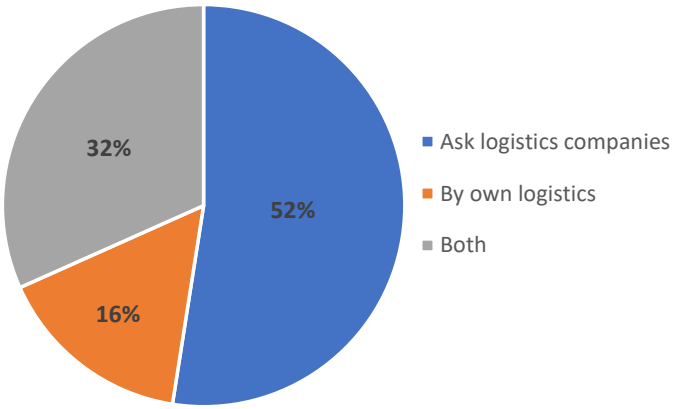


Source: JST based on the interview survey for consigner companies

Figure 11.1.19 Distribution of Commodity Interviewed Companies Handle

b) Logistics Services

52% of the interviewed companies outsourcing the logistics service to other companies. 16% of the companies arranged logistics by themselves. Remaining 32% of the companies has own logistics and outsourcing some services.



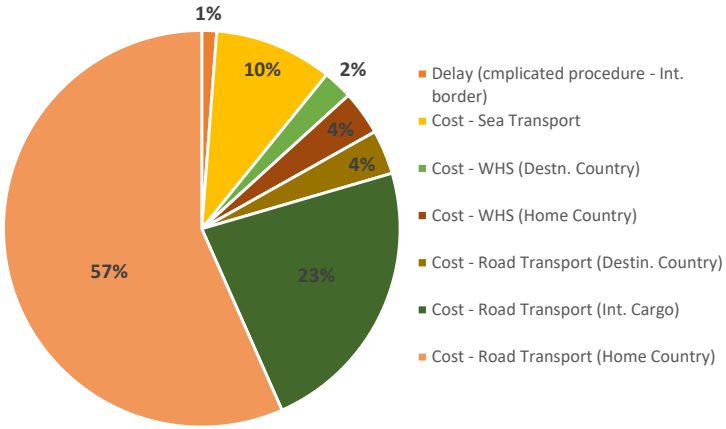
Source: JST based on the interview survey for consigner companies

Figure 11.1.20 Distribution of Type of Logistics Services

(3) Issues on Logistics

a) Issues on Hiring Logistics Companies

99% of the companies answered that the main issue on hiring logistics companies is related to the cost for service. Especially, road transport cost in home country shares 57%, followed by the cost for international transport shares 23%.

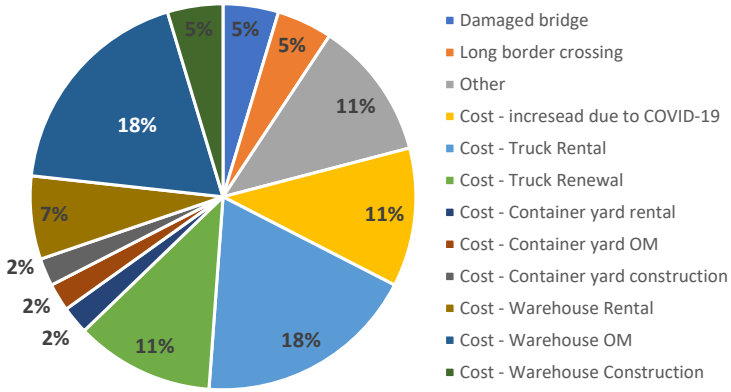


Source: JST based on the interview survey for consigner companies

Figure 11.1.21 Issues on hiring Logistics Companies

b) Issues on Arranging Cargo Transport

For the companies has own logistics, the cost of renting trucks and the cost for operating and maintaining own warehouse is the primary issues.

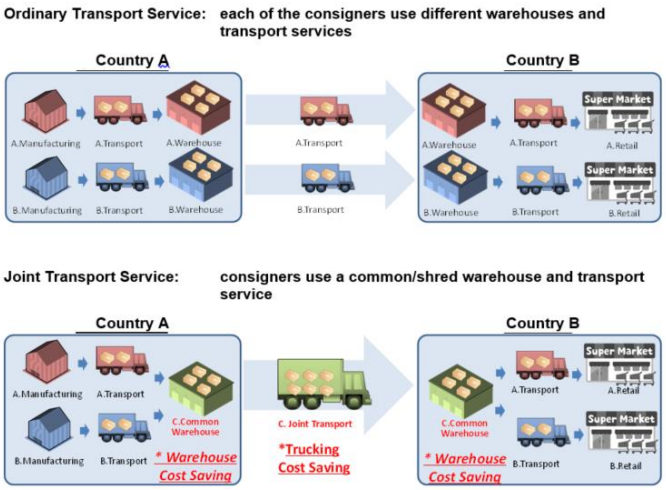


Source: JST based on the interview survey for consigner companies

Figure 11.1.22 Issues on Arranging Cargo Transport

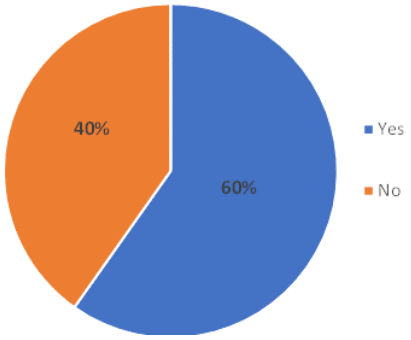
c) Possibilities to Use New Transport Services – Joint Transport Services

60% of the interviewed companies are willing to use joint transport services within Central America.



Source: JST

Figure 11.1.23 Image of Joint Transport Service



Source: JST

Figure 11.1.24 Willingness to Use Joint Transport Service

Based on the interview, the preferred sections to serve the joint transport are shown in the Table 11.1.6. Costa Rica is one of the most required destination countries especially from Panama. On the other hand, El Salvador is one of the least necessary destination based on the interview.

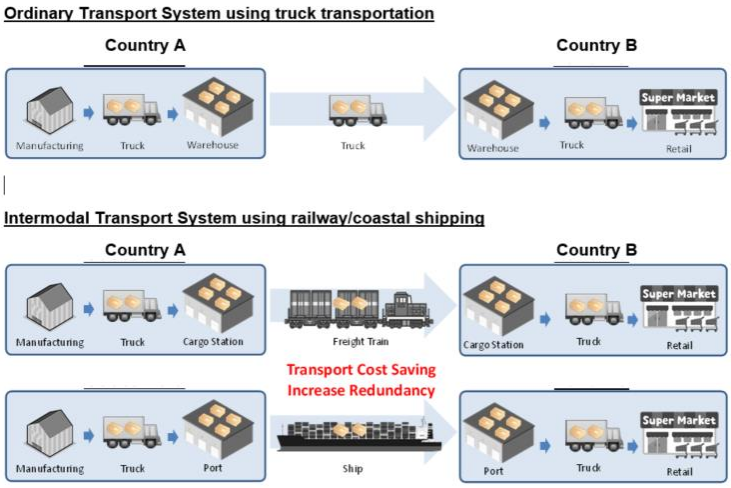
Table 11.1.6 The Most Preferred Section for Joint Transport

Destination / Origin	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panama
Guatemala		2	2	2	2	1
El Salvador			3	2		1
Honduras	3			5	1	2
Nicaragua	2	1	1		1	
Costa Rica			1	1		2
Panama	1	2	2	1	9	2
Total	6	5	9	11	13	8

Source: JST based on the interview survey for consigner companies

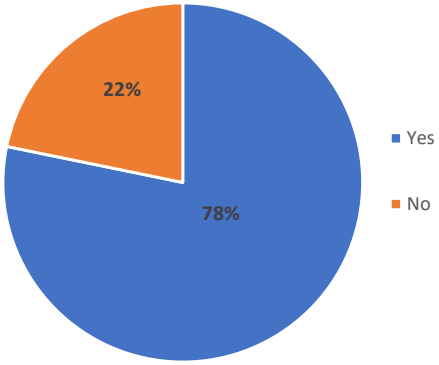
d) Possibilities to Use New Transport Services – Coastal Shipping or Railway Service

78% of the interviewed companies are willing to use coastal shipping or railway service within Central America.



Source: JST

Figure 11.1.25 Image of Coastal Shipping or Railway Service



Source: JST

Figure 11.1.26 Willingness to Use Coastal Shipping or Railway Service

Based on the interview, the preferred sections to have air or railway service are shown in the Table 11.1.7 . Guatemala is one of the most required destination countries especially from Panama. On the other hand, El Salvador is one of the least necessary destination based on the interview. It is similar with the tendency of opening route to El Salvador for joint service.

Table 11.1.7 The Most Preferred Section for Other Transport Sector (Railway and Maritime)

Destination / Origin	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panama
Guatemala	2	2		4	3	2
El Salvador	1	1	2	3	1	2
Honduras	2	1	1	1	4	1
Nicaragua	2		1	1	1	
Costa Rica		1	1			3
Panama	10	2	7	2	2	2

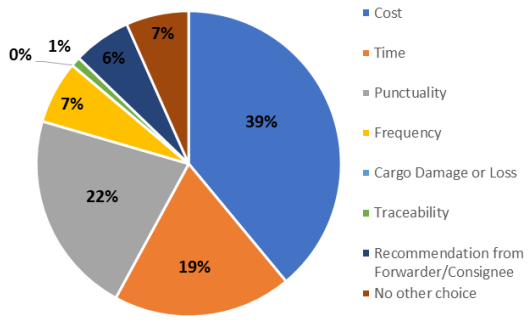
Source: JST based on the interview survey for consigner companies

e) Factor to Select the Transportation Mode

Following figures show the reason to select transportation mode for exporting and importing cargo.

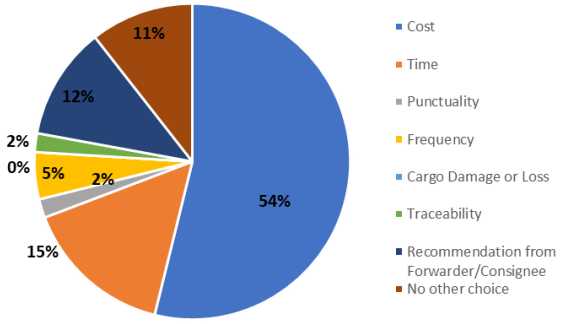
As for import, 39 % of the interviewed companies answered the cost is the main factor to select the mode, followed by punctuality, 22 %.

On the other hand, 54% of the companies mentioned the cost is the factor to select the transport mode for importing cargo. Punctuality isn't prioritized for import.



Source: JST

Figure 11.1.27 Factor to Select Transport Mode （Export）



Source: JST

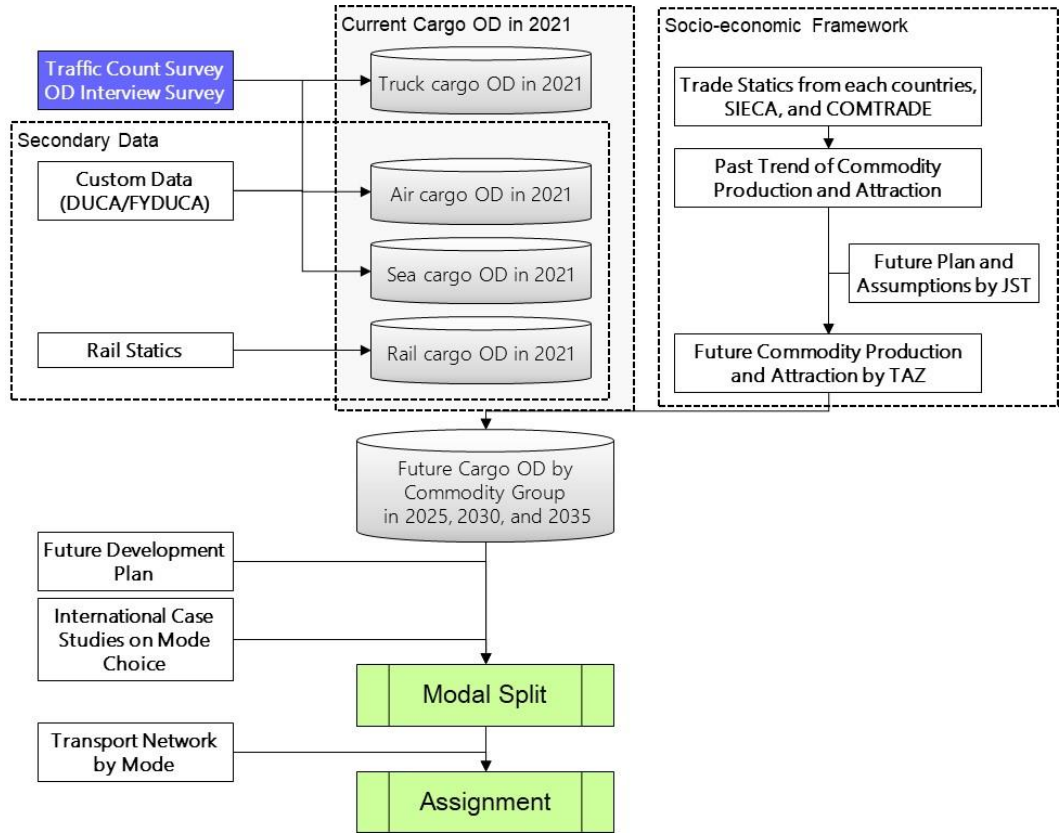
Figure 11.1.28 Factor to Select Transport Mode （Import）

11.2 Freight Demand Forecast

11.2.1 Methogology

(1) Demand Forecast Process

Figure 11.2.1 shows an overall flow chart for freight demand forecast. Base year truck cargo OD was estimated based on the traffic count survey and OD interview suevey result. Air and sea cargo OD was estimated based on the trade data from customs. Future freight demand was forecasted based on current cargo movements along with a trade growth ratio forecast for each commodity type.



Source: JST

Figure 11.2.1 Work Flow of Freight Demand Forecast

(2) Planning Horizons

Since the field traffic survey was carried out in 2021, 2021 is set as the base year for the transport modeling. The ultimate target year is set at 2035 based on the Terms of Reference of the Project. 2025 and 2030 are set as the short and mid-term planning horizon. Demand forecasts were prepared for three planning horizons:

- Base year: 2021
- Short-term planning horizon:2025
- Mid-term planning horizon: 2030
- Long-term planning horizon: 2035

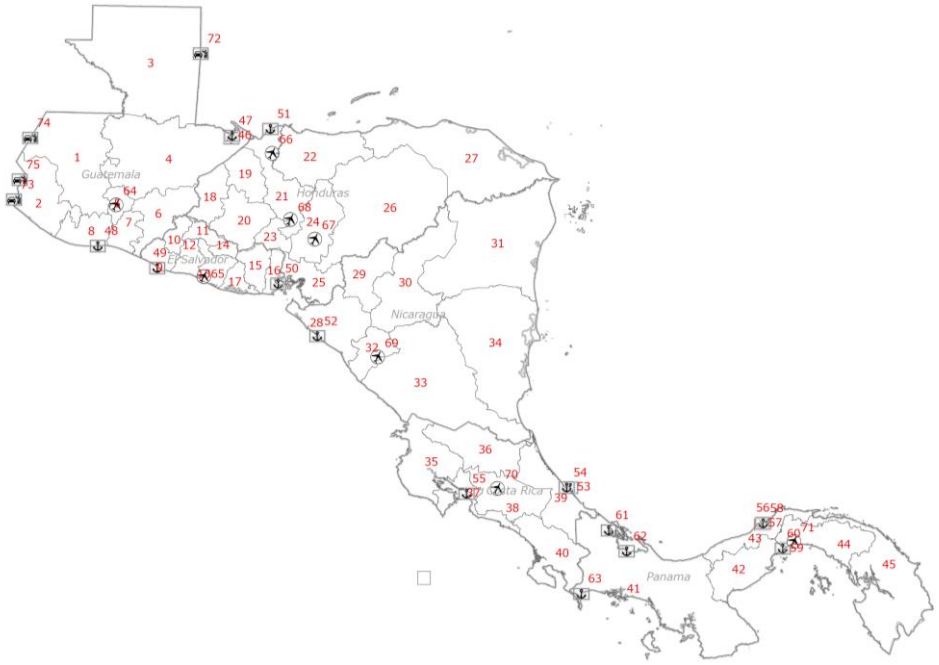
(3) Traffic Analysis Zones

In this analysis, each country is divided into some internal zones considering logistics strategy, transport policy, administrative boundaries, geographical characteristics, and available socio-economic data. In addition, major ports, airports, and land borders with Mexico are set as external zones. In total, as shown in Table 11.2.1 and Figure 11.2.2, the whole study area is divided into 75 zones: 45 internal zones and 30 external zones.

Table 11.2.1 Zoning System

	Internal Zone	External Zone		
		Port	Airport	Land border
Guatemala	8	3	1	4
El Salvador	9	2	1	
Honduras	10	1	3	
Nicaragua	6	1	1	
Costa Rica	5	3	1	
Panama	7	8	1	
Sub Total	45	18	8	4
Total				75

Source: JST



Source: JST

Figure 11.2.2 Zone System

(4) Transport Network

a) Road Network

1. Road Classification

Considering the road category in the "Central American Standards Manual for Geometric Road Design of the Regional Road (*Manual Centroamericano de Normas para el Diseño Geométrico de Carreteras, 2011*)", road classification for transport modelling was defined as below.

Table 11.2.2 Road Classification

Category ID in the Manual	Category ID in Transport Modelling	Road Class	Road Class	ADT(Vehicle/day)
AA	1	Highway*	Highway	>20,000
A	2	Arterial	Principal Arterial	10,000-20,000
AM	3		Minor Arterial	3,000-10,000
C	4	Collector	Major Collector	10,000-20,000
CM	5		Minor Collector	500-3,000
L	6	Local	Local	<500

Note*: highway include toll roads
Source: JST based on Central American Standards Manual for Geometric Road Design of the Regional Road

2. Urban Area and Rural Area Classification

The road category was further divided into urban and rural area[2]. The urban area is shown in Figure 11.2.3.

[2] Urban area is decided in accordance with the Functional Urban Area (FUA) of "GHSL-OECD Functional Urban Areas (Joint Research Centre (JRC), the European Commission's science and knowledge service)". https://ghsl.jrc.ec.europa.eu/documents/GHSL_FUA_2019.pdf?t=1583246033

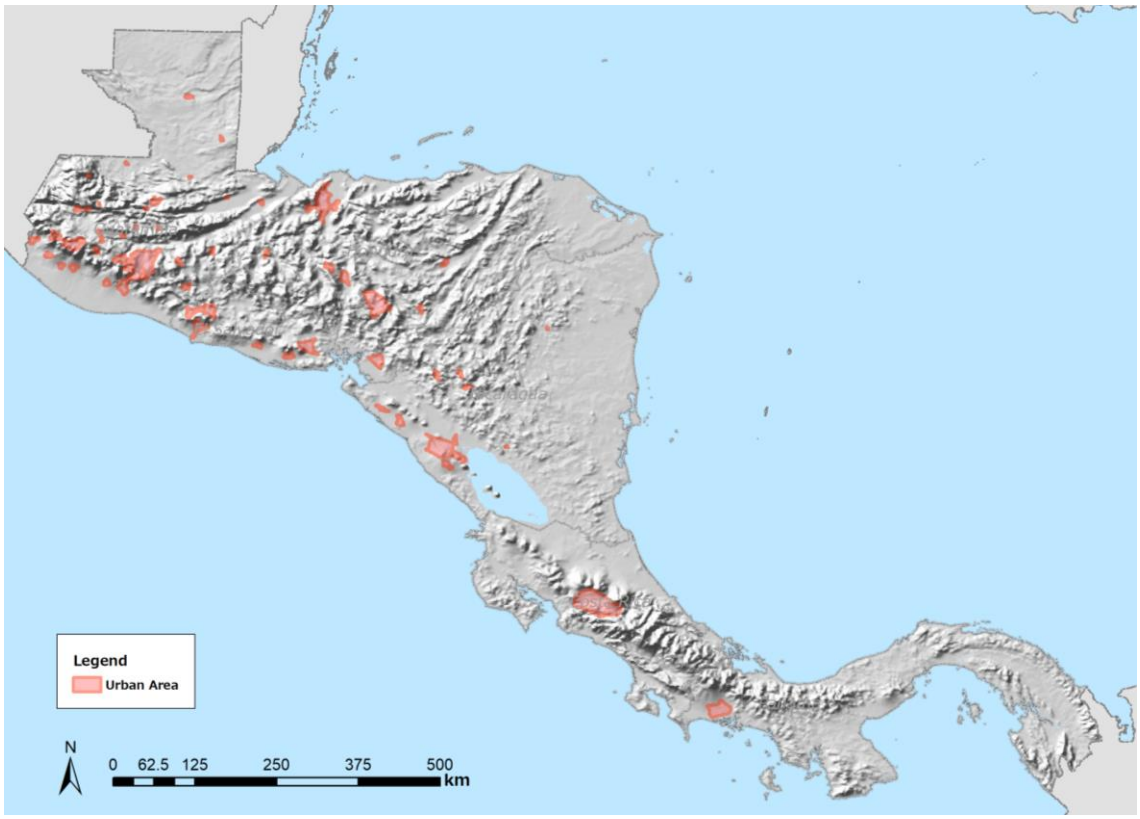
3. Terrain

Based on the terrain information of Digital Elevation Model (DEM), the road was further categorized into flat, rolling and mountaneious road since the information on gradient of all roads were not available.

Table 11.2.3 Terrain Classification

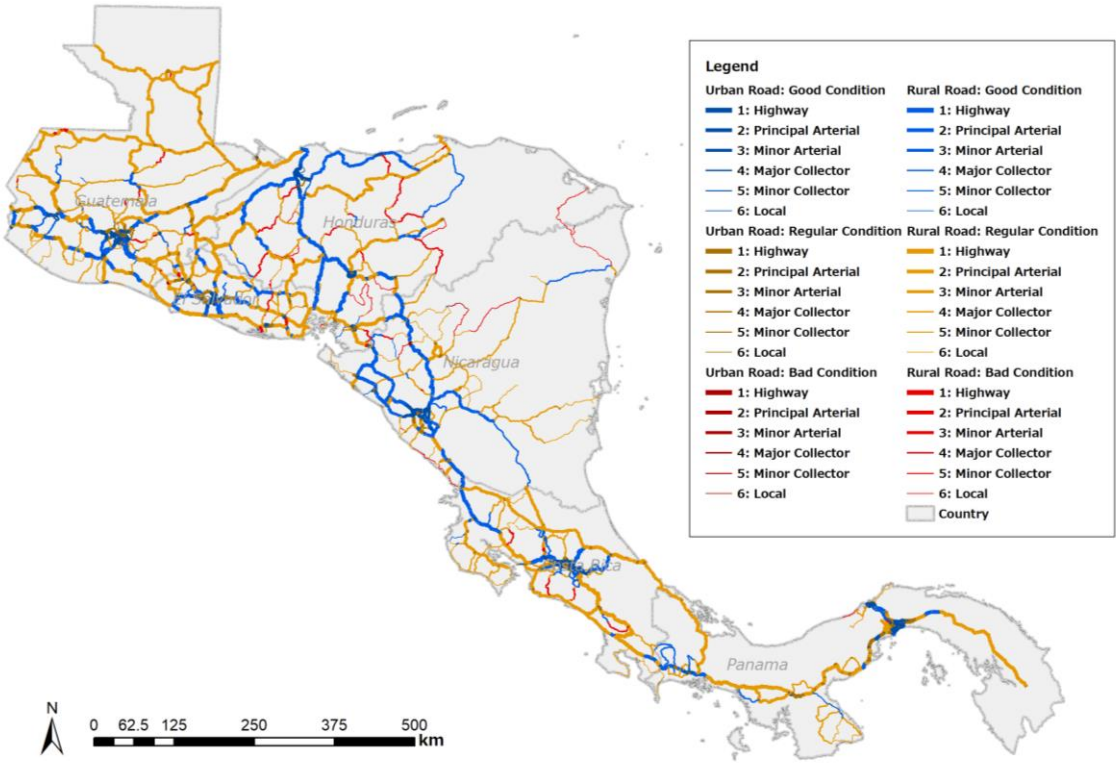
Terrain Category	Gradient
Flat	0 – 4%
Rolling	4 – 20%
Mountainious	More than20 %

Source: JST



Source: JST

Figure 11.2.3 Urban/Rural Area and Terrain



Source: JST

Figure 11.2.4 Road Network

4. Road Capacity

Capacity of each road category is defined as shown below based on the above mentioned road category.

Table 11.2.4 Road Link Capacity (Paved Road)

Road Category	Number of Lanes	Capacity (PCU/day)					
		Flat			Rolling/Mountainious		
		LOS B	LOS C	LOS D	LOS B	LOS C	LOS D
Urban	2	23,200	33,250	42,500	21,550	30,900	39,450
	3	34,800	49,875	63,750	32,325	46,350	59,175
	4	46,400	66,500	85,000	43,100	61,800	78,900
	5	70,000	90,100	108,600	66,700	85,400	102,500
	6	69,500	99,800	127,400	64,500	92,700	118,400
	7	93,100	123,400	151,000	88,100	116,300	142,000
	8	92,600	133,000	169,900	86,000	123,600	157,800
	9	116,200	156,600	193,500	109,600	147,200	181,400
	10	115,800	166,300	212,400	107,600	154,500	197,200
	11	139,400	189,900	236,000	131,200	178,100	220,800
	12	139,000	199,500	254,900	129,100	185,300	236,600
	13	162,600	223,100	278,500	152,700	208,900	260,200
	14	162,200	232,800	297,400	150,700	216,200	276,100
Rural	2	17,350	25,100	33,050	15,600	22,550	29,600
	3	26,025	37,650	49,575	23,400	33,825	44,400
	4	34,700	50,200	66,100	31,200	45,100	59,200

Road Category	Number of Lanes	Capacity (PCU/day)					
		Flat			Rolling/Mountainious		
		LOS B	LOS C	LOS D	LOS B	LOS C	LOS D
	5	58,300	73,800	89,700	54,800	68,700	82,800
	6	52,100	75,200	98,900	46,900	67,700	88,900
	7	75,700	98,800	122,500	70,500	91,300	112,500
	8	69,400	100,300	132,000	62,400	90,200	118,400
	9	93,000	123,900	155,600	86,000	113,800	142,000
	10	86,800	125,400	165,000	78,000	112,700	148,000
	11	110,400	149,000	188,600	101,600	136,300	171,600
	12	104,100	150,500	198,100	93,600	135,200	177,600
	13	127,700	174,100	221,700	117,200	158,800	201,200
	14	121,500	175,600	231,100	109,200	157,800	207,200

Source: JST in reference to Highway Capacity Manual (2010), Transportation Research Board (USA)

Table 11.2.5 Road Link Capacity (Unpaved Road)

Number of Lanes	Capacity (PCU/day)
1	5,000
2	9,000
3	14,000
4	18,000
5	23,000
6	28,000
17	28,000

Source: JST in reference to Highway Capacity Manual (2010), Transportation Research Board (USA)

5. Empty Cargo Ratio

Empty cargo ratio by origin country by destination country was estimated as shown below based on the transport survey in this study.

Table 11.2.6 Empty Cargo Ratio by Origin-Destination Country (%)

Empty Cargo Ratio	GTM	SLV	HND	NIC	CRC	PNM	External
GTM	47	32	46	21	59	49	65
SLV	44	44	44	60	60	91	67
HND	67	48	52	64	88	N/A	62
NIC	56	79	51	27	73	81	59
CRC	58	55	71	61	33	62	61
PNM	50	N/A	81	82	72	41	N/A
External	55	60	61	38	64	N/A	N/A

Source: JST based on the Transport Survey Result

6. PCU Factor

Table 11.2.7 shows 12 vehicle types considered in this study. The Passenger Car Unit (PCU)[3] is defined based on the Highway Capacity Manual.

Table 11.2.7 PCU Factor by Vehicle Classification

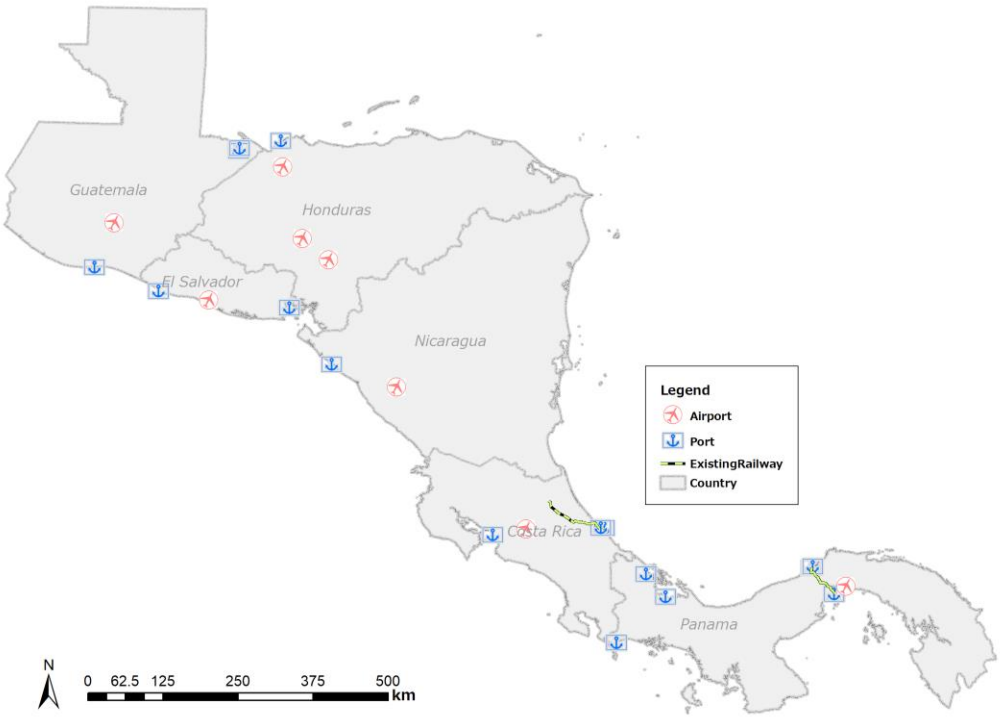
Vehicle Classification			PCU
Type1	Passenger Vehicle	Motorcycle	0.5
Type2		Car/Jeep	1.0
Type3		Passenger Van	1.0
Type4		Micro Bus	2.0
Type5		Large Bus	2.0
Type13		Others	1.0
Type6	Truck	Pickup / Three-Wheeled Truck	1.0
Type7		Head Only	1.0
Type8		Light Truck	2.0
Type9		Heavy Truck (C3)	2.0
Type10		Heavy Truck (C4)	3.0
Type11		Container Trailer (T2)	4.0
Type12		Container Trailer (T3)	4.0

Source: JST in reference to Highway Capacity Manual (2000), Transportation Research Board (USA)

b) Other Transport Network

A computer-generated railway freight network was developed as part of this demand forecast model. In the present situation, only the Panama Canal Railway and a railway line in western Costa Rica are in operation for greight transport. Ports and airports are assumed special cargo generaters which connect to highway and railway network.

[3] A measure used primarily to assess highway capacity, for modelling purposes. Different vehicles are assigned different values, according to the space they take up. A car has a value of 1; smaller vehicles will have lower values, and larger vehicles will have higher values.



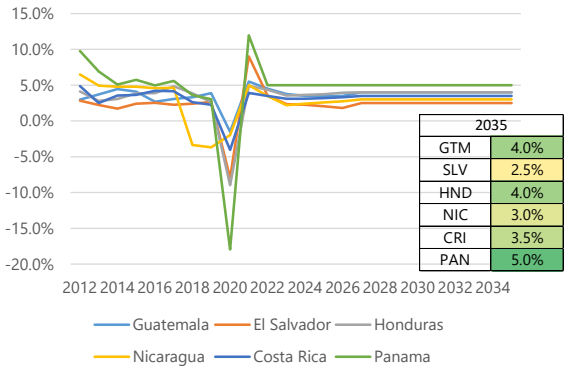
Source: JST

Figure 11.2.5 Railway, Air, Maritime Transport

11.2.2 Socioeconomic Framework

(1) GDP

As it is mentioned in the chapter 4.3.3. in the main report, the baseline GDP projection of Central America for 2021 is a rebound in growth to 6.7% according to IMF. However, the recovery is not assured even in countries where infections are currently very low so long as the virus circulates elsewhere. Growth is then projected to revert to the long-run trend of around 3.5% per annum until 2035 (Figure 11.2.6).



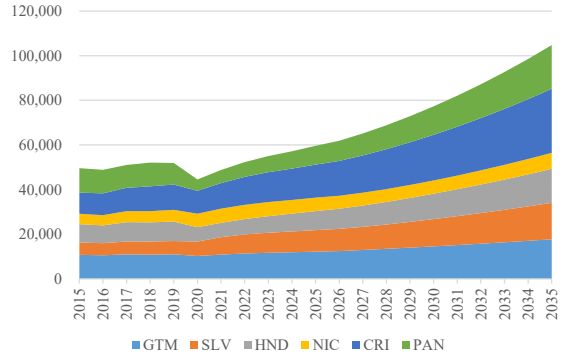
Source: JST, based on WEO database

Figure 11.2.6 Real GDP Growth Rate (2011-2035)

(2) Projection of Export Values of Strategic Commodities

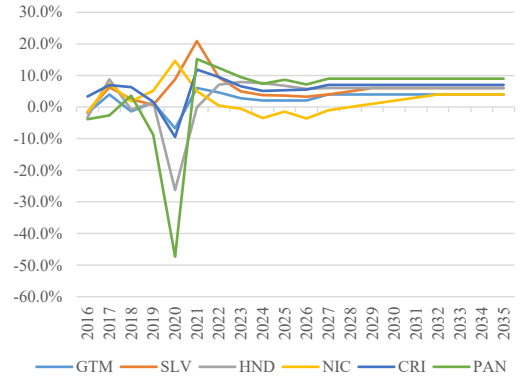
a) Preconditions

Based on the total export projection developed through a process of estimating the future GDP described in Chapter 4.3.3, the export values and growth rates of strategic commodities were estimated. The identification of strategic commodities for each country was described in Chapter 4.2.3. The projection of total export value and the annual growth rate is shown in the Figure below.



Source: JST

Figure 11.2.7 Projection of Total Export Values by Country (2015-2035, USD million)



Source: JST

Figure 11.2.8 Projection of Total Export Annual Growth Rate (2015-2035)

The 30 export commodities are categorized by strategic (agriculture, manufacturing products) and non-strategic commodities.

Table 11.2.8 Category of 30 Export Commodities

Strategic Commodities		Non-strategic Commodities	
Agriculture	**Manufacturing**		
- Meat - Crustaceans (i.e. Shrimp) - Fish & Aquatic Invertebrates - Pineapple	- Preparation - Pharmaceutical Product - Chemicals & Allied Industries - Plastics & Rubbers - Textiles - Machinery / Electrical / Precision - Transportation - Medical products	- Animal & Animal Product - Live Trees & Flower - Banana - Coffee - Cardamom - Cereal - Cereal Flour - Palm oil - Vegetable Product	- Sugar - Mineral Fuel - Mineral Product - Raw Hides, Skins, Leather, & Furs - Wood & Wood Products - Article of Stone & Glass - Precious Stone - Metals - Others

Source: JST

b) Trend Analysis from 2015 to 2019

The following table summarizes each country's GDP growth rate for the target year 2035, export value growth rate, and the composition of strategic commodities in total exports.

Table 11.2.9 Export Growth Rates of Strategic Commodities

	Exports Growth Rates (2035)	AAGR of Strategic Commodities (2015-2019)	Composition of Strategic Commodities (2019)
Guatemala	4.0%	0.0%	41.5%
El Salvador	6.0%	2.5%	73.3%
Honduras	6.0%	1.9%	67.4%
Nicaragua	4.0%	3.0%	64.9%
Costa Rica	7.0%	5.7%	71.7%
Panama	9.0%	-3.0%	88.0%

Source: JST

The export growth rates of strategic commodities in 2035 are expected to be higher than the total export growth rates, but in Guatemala and Nicaragua, the growth rates of non-strategic commodities were higher than the growth rate of strategic commodities in 2015-2019. This may be associated with the differences in the composition of strategic commodities in total exports as shown in the table above, as well as the differences between agricultural sector commodities and manufacturing sector commodities in strategic commodities (see table below). However, since strategic commodities are subject to various policies aimed at increasing production and exports in the future, future growth rates will not necessarily be linked to the past performance.

Table 11.2.10 Export Growth Rates of Strategic and Non-Strategic Commodities (2015-2019)

	Growth rate of total exports	Growth rate of strategic commodities	Growth rate of non-strategic commodities
Guatemala	0.5%	0.0%	0.9%
El Salvador	1.9%	2.5%	0.5%
Honduras	1.5%	1.9%	0.5%
Nicaragua	3.1%	3.0%	3.3%
Costa Rica	4.5%	5.7%	2.0%
Panama	-2.9%	-3.0%	-3.5%

Source: JST

Table 11.2.11 Export Growth Rates of Agriculture and Manufacturing Sector (2015-2019)

	Ratio of Agricultural Strategic Commodities (2019)	Ratio of Manufacturing Strategic Commodities (2019)	AAGR of Agricultural Strategic Commodities (2015-2019)	AAGR of Manufacturing Strategic Commodities (2015-2019)	Agriculture Sector as % of GDP (2019)	Manufacturing Sector as % of GDP (2019)
Guatemala	2.1%	97.9%	9.0%	-0.1%	10.4%	15.2%
El Salvador	0.3%	99.7%	10.0%	2.4%	5.4%	17.1%
Honduras	6.9%	93.1%	4.2%	1.8%	14.8%	20.4%
Nicaragua	24.8%	75.2%	3.5%	2.8%	17.3%	16.9%
Costa Rica	14.6%	85.4%	4.1%	6.0%	5.2%	12.8%
Panama	1.8%	98.2%	-4.6%	-2.9%	2.7%	5.6%

Source: JST

The growth rate of strategic commodities, more than 1% higher than the growth rate of total exports on an actual basis, was one country, Costa Rica, and lower than the growth rate of non-strategic commodities in Guatemala and Nicaragua.

c) Projection of Strategic Commodities and Estimated Annual Value

The following calculations were made for the export projection through 2035.

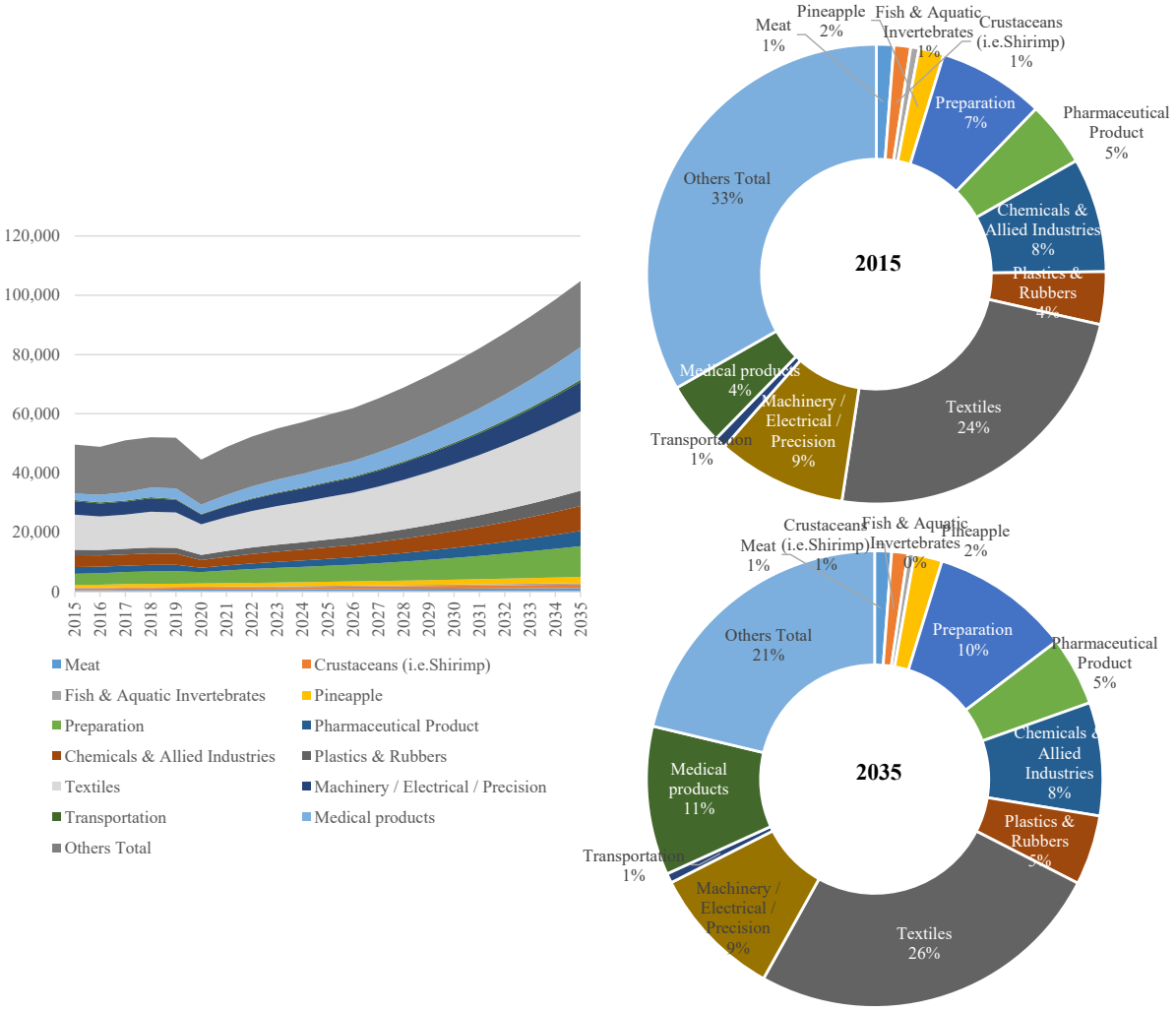
1) Annual growth rate of strategic commodities is set as 1% more than the export growth rate of all commodities. As the composition of Panama's strategic commodities already reached 88%, and there is not sufficient room for further increase, therefore, the annual growth rate of Panama's strategic commodities is set as 0.5% more than the growth rate of all commodities.
2) Average growth rates of 2015-2019 for agricultural commodities among the strategic commodities are applied.
3) Export value is forecasted by applying the composition of each strategic product in the agriculture sector and the manufacturing sector in 2019 to 2035.

The results are summarized as follows:

Table 11.2.12 Projection in Exports of Strategic Commodities

	Exports of Strategic Commodities in 2019 (Actual, thousand USD)	Exports of Strategic Commodities in 2035 (Estimates, thousand USD)	2035/ 2019	Composition of Strategic Commodities (2019)	Composition of Strategic Commodities (2035)	2035-2019
Guatemala	4,576,231	8,603,347	188%	41.5%	48.5%	+7.0%
El Salvador	4,359,123	13,923,216	319%	73.3%	85.2%	+11.9%
Honduras	5,872,193	11,973,496	204%	67.4%	78.6%	+11.2%
Nicaragua	3,420,477	5,419,553	158%	64.9%	75.9%	+11.0%
Costa Rica	8,105,165	23,909,040	295%	71.7%	83.3%	+11.6%
Panama	8,528,183	18,659,868	219%	88.0%	95.2%	+7.1%

Source: JST



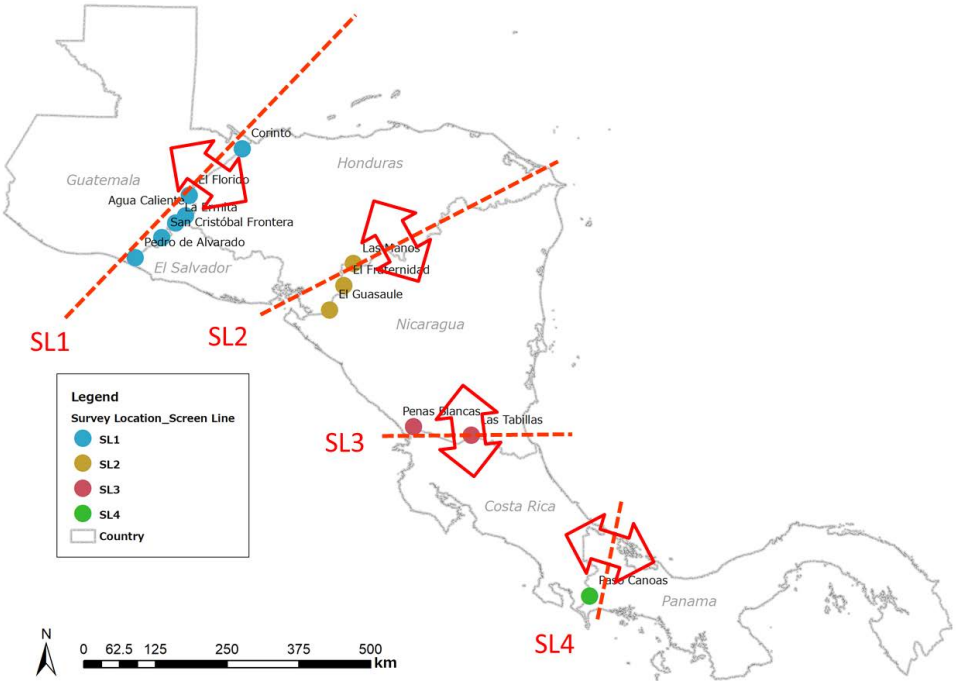
Source: JST

Figure 11.2.9 Projection of Total Export Values by Commodity (2015-2035, USD million)

The results show that the share of strategic commodity will increase from 67% in 2015 to 79% in 2035 by focusing on expanding exports in competitive products. Especially the share of medical products will increase from 4% in 2015 to 11% in 2035.

11.2.3 Validation

The estimated traffic with the transport model are validated with the observed traffic at 4 Screen Lines (SLs) shown in Figure 11.2.10. As shown in the comparsion Table 11.2.13, the difference between the observed traffic and the estimated traffic were less than 10%.



Source: JST

Figure 11.2.10 Screen Line for Transport Model Valdation

Table 11.2.13 Comparsion between Observed Traffic and Estimated Traffic

Unit: PCU/day

	Observed Traffic			Estimated Traffic			Difference
	Passenger Car	Trucks	Total	Passenger Car (Pre-load)	Trucks	Total	
SL1	21,800	15,600	37,400	21,800	14,500	36,300	97%
SL2	300	5,000	5,300	300	5,300	5,600	106%
SL3	2,300	4,400	6,700	2,300	4,800	7,000	104%
SL4	7,600	1,800	9,400	7,600	1,900	9,500	101%

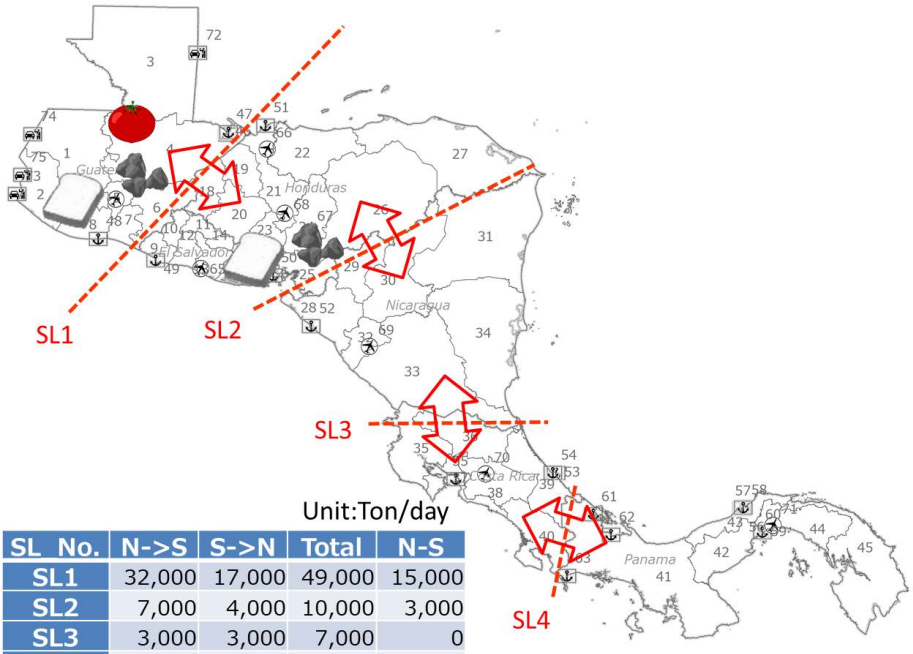
Source: JST

11.2.4 Existing Cargo Flow Analysis

(1) North-South Direction

To understand the characteristics of current cargo flow within the Central America, the estimated cargo OD in 2021 was analyzed. It should be noted the cargo flow doesn't include the transship cargo such as the cargo passing through the Panama Canal.

Firstly, the major cargo of north-south direction was analyzed. The Central America was divided with 4 Screen Lines (SLs), land borders, as shown in Figure 11.2.16. Total cargo volume crossing the each screen line was summarized in Figure 11.2.11. As shown, large cargo volume was observed at SL1. Generally, the cargo volume in northern screen line is larger than the southern screen line. Figure 11.2.12 shows the cargo volume by commodity type by direction by screen line. Vegetables, food preparation and mineral products are transported at the SL1.

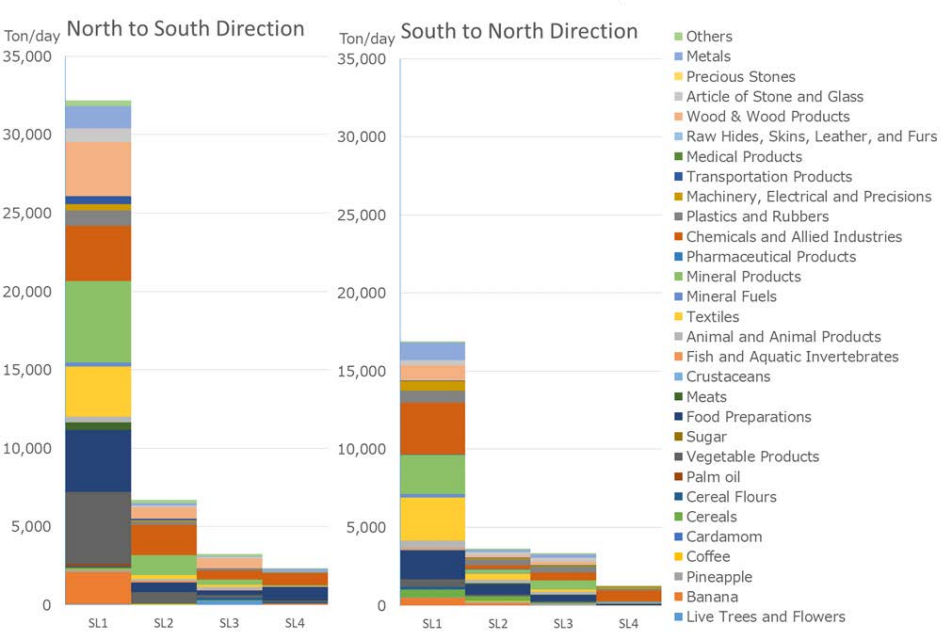


Unit:Ton/day

SL No.	N->S	S->N	Total	N-S
SL1	32,000	17,000	49,000	15,000
SL2	7,000	4,000	10,000	3,000
SL3	3,000	3,000	7,000	0
SL4	2,000	1,000	4,000	1,000

Source: JST

Figure 11.2.11 North-South Screen Lines for Cargo Flow Analysis



Source: JST

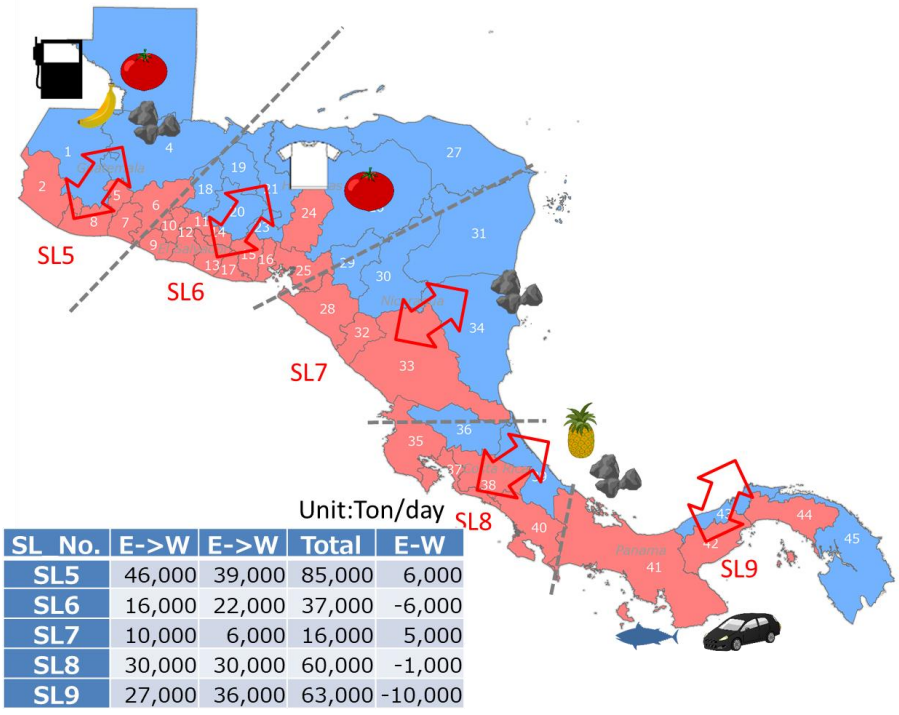
Figure 11.2.12 Cargo Volume by Commodity Type by Screen Line

(2) East-West Direction

Similarly, the cargo flow within the Central America in east-west direction was analyzed as shown in Figure 11.2.13. It should be clarified that the cargo volume doesn't includes the traffic passing through the north-south screen lines[4]. Large cargo flow of east-west direction in SL5 in Guatemala, SL8 in Costa Rica and

[4] For instance, the cargo from TAZ 12 in El Salvador to TAZ 4 in Guatemala wasn't included in the cargo volume in SL5.

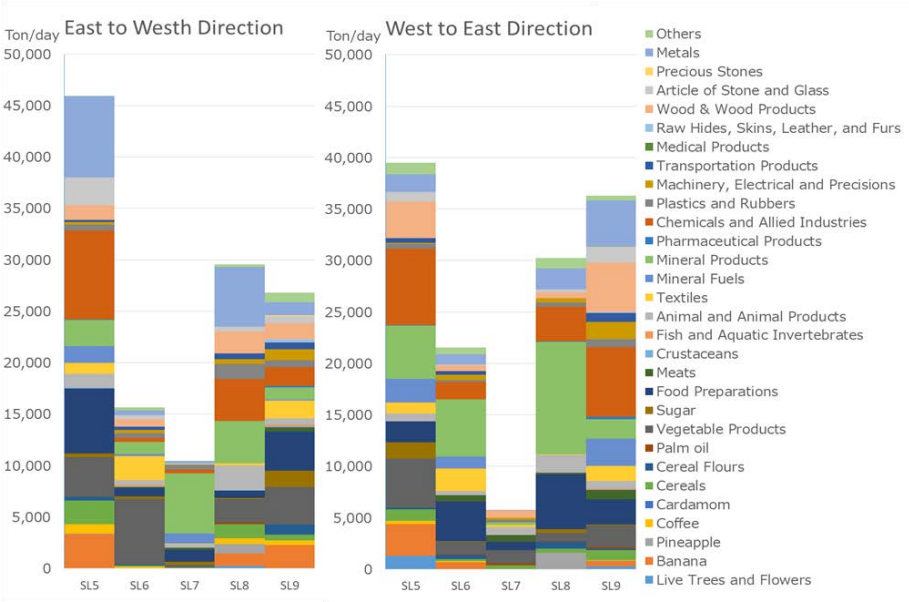
SL9 in Panama. It's implying the necessity of inter-ocean corridors. Figure 11.2.14 shows the cargo volume by commodity type by direction by screen line. Banama and vegetables are transported at the SL5.



SL No.	E->W	E->W	Total	E-W
SL5	46,000	39,000	85,000	6,000
SL6	16,000	22,000	37,000	-6,000
SL7	10,000	6,000	16,000	5,000
SL8	30,000	30,000	60,000	-1,000
SL9	27,000	36,000	63,000	-10,000

Source: JST

Figure 11.2.13 East-West Screen Lines for Cargo Flow Analysis

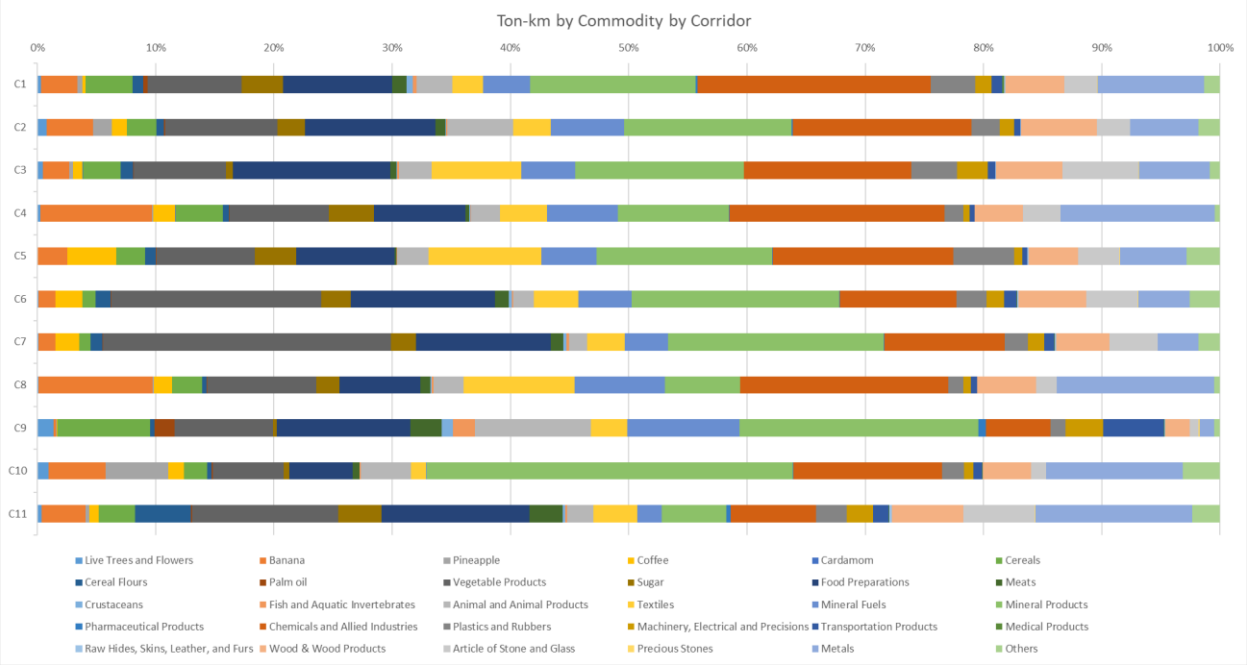


Source: JST

Figure 11.2.14 Cargo Volume by Commodity Type by Screen Line

(3) Corridor Analysis

The observed cargo OD was assigned to the existing road network in the transport model. Figure 11.2.15 shows the commodity share in ton-km in the identified 11 corridors which is shown in the chapter 6. Each inter-ocean corridor has unique characteristics of transporting cargo. For example, corridor 4, the share of transported banana in the inter-ocean corridor between Quetzal Port and Cortes Port is larger than other corridors.



Source: JST

Figure 11.2.15 Transported Commodity Share by Corridor

11.2.5 Traffic Demand Forecast

(1) Cargo Generation/Attraction

Future cargo demand by commodity type is highly related to the industrial and export policy in this region. In this study, it is assumed that the future cargo generation volume increases in proportional to the growth ratio of expert cargo volume which is described in trade and industrial framework. Similarly, it is assumed that cargo attraction volume is proportional to the economic growth ratio as shown in Table 11.2.14.

Table 11.2.15 - Table 11.2.17 show applied growth rates of cargo volume by commodity type by country for years 2025, 2030 and 2035.

Table 11.2.14 Precondition of Cargo Volume Growth

Cargo Generation Area	Cargo Attraction (Destionation) Area	Preconditon of Cargo Volume Growth
Internal Zone (Within Central American)	Internal Zone (Within Central American)	Cargo generation volume increases in proportional to the growth ratio of export volume by types of commodity by cargo generation country.
Internal Zone (Within Central American)	External Zone (Outside of Central America)	Cargo generation volume increases in proportional to the growth ratio of export volume by types of commodity by cargo generation country.

Cargo Generation Area	Cargo Attraction (Destionation) Area	Preconditon of Cargo Volume Growth
External Zone (Outside of Central America)	Internal Zone (Within Central American)	Cargo generation volume increases in proportional to the growth ratio of GDP of cargo attraction country.

Source: JST

Table 11.2.15 Cargo Volume Growth Ratio by Commodity by Country from 2021 to 2025

Commodity Code	Commmodity Short Name	GTM	SLV	HND	NIC	CRC	PNM
1	Live Trees & Flower	1.09	1.09	1.22	0.87	1.16	1.39
2	Banana	1.09	1.09	1.22	0.87	1.16	1.39
3	Pineapple	1.41	1.47	1.18	1.15	1.17	0.98
4	Coffee	1.09	1.09	1.22	0.87	1.16	1.39
5	Cardamom	1.09	1.09	1.22	0.87	1.16	1.39
6	Cereal	1.09	1.09	1.22	0.87	1.16	1.39
7	Cereal Flour	1.09	1.09	1.22	0.87	1.16	1.39
8	Palm oil	1.09	1.09	1.22	0.87	1.16	1.39
9	Vegetable Product	1.09	1.09	1.22	0.87	1.16	1.39
10	Sugar	1.09	1.09	1.22	0.87	1.16	1.39
11	Preparation	1.16	1.28	1.40	0.95	1.37	1.59
12	Meat	1.41	1.47	1.18	1.15	1.17	0.98
13	Crustaceans (i.e.Shirimp)	1.41	1.47	1.18	1.15	1.17	0.98
14	Fish & Aquatic Invertebrates	1.41	1.47	1.18	1.15	1.17	0.98
15	Animal & Animal Product	1.09	1.09	1.22	0.87	1.16	1.39
16	Textiles	1.16	1.28	1.40	0.95	1.37	1.59
17	Mineral Fuel	1.09	1.09	1.22	0.87	1.16	1.39
18	Mineral Product	1.09	1.09	1.22	0.87	1.16	1.39
19	Pharmaceutical Product	1.16	1.28	1.40	0.95	1.37	1.59
20	Chemicals & Allied Industries	1.16	1.28	1.40	0.95	1.37	1.59
21	Plastics & Rubbers	1.16	1.28	1.40	0.95	1.37	1.59
22	Machinery / Electrical / Precision	1.16	1.28	1.40	0.95	1.37	1.59
23	Transportation	1.16	1.28	1.40	0.95	1.37	1.59
24	Medical products	1.16	1.28	1.40	0.95	1.37	1.59
25	Raw Hides, Skins, Leather, & Furs	1.09	1.09	1.22	0.87	1.16	1.39
26	Wood & Wood Products	1.09	1.09	1.22	0.87	1.16	1.39
27	Article of Stone & Glass	1.09	1.09	1.22	0.87	1.16	1.39
28	Precious Stone	1.09	1.09	1.22	0.87	1.16	1.39
29	Metals	1.09	1.09	1.22	0.87	1.16	1.39
30	Others	1.09	1.09	1.22	0.87	1.16	1.39
	Average	1.15	1.19	1.26	0.93	1.22	1.39

Source: JST

Table 11.2.16 Cargo Volume Growth Ratio by Commodity by Country from 2021 to 2030

Commodity Code	Commmodity Short Name	GTM	SLV	HND	NIC	CRC	PNM
1	Live Trees & Flower	1.25	1.15	1.43	0.76	1.36	2.03
2	Banana	1.25	1.15	1.43	0.76	1.36	2.03
3	Pineapple	2.17	2.36	1.44	1.37	1.43	0.96

Commodity Code	Commmodity Short Name	GTM	SLV	HND	NIC	CRC	PNM
4	Coffee	1.25	1.15	1.43	0.76	1.36	2.03
5	Cardamom	1.25	1.15	1.43	0.76	1.36	2.03
6	Cereal	1.25	1.15	1.43	0.76	1.36	2.03
7	Cereal Flour	1.25	1.15	1.43	0.76	1.36	2.03
8	Palm oil	1.25	1.15	1.43	0.76	1.36	2.03
9	Vegetable Product	1.25	1.15	1.43	0.76	1.36	2.03
10	Sugar	1.25	1.15	1.43	0.76	1.36	2.03
11	Preparation	1.44	1.70	1.98	0.93	2.04	2.63
12	Meat	2.17	2.36	1.44	1.37	1.43	0.96
13	Crustaceans (i.e.Shirimp)	2.17	2.36	1.44	1.37	1.43	0.96
14	Fish & Aquatic Invertebrates	2.17	2.36	1.44	1.37	1.43	0.96
15	Animal & Animal Product	1.25	1.15	1.43	0.76	1.36	2.03
16	Textiles	1.44	1.70	1.98	0.93	2.04	2.63
17	Mineral Fuel	1.25	1.15	1.43	0.76	1.36	2.03
18	Mineral Product	1.25	1.15	1.43	0.76	1.36	2.03
19	Pharmaceutical Product	1.44	1.70	1.98	0.93	2.04	2.63
20	Chemicals & Allied Industries	1.44	1.70	1.98	0.93	2.04	2.63
21	Plastics & Rubbers	1.44	1.70	1.98	0.93	2.04	2.63
22	Machinery / Electrical / Precision	1.44	1.70	1.98	0.93	2.04	2.63
23	Transportation	1.44	1.70	1.98	0.93	2.04	2.63
24	Medical products	1.44	1.70	1.98	0.93	2.04	2.63
25	Raw Hides, Skins, Leather, & Furs	1.25	1.15	1.43	0.76	1.36	2.03
26	Wood & Wood Products	1.25	1.15	1.43	0.76	1.36	2.03
27	Article of Stone & Glass	1.25	1.15	1.43	0.76	1.36	2.03
28	Precious Stone	1.25	1.15	1.43	0.76	1.36	2.03
29	Metals	1.25	1.15	1.43	0.76	1.36	2.03
30	Others	1.25	1.15	1.43	0.76	1.36	2.03
	Average	1.42	1.46	1.58	0.89	1.55	2.05

Source: JST

Table 11.2.17 Cargo Volume Growth Ratio by Commodity by Country from 2021 to 2035

Commodity Code	Commmodity Short Name	GTM	SLV	HND	NIC	CRC	PNM
1	Live Trees & Flower	1.46	1.22	1.63	0.80	1.55	3.00
2	Banana	1.46	1.22	1.63	0.80	1.55	3.00
3	Pineapple	3.35	3.81	1.77	1.63	1.74	0.93
4	Coffee	1.46	1.22	1.63	0.80	1.55	3.00
5	Cardamom	1.46	1.22	1.63	0.80	1.55	3.00
6	Cereal	1.46	1.22	1.63	0.80	1.55	3.00
7	Cereal Flour	1.46	1.22	1.63	0.80	1.55	3.00
8	Palm oil	1.46	1.22	1.63	0.80	1.55	3.00
9	Vegetable Product	1.46	1.22	1.63	0.80	1.55	3.00
10	Sugar	1.46	1.22	1.63	0.80	1.55	3.00
11	Preparation	1.83	2.38	2.80	1.20	3.06	4.35
12	Meat	3.35	3.81	1.77	1.63	1.74	0.93
13	Crustaceans (i.e.Shirimp)	3.35	3.81	1.77	1.63	1.74	0.93
14	Fish & Aquatic Invertebrates	3.35	3.81	1.77	1.63	1.74	0.93
15	Animal & Animal Product	1.46	1.22	1.63	0.80	1.55	3.00

Commodity Code	Commmodity Short Name	GTM	SLV	HND	NIC	CRC	PNM
16	Textiles	1.83	2.38	2.80	1.20	3.06	4.35
17	Mineral Fuel	1.46	1.22	1.63	0.80	1.55	3.00
18	Mineral Product	1.46	1.22	1.63	0.80	1.55	3.00
19	Pharmaceutical Product	1.83	2.38	2.80	1.20	3.06	4.35
20	Chemicals & Allied Industries	1.83	2.38	2.80	1.20	3.06	4.35
21	Plastics & Rubbers	1.83	2.38	2.80	1.20	3.06	4.35
22	Machinery / Electrical / Precision	1.83	2.38	2.80	1.20	3.06	4.35
23	Transportation	1.83	2.38	2.80	1.20	3.06	4.35
24	Medical products	1.83	2.38	2.80	1.20	3.06	4.35
25	Raw Hides, Skins, Leather, & Furs	1.46	1.22	1.63	0.80	1.55	3.00
26	Wood & Wood Products	1.46	1.22	1.63	0.80	1.55	3.00
27	Article of Stone & Glass	1.46	1.22	1.63	0.80	1.55	3.00
28	Precious Stone	1.46	1.22	1.63	0.80	1.55	3.00
29	Metals	1.46	1.22	1.63	0.80	1.55	3.00
30	Others	1.46	1.22	1.63	0.80	1.55	3.00
	Average	1.81	1.88	1.96	1.02	1.98	3.08

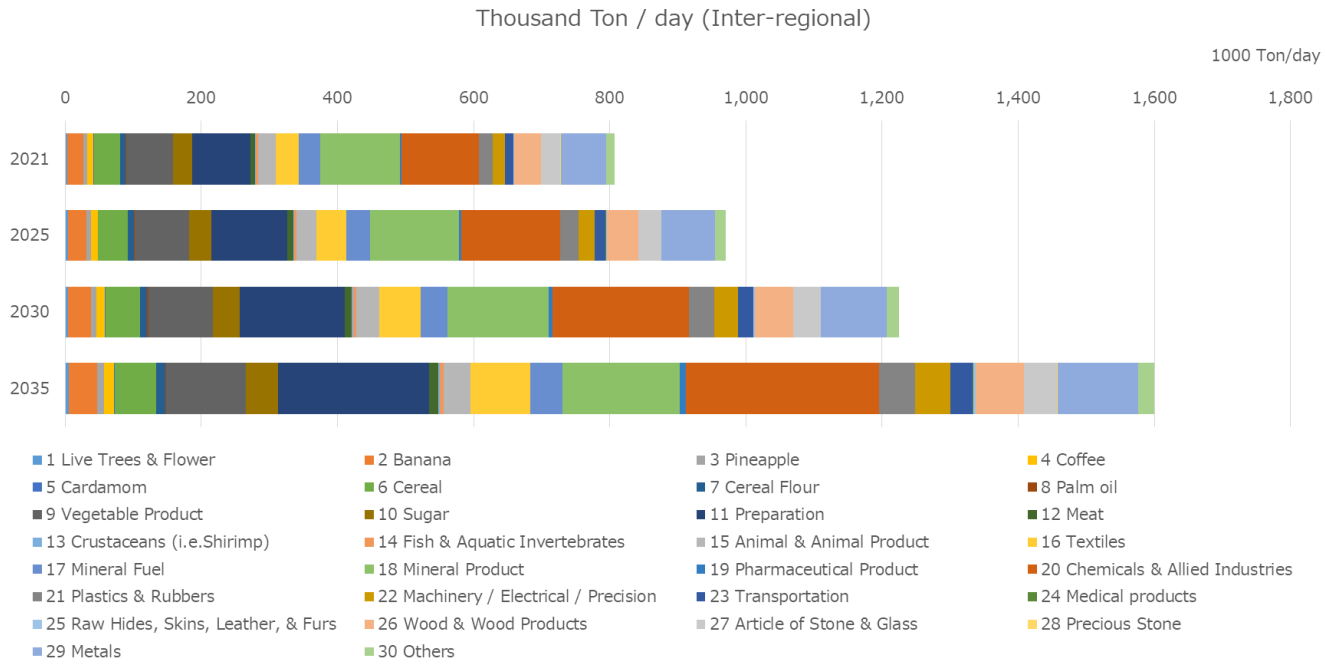
Source: JST

Table 11.2.18 Cargo Attraction Volume Growth Ratio by Country from 2021 to 2035

Country	2021-2025	2021-2030	2021-2035
GTM	1.28	1.49	1.73
SLV	1.43	1.73	2.11
HND	1.40	1.79	2.29
NIC	1.30	1.51	1.75
CRC	1.37	1.82	2.44
PNM	1.65	2.32	3.25

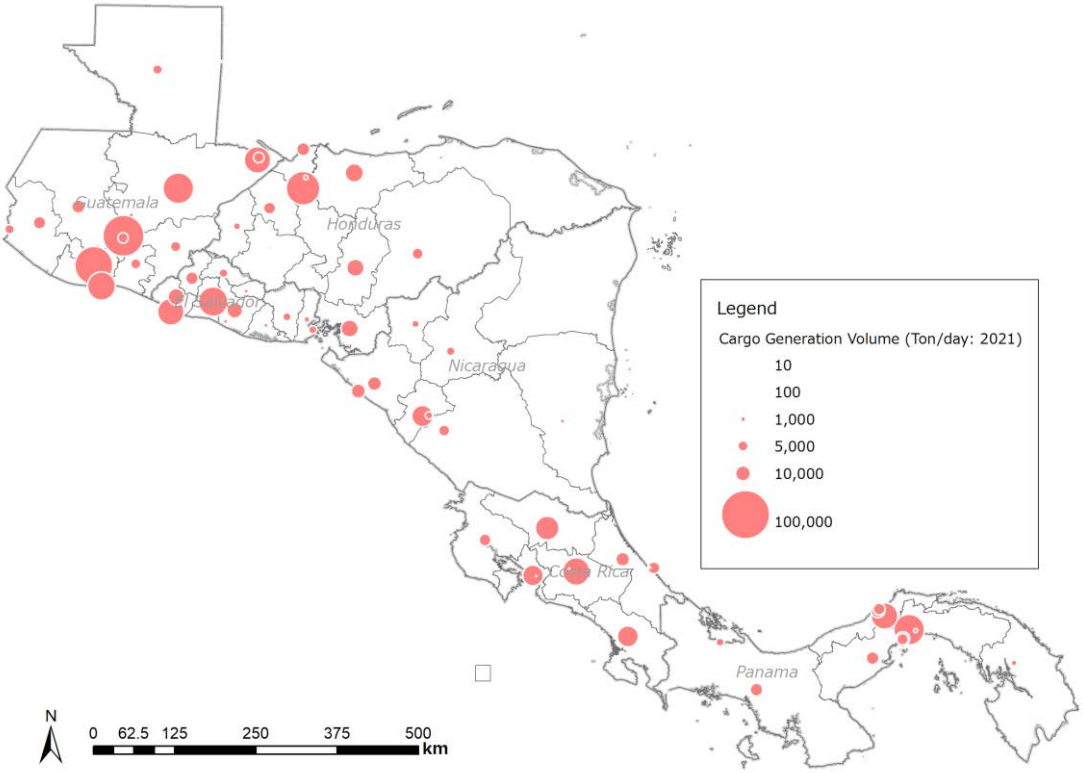
Source: JST

Figure 11.2.16 show future cargo volume within the region by commodity type. It is estimated that the total cargo volume within the region will increased from 0.8 million ton per day in 2021 to 1.6 million ton per day in 2035. Figure 11.2.17 and Figure 11.2.18 show the estimated cargo generation volume by TAZ in 2021 and 2035.



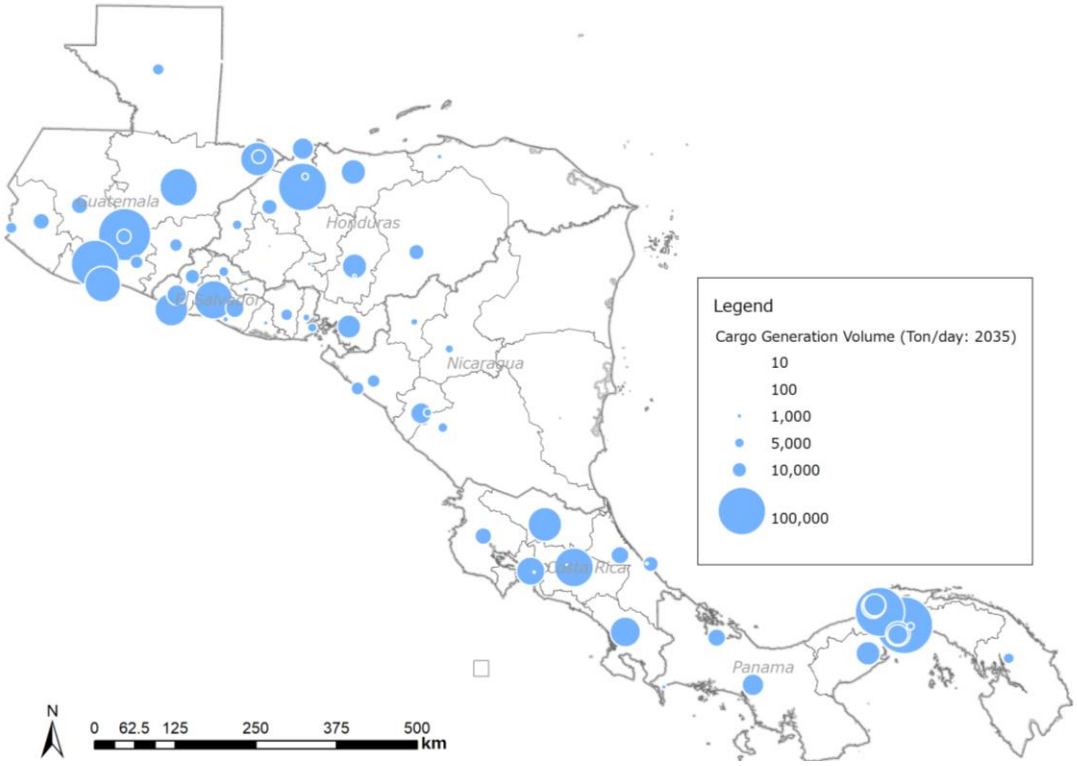
Source: JST

Figure 11.2.16 Future Cargo Volume by Commodity (1,000 tons/day)



Source: JST

Figure 11.2.17 Total Cargo Generation Volume by TAZ (2021)

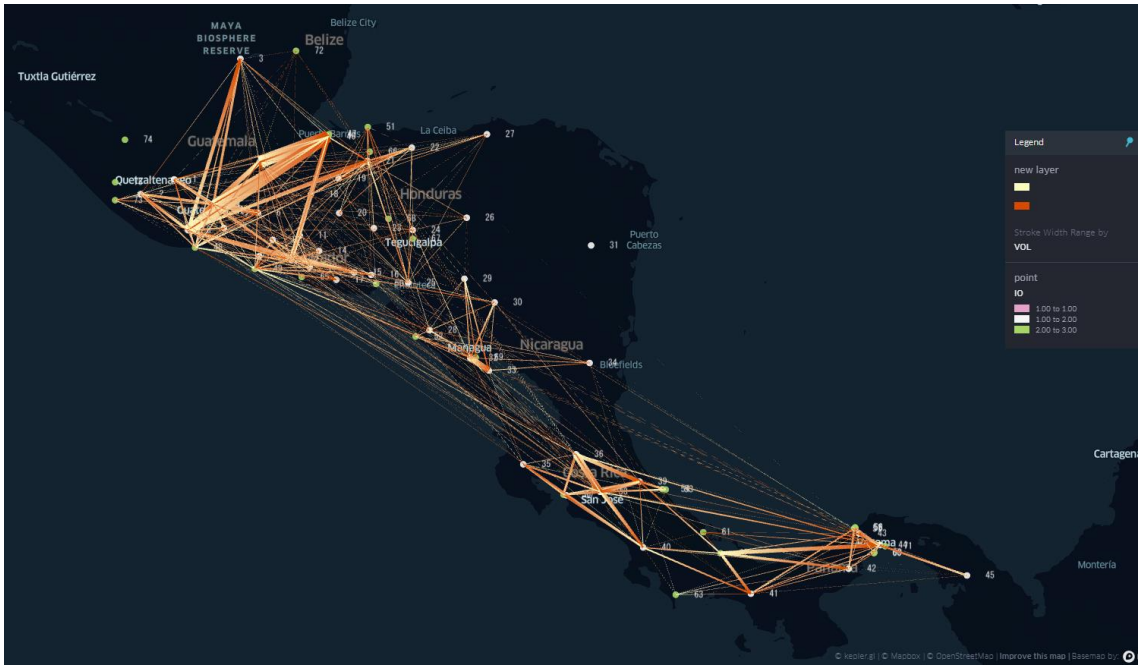


Source: JST

Figure 11.2.18 Total Cargo Generation Volume by TAZ (2035)

(2) Cargo Distribution

Figure 11.2.19 and Figure 11.2.20 show the estimated cargo distirubion between TAZ in 2021 and 2035. The width of lines shows the volume of cargo between origin TAZ in yellow and destination TAZ in red. Those figures called desired line doesn't consider the route of transport, connecting origin and destination. In 2021, marjor cargo flow is observed between the Pacific side of Guatemala to the Atlantic side of Guatemala.



Source: JST

Figure 11.2.19 Total Cargo Distribution Volume between TAZ (2021)

Source: JST

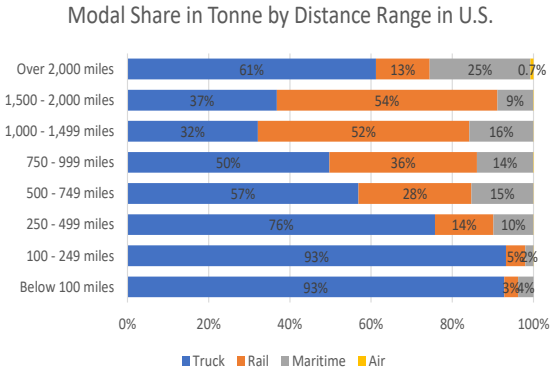
Figure 11.2.20 Total Cargo Distribution Volume between TAZ (2035)

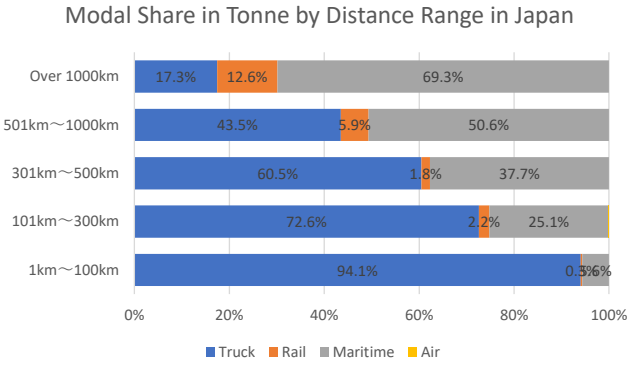
(3) Modal Split

a) International Case Studies of Cargo Modal Choice

In the Central America, cargo is mainly transported by trucks at present. It is difficult to estimate the future modal share after the new transmode such as railways and short-distance shipping are developed since there are no trend information, nor tariff standard. Therefore, the modal share of other countries where freight transportation by rail and sea is actually being operated was studied as a benchmark.

In the United States and Japan, cargo is transported by multiple modes of transportation and information on the transportation mode share by distance range and by item is available. The transportation mode share in weight for each distance band in freight transportation in the United States and Japan is shown below. In short-distance transportation, truck transportation accounts for the majority. Modal share of railway and sea transport increase in proportional to the distance.



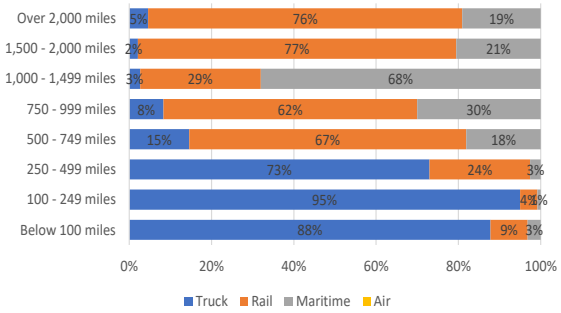


Source: Freight Analysis Framework 5 and Freight Facts and Figures 2017 Report, Bureau of Transportation Statistics, Waashinbgton D.C., USA, 2017 (hereinafter the "U.S. statistics")
National Freight Net Flow Survey, MLIT Japan, 2015 (here after the "Japan statistics").
Note: Other than above transport modes such as piplines were excluded.

Figure 11.2.21 Freight Modal Share by Distance Band in the U.S.

Figure 11.2.22 Freight Modal Share by Distance Band in Japan

Following figures shows the share of cargo transportation by distance band for grains and transportation machinery. Railway and marine transportation are the main means of transportation for grains from 500 miles or more, but transportation machinery is mainly transported by trucks. For the U.S. statistics, cargo transport statistics by distance band for 43 items are available. For the Japan statistics, only statistics integrated into 9 categories are available. Therefore, the U.S. statistics are selected as the bench mark of modal share in this study.



Source: Freight Analysis Framework 5 and Freight Facts and Figures 2017 Report, Bureau of Transportation Statistics, Waashinbgton D.C., USA, 2017 (hereinafter the "U.S. statistics")

Figure 11.2.23 Freight Modal Share by Distance Band in the U.S. (Grain)

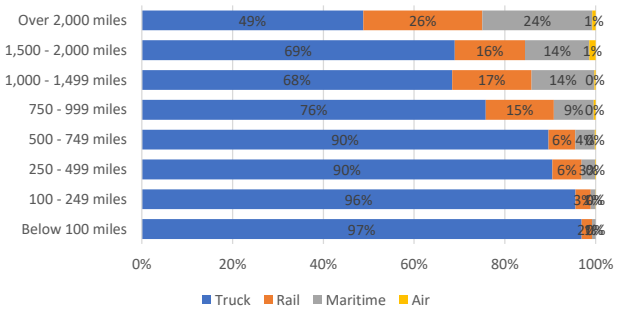


Figure 11.2.24 Freight Modal Share by Distance Band in the U.S. (Transport Machine)

Following table shows the comparison between the category of commodity types in this study, 30 types, and the category in the U.S. statistics, 43 types. In this study, commodity types of agriculture products are more classified than the types in the U.S. statistics. On the other hand, commodity types of fuels are further classified in the U.S. statistics.

Table 11.2.19 Commodity Types in This Study (left) and in the U.S. Statistics (Right)

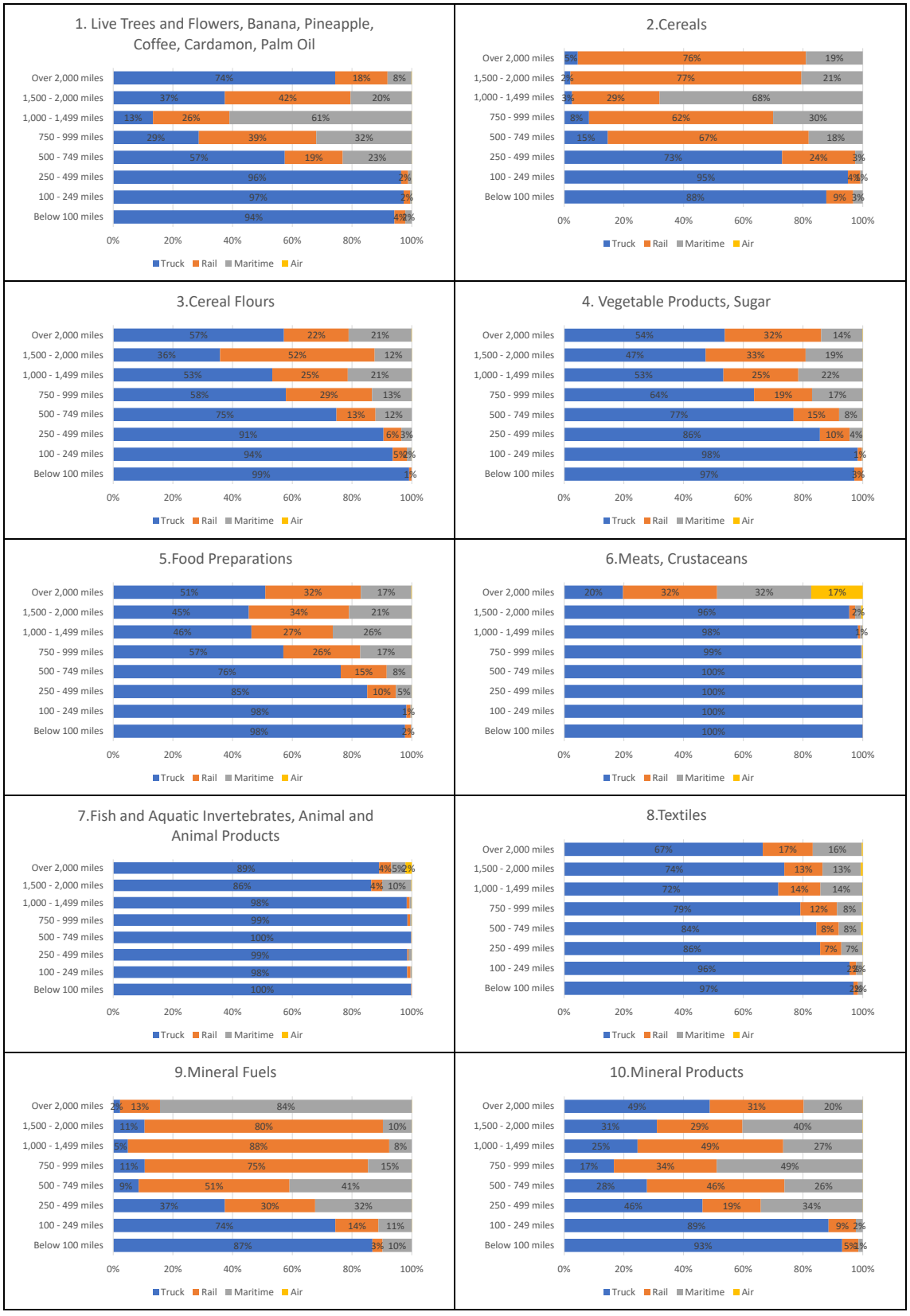
No_New	Commodity Type
1	Live Trees and Flowers
2	Banana
3	Pineapple
4	Coffee
5	Cardamom
6	Cereals
7	Cereal Flours
8	Palm oil
9	Vegetable Products
10	Sugar
11	Food Preparations
12	Meats
13	Crustaceans
14	Fish and Aquatic Invertebrates
15	Animal and Animal Products
16	Textiles
17	Mineral Fuels
18	Mineral Products
19	Pharmaceutical Products
20	Chemicals and Allied Industries
21	Plastics and Rubbers
22	Machinery, Electrical and Precisions
23	Transportation Products
24	Medical Products
25	Raw Hides, Skins, Leather, and Furs
26	Wood & Wood Products
27	Article of Stone and Glass
28	Precious Stones
29	Metals
30	Others

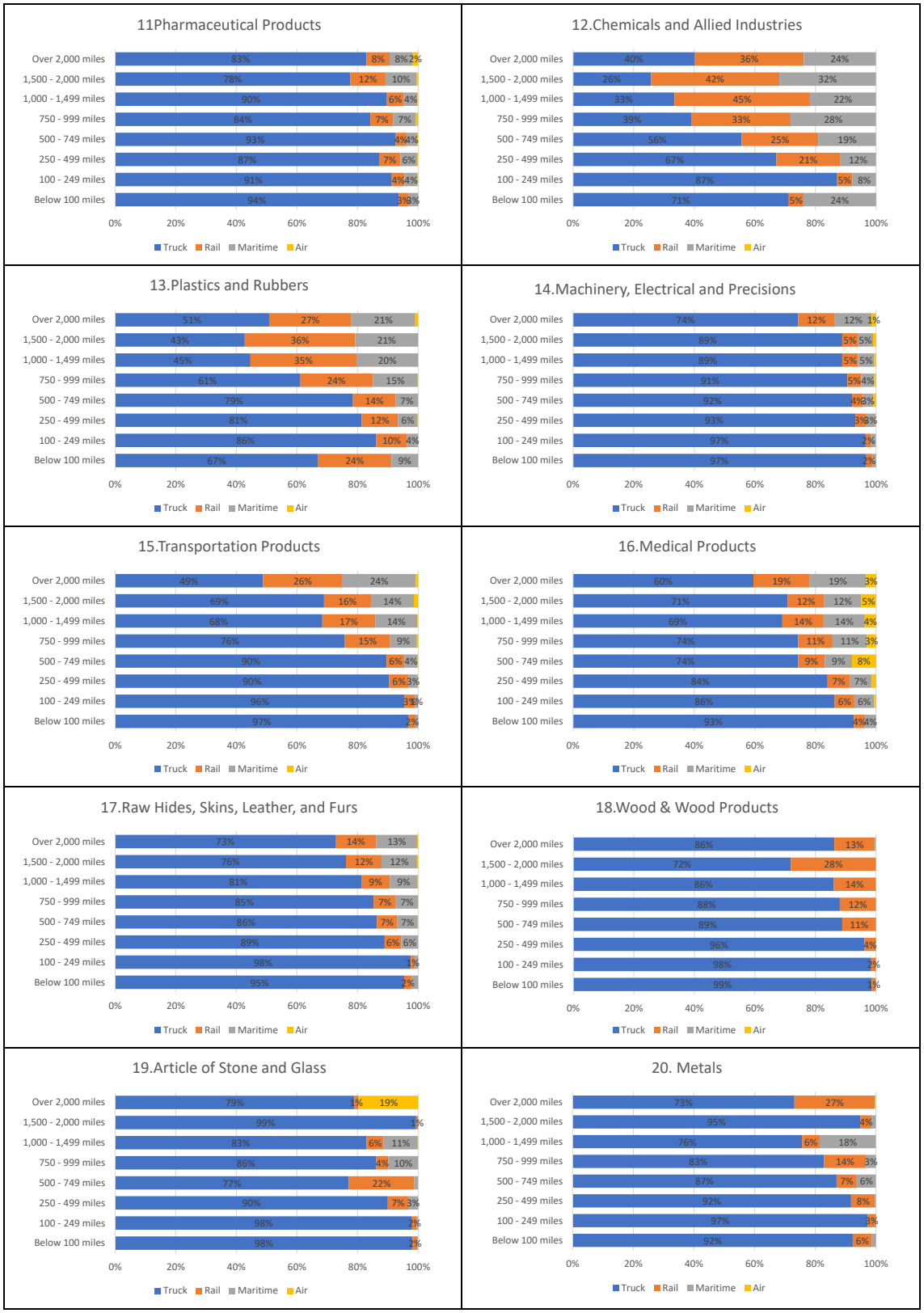
Table ID	Adapted Commodity Category in USA Freight Analysis Framework				
1	03-Other ag prods.				
1	03-Other ag prods.				
1	03-Other ag prods.				
1	03-Other ag prods.				
1	03-Other ag prods.				
2	02-Cereal grains				
3	06-Milled grain prods.				
1	03-Other ag prods.				
4	07-Other foodstuffs				
4	07-Other foodstuffs				
5	04-Animal feed	07-Other foodstuffs	08-Alcoholic beverages	09-Tobacco prods.	
6	01-Live animals/fish				
6	01-Live animals/fish				
7	05-Meat/seafood				
7	05-Meat/seafood				
8	30-Textiles/leather				
9	15-Coal	16-Crude petroleum	17-Gasoline	18-Fuel oils	19-Coal-n.e.c.
10	10-Building stone	11-Natural sands	12-Gravel	13-Nonmetallic minerals	14-Metallic ores
11	21-Pharmaceuticals				
12	20-Basic chemicals	22-Fertilizers	23-Chemical prods.		
13	24-Plastics/rubber				
14	34-Machinery	35-Electronics	38-Precision instruments		
15	36-Motorized vehicles	37-Transport equip.			
16	38-Precision instruments				
17	40-Misc. mfg. prods.				
18	25-Logs	26-Wood prods.	27-Newsprint/paper	28-Paper articles	29-Printed prods.
19	31-Nonmetal min. prods.				
19	31-Nonmetal min. prods.				
20	32-Base metals	33-Articles-base metal			
21	39-Furniture	40-Misc. mfg. prods.	41-Waste/scrap	43-Mixed freight	

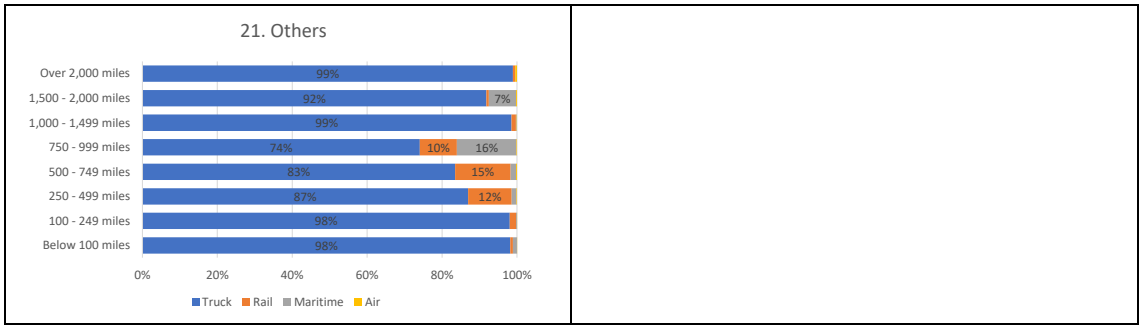
Source: JST

The transportation mode share by distance band in the U.S. statistics by each category, each orange category number in the table, is shown in below.

For the category that are subdivided into multiple commodity types in the U.S. statistics, the modal share was calculated by averaging them on a weight basis. In the future transportation network, the modal shares will be applied along the routes where railway, marine and truck transportation compete.


1. Live Trees and Flowers, Banana, Pineapple, Coffee, Cardamon, Palm Oil
2.Cereals
3.Cereal Flours
4. Vegetable Products, Sugar
5.Food Preparations
6.Meats, Crustaceans
7.Fish and Aquatic Invertebrates, Animal and Animal Products
8.Textiles
9.Mineral Fuels
10.Mineral Products
Over 2,000 miles
1,500 - 2,000 miles
1,000 - 1,499 miles
750 - 999 miles
500 - 749 miles
250 - 499 miles
100 - 249 miles
Below 100 miles
0%
20%
40%
60%
80%
100%
Truck
Rail
Maritime
Air


11Pharmaceutical Products
Over 2,000 miles 83% 8% 8% 2%
1,500 - 2,000 miles 78% 12% 10%
1,000 - 1,499 miles 90% 6% 4%
750 - 999 miles 84% 7% 7%
500 - 749 miles 93% 4% 4%
250 - 499 miles 87% 7% 6%
100 - 249 miles 91% 4% 4%
Below 100 miles 94% 3% 3%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
12.Chemicals and Allied Industries
Over 2,000 miles 40% 36% 24%
1,500 - 2,000 miles 26% 42% 32%
1,000 - 1,499 miles 33% 45% 22%
750 - 999 miles 39% 33% 28%
500 - 749 miles 56% 25% 19%
250 - 499 miles 67% 21% 12%
100 - 249 miles 87% 5% 8%
Below 100 miles 71% 5% 24%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
13.Plastics and Rubbers
Over 2,000 miles 51% 27% 21%
1,500 - 2,000 miles 43% 36% 21%
1,000 - 1,499 miles 45% 35% 20%
750 - 999 miles 61% 24% 15%
500 - 749 miles 79% 14% 7%
250 - 499 miles 81% 12% 6%
100 - 249 miles 86% 10% 4%
Below 100 miles 67% 24% 9%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
14.Machinery, Electrical and Precisions
Over 2,000 miles 74% 12% 12% 1%
1,500 - 2,000 miles 89% 5% 5%
1,000 - 1,499 miles 89% 5% 5%
750 - 999 miles 91% 5% 4%
500 - 749 miles 92% 4% 3%
250 - 499 miles 93% 3% 3%
100 - 249 miles 97% 2%
Below 100 miles 97% 2%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
15.Transportation Products
Over 2,000 miles 49% 26% 24%
1,500 - 2,000 miles 69% 16% 14%
1,000 - 1,499 miles 68% 17% 14%
750 - 999 miles 76% 15% 9%
500 - 749 miles 90% 6% 4%
250 - 499 miles 90% 6% 3%
100 - 249 miles 96% 3% 1%
Below 100 miles 97% 2%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
16.Medical Products
Over 2,000 miles 60% 19% 19% 3%
1,500 - 2,000 miles 71% 12% 12% 5%
1,000 - 1,499 miles 69% 14% 14% 4%
750 - 999 miles 74% 11% 11% 3%
500 - 749 miles 74% 9% 9% 8%
250 - 499 miles 84% 7% 7%
100 - 249 miles 86% 6% 6%
Below 100 miles 93% 4% 4%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
17.Raw Hides, Skins, Leather, and Furs
Over 2,000 miles 73% 14% 13%
1,500 - 2,000 miles 76% 12% 12%
1,000 - 1,499 miles 81% 9% 9%
750 - 999 miles 85% 7% 7%
500 - 749 miles 86% 7% 7%
250 - 499 miles 89% 6% 6%
100 - 249 miles 98% 1%
Below 100 miles 95% 2%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
18.Wood & Wood Products
Over 2,000 miles 86% 13%
1,500 - 2,000 miles 72% 28%
1,000 - 1,499 miles 86% 14%
750 - 999 miles 88% 12%
500 - 749 miles 89% 11%
250 - 499 miles 96% 4%
100 - 249 miles 98% 2%
Below 100 miles 99% 1%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
19.Article of Stone and Glass
Over 2,000 miles 79% 1% 19%
1,500 - 2,000 miles 99% 1%
1,000 - 1,499 miles 83% 6% 11%
750 - 999 miles 86% 4% 10%
500 - 749 miles 77% 22%
250 - 499 miles 90% 7% 3%
100 - 249 miles 98% 2%
Below 100 miles 98% 2%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air
20. Metals
Over 2,000 miles 73% 27%
1,500 - 2,000 miles 95% 4%
1,000 - 1,499 miles 76% 6% 18%
750 - 999 miles 83% 14% 3%
500 - 749 miles 87% 7% 6%
250 - 499 miles 92% 8%
100 - 249 miles 97% 3%
Below 100 miles 92% 6%
0% 20% 40% 60% 80% 100%
Truck Rail Maritime Air



Source: JST summarized based on Freight Analysis Framework 5 and Freight Facts and Figures 2017 Report, Bureau of Transportation Statistics, Waashinbgton D.C., USA, 2017 (hereinafter the "U.S. statistics")

Figure 11.2.25 Modal Share by Distance Band by Commodity Types

(4) Traffic Assignment

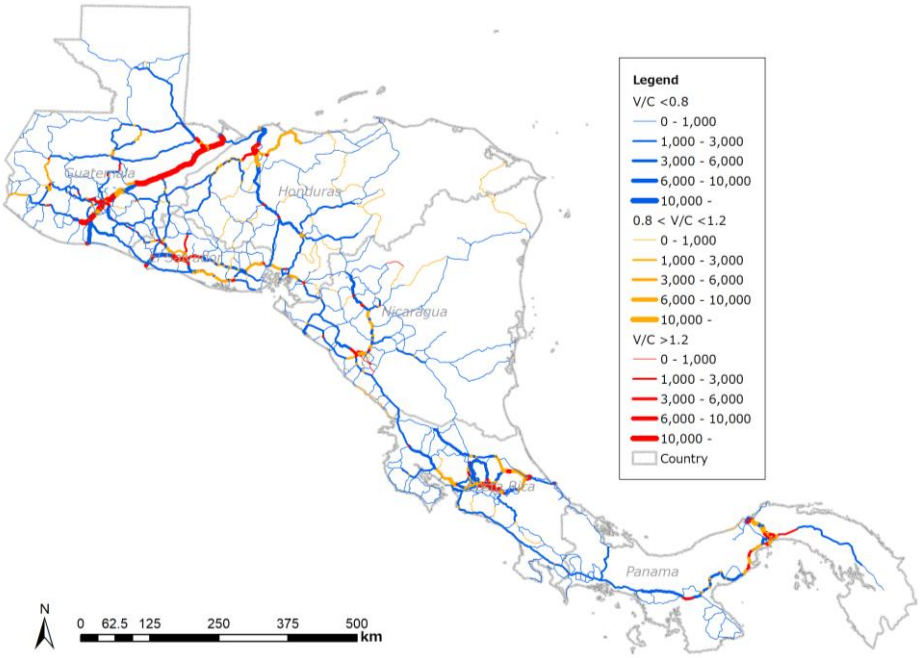
Table 11.2.20 shows the comparison of the major indicators of traffic assignment result in 2021 and 2035 by corridor which is identified in chapter 6 of main report. Figure 11.2.26 and Figure 11.2.27 shows the results of traffic assignment on the road network for year 2021 and year 2035 without any improvement, do-nothing scenario. Figure 11.2.28 shows the traffic assignment result in 2035 with all the projects proposed in this master plan which is mentioned in chapter 7 of main report.

A comparatively large volume of traffic is observed along the C4 corridor in Guatemala. Compared to 2021, traffic volume will increase in most of the corridors in 2035. As for congestion levels, no severe congestion is estimated even in 2035. The volume capacity (V/C) ratio is more than 1.2 in most sections along the C4 and C8 in Guatemala, C10 in Costa Rica and C11 in Panama in 2035.

Table 11.2.20 Comparison of Traffic Assignment Result along the Corridors in 2021 and 2035

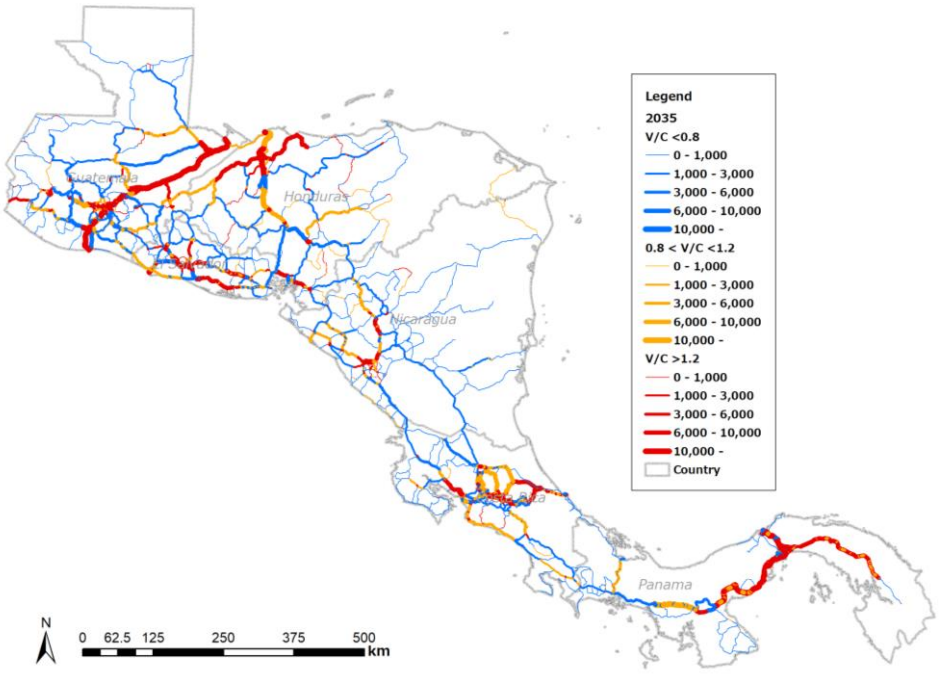
Corridor ID	Year 2021		Year 2035 (Do-nothing)		Year 2035 (With M/P Projects)	
	Daily Demand 1000 PCU-km	Average Demand PCU/km	Daily Demand 1000 PCU-km	Average Demand PCU/km	Daily Demand 1000 PCU-km	Average Demand PCU/km
C1	10,434	4,800	20,082	9,200	19,261	8,800
C2	9,331	4,500	16,944	8,200	16,685	8,000
C3	3,827	4,800	6,613	8,200	6,432	8,000
C4	8,481	17,400	11,556	23,700	11,463	23,500
C5	2,531	4,800	5,254	10,100	5,217	10,000
C6	3,147	7,600	6,498	15,700	6,561	15,900
C7	2,824	6,900	6,034	14,800	5,957	14,600
C8	4,734	12,600	7,436	19,800	7,330	19,500
C9	1,217	2,300	1,756	3,400	1,773	3,400
C10	1,730	7,200	2,439	10,200	2,411	10,000
C11	365	4,400	578	7,000	576	7,000

Source: JST



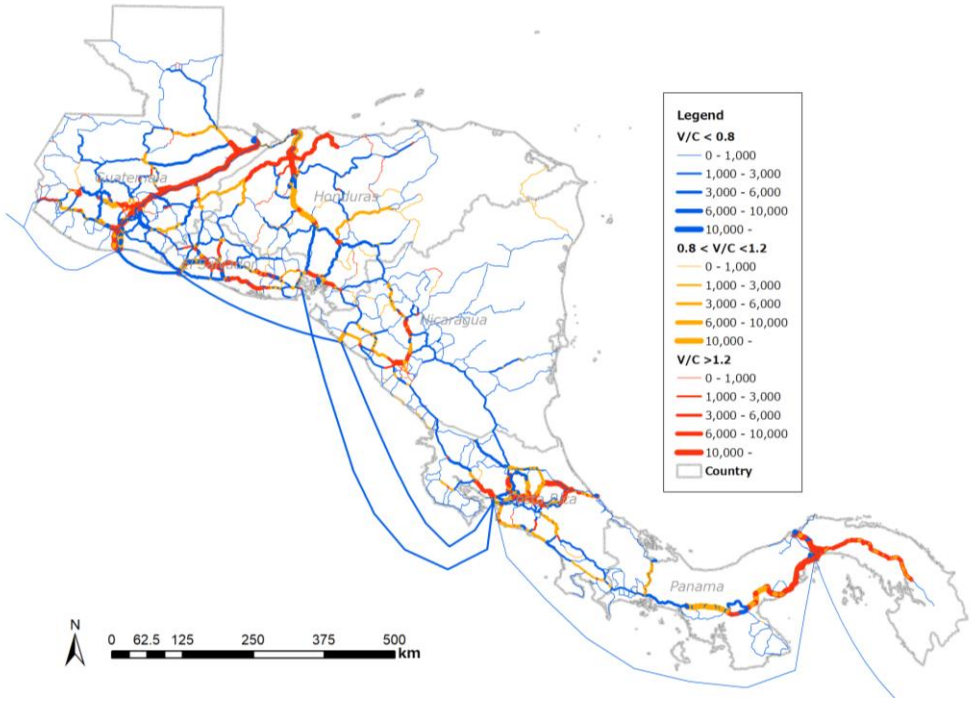
Source: JST

Figure 11.2.26 Traffic Assignment Result (2021)



Source: JST

Figure 11.2.27 Traffic Assignment Result (2035: Do-nothing Case)



Source: JST

Figure 11.2.28 Traffic Assignment Result (2035: With M/P Projects Case)

Project to Strengthen Capacities in the Elaboration of Regional Master Plan for Mobility and Logistics for Sustainable Regional Development in the Framework of Central American Economic Integration

Appendix 12

Online Questionnaire Survey

November 2023

Japan International Cooperation Agency
Oriental Consultants Global Co., Ltd.
Nippon Koei Co., Ltd.
ALMEC Corporation
Overseas Coastal Area Development Institute of Japan
International Development Center of Japan Inc.

Project to Strengthen Capacities in the Elaboration of Regional Master Plan for Mobility and Logistics for Sustainable Regional Development in the Framework of Central American Economic Integration

Appendix 12
Online Questionnaire Survey

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Appendix 12 Online Questionnaire Survey

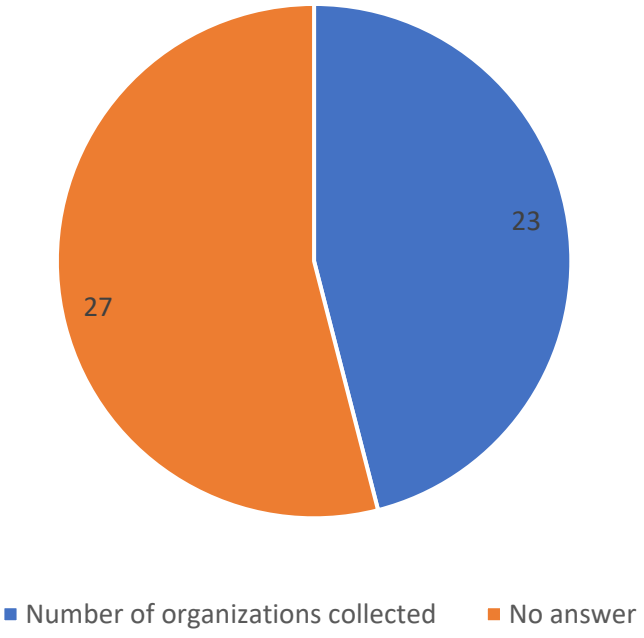
12.1 Introduction

12.1.1 Objective

The strategy and future development scenario of transport network in the regional master plan for mobility and logistics for sustainable regional development (hereafter called "M/P") was drafted in the Interim Report 2 (IT/R2). To promote the consensus building among stakeholders, online questionnaire survey was conducted to receive the comments and suggestions on the draft strategy and future network. Also, the opinion and suggestions on the possible priority projects and weighting of criteria to select the projects was collected.

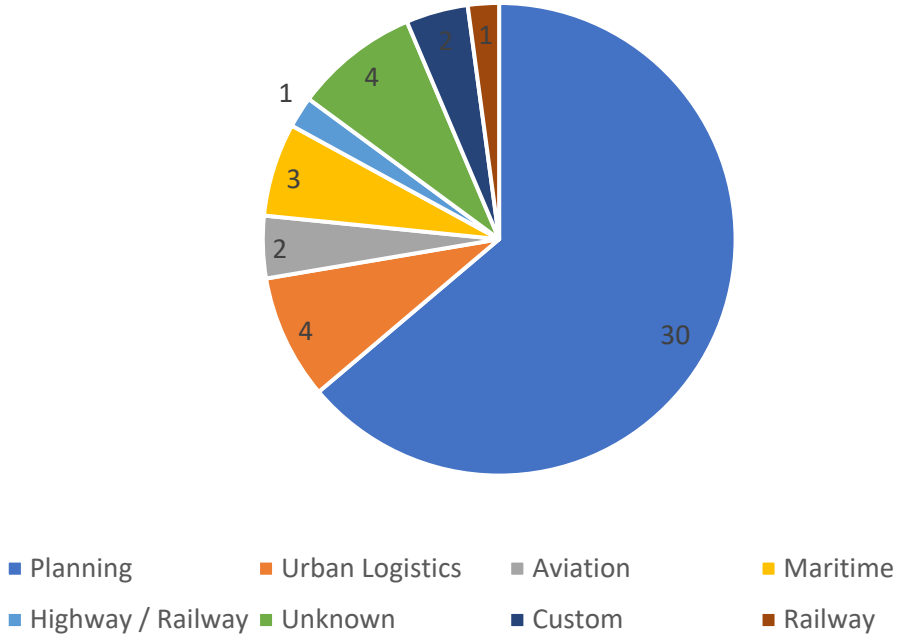
12.1.2 Outline

The survey was conducted with 50 organizations and responses were collected from 23 organizations with 47 people, mostly related to planning sector as shown in Figure 12.1.1 and Figure 12.1.2



Source: JST

Figure 12.1.1 Number of Organizations Collected



Source: JST

Figure 12.1.2 Number of Respondents by Sector

12.2 Survey Result

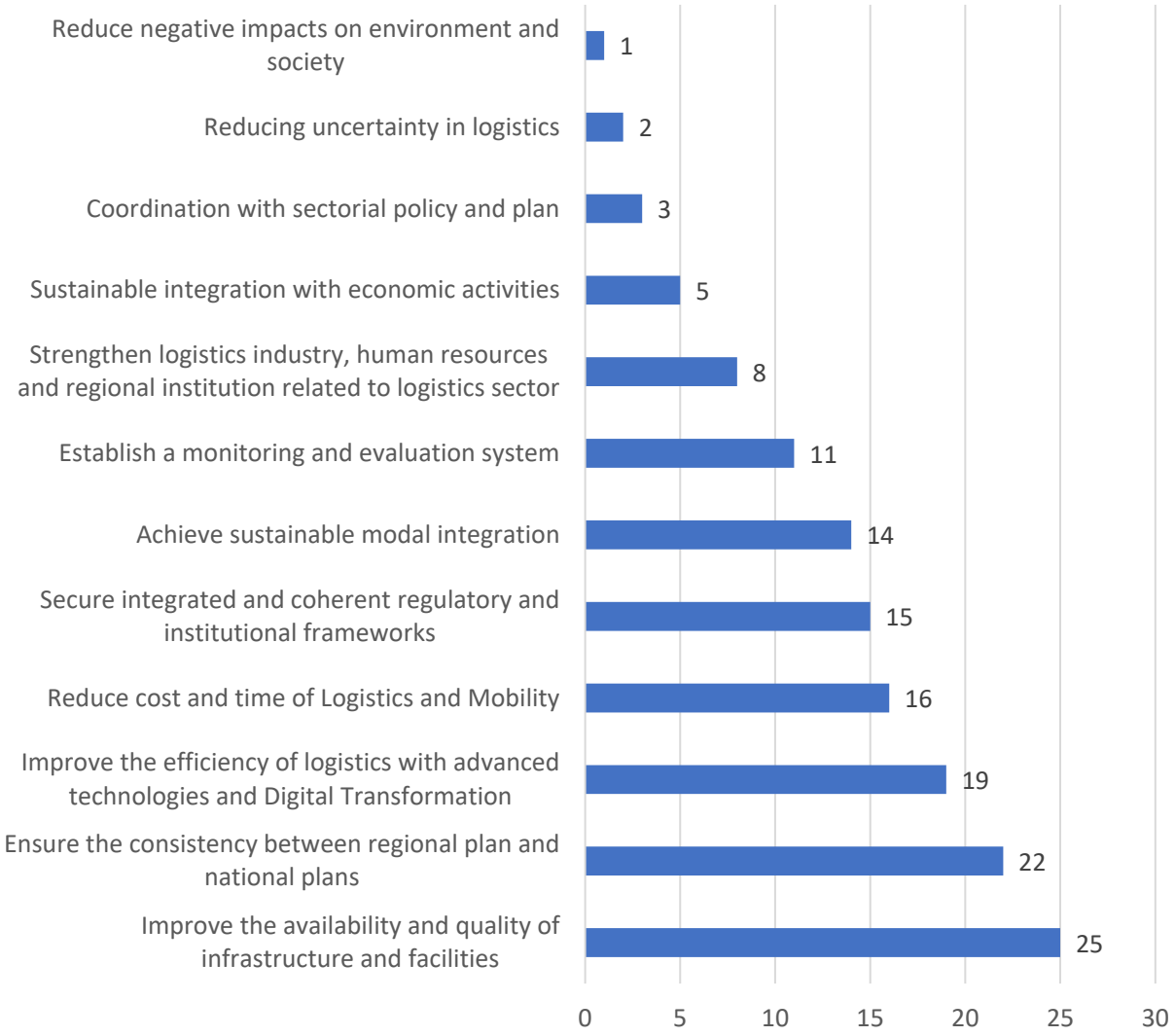
12.2.1 Strategy

In the IT/R2, following vision of the M/P was proposed based on the approved upstream policy framework.

Central America will be a more integrated and competitive region that mobilizes its population and its supply chain more effectively, increases and diversifies its trade, enhances complementarity and regional productive transformation (value chains), promotes sustainable, balanced and resilient spatial development and improves the quality of life of its population.

The respondents were asked to select three of the 12 guidelines they considered important for achieving the regional vision. Figure 12.2.1 shows the number of selected guidelines. As shown in this figure. “Improve the availability and quality of infrastructure and facilities” had the highest number of responses. Also, respondents were asked to the missing aspects not including the general guidelines in the free answer.

Table 12.2.1shows the comments to the missing aspects.



Source: JST

Figure 12.2.1 Number of Selected Guidelines

Table 12.2.1 Comments to Missing Aspects

Comment
Create a regulation on harmonized general technical specifications regarding design, technical characteristics, operation and maintenance for railway transportation projects, which are common to all of Central America. Likewise, the necessary training should be provided and disseminated to key stakeholders in the region.
It is suggested to include coordination and execution mechanisms so that countries can promote, finance, design, execute and follow up projects of regional interest or integration.
It is important to consider the financing and sustainability of regional investments in a comprehensive manner, as well as close coordination with financial and economic entities in the countries, in order to ensure that the projects generate the expected impacts.
Strengthen the regional institutional framework responsible for operationalizing, implementing and monitoring the execution of the plan.
Articulate and align integration approaches; there are currently two schemes, one in the northern triangle and the other in the southern countries.

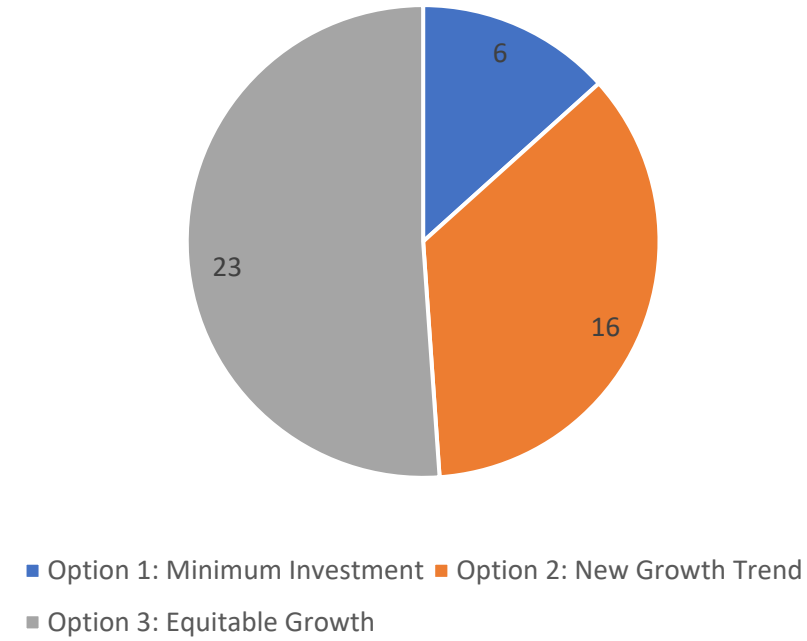
Comment
Ensure that the authorities and institutions in each of the countries are familiar with the PMRML in detail.
1. There are important aspects such as the facilitation of the processes of reception and clearance of cargo (IMPO-EXPO), vessels and persons, 2. To try to diminish the discretionality of the officials involved in the processes in the previous point. 3. Create a uniform Central American system for the processes in point 1.
Establish a regional strategy for obtaining funding to improve supply and value chains.
Reactivate the productive sector in a way that fosters (i) a higher volume of better quality investment, especially in infrastructure and digital connectivity; (ii) digitization and faster adoption of new technologies; (iii) entrepreneurship and innovation, including in creative industries (the "orange economy"); (iv) support for SMEs; (v) deeper regional economic integration that promotes trade and capital inflows; and (vi) public-private synergies to enhance the role of the private sector as a driver of growth and partner in the implementation of development programs. Promote the development of human capital in the transport and logistics sector, through sectoral training and provision of quality logistics services, with gender equality and diversity as guidelines. Actively promote decarbonization measures from the transportation sector to address climate change through (i) modal transition to public and non-motorized transportation in urban areas, (ii) promotion of electromobility measures, (iii) intermodal logistics development (rail and maritime) to reduce emissions from land transportation, as well as (iv) promoting the development of resilient infrastructure to reduce future losses in assets and welfare due to natural disasters.
Institutional strengthening at MOPs level and other institutions at the national level with competencies and at the regional level, the Directorate of Transportation, Infrastructure and Logistics of SIECA and other regional entities, such as COCATRAM, COCESNA, COCAVIAL, CODITRANS, CRGRACC, GTR SIG, etc.
Investments in logistics infrastructure (ports, airports, roads, border crossings) and master plans that respond to the growth of regional foreign trade and are not affected by climatic phenomena.
In the area of infrastructure, take into consideration that in the case of intra-regional Customs, it is necessary to convert them into places of agile passage (controls prior to arrival at Customs can be used) and in the case of peripheral Customs to have facilities that allow for coordinated border management through integrated risk management between border control institutions (e.g. maritime Temporary Customs Warehouses, to have a Port Community System PCS).
Ensuring the quality of services and trained human resources to adequately and efficiently serve the users/clients of the entire logistics system (land, sea and air) at the regional level is imperative for success. And the other aspect would be the financing methodology to adequately promote the projects, which is very necessary due to the inequalities that exist in the region.
Institutional strengthening and follow-up
To guarantee the Central American integration of all countries in the region.
There must be convergence between appropriate legal regulations that are consistent with intra-regional trade operations that are linked to the functions and operations of the Customs Service, which for some time now has been aimed at facilitating trade. The region already has some regional legal instruments in this regard, such as the CAUCA, RECAUCA, International Land Transit Regulations, among others, which should complement the objectives of these efforts and, if a new regulatory instrument is necessary, its content should not be so extensive and should not conflict with existing ones.
It is necessary to establish a monitoring and evaluation system to ensure consistency between the regional plans and the national plans in order to follow up on the implementation process of the reforms and their impact on the goals of each area.
It is necessary to standardize standards for railroad construction and operation with the AREMA standards used in North America, as well as cross-border interoperability.

Source: JST

12.2.2 Future Transport Network Scenerio

In the IT/R2, three future transport network scenarios were proposed. Of these three scenarios, respondents

were asked to select the one most suitable for the future transport network in Central America region. Figure 12.2.2 shows the number of selections to each scenario. As shown in this figure, Option3 called "Equitable Growth" is the highest number of responses.

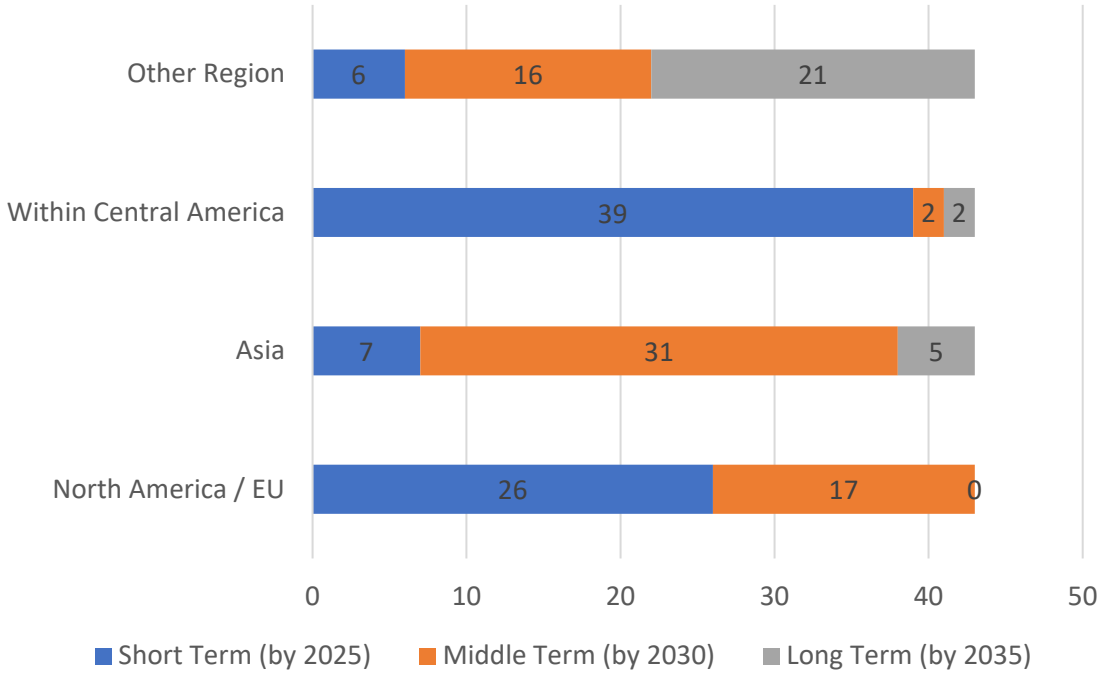


Source: JST

Figure 12.2.2 Number of Selections to Each Scenario

Respondents were also asked when the connectivity of logistics should be increased with within Central America, North America/EU, Asia and other regions, given the future freight demand and budget constrain.

Figure 12.2.3 shows the number of responses to each region. Within Central America and North America and the EU, where there are existing networks were the majority of responses by 2025. Also, Asia, where the demand is currently increasing was the majority of responses by 2030.



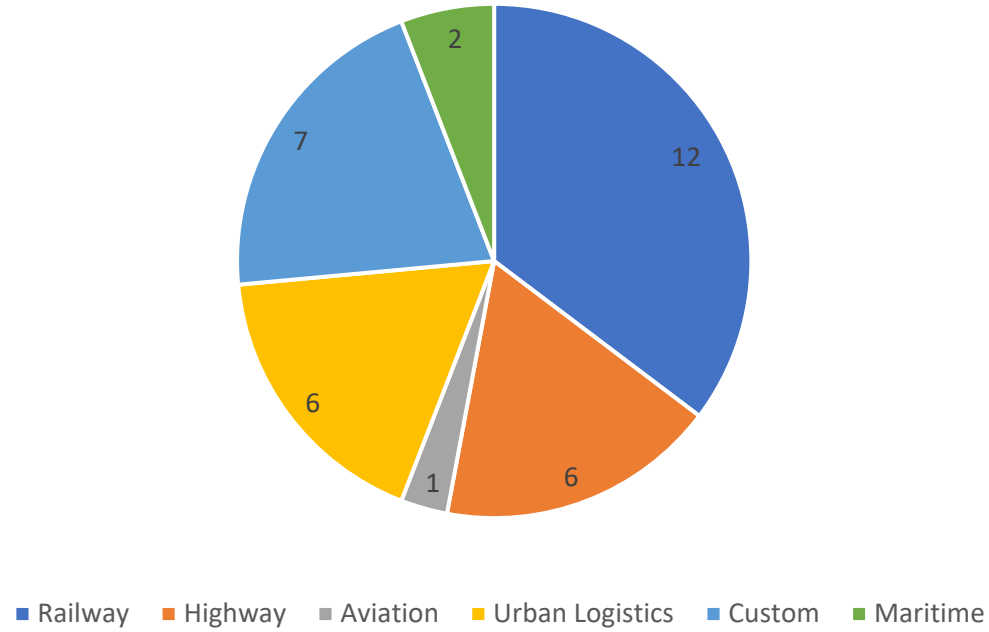
Source: JST

Figure 12.2.3 Number of Responses to Each Region for Three Terms

12.2.3 Priority Projects

(1) Project Selection in Three Territorial Level

In the draft IT/R2, the M/P strategy was proposed in three territorial level, namely 1) Central America level, 2) corridor level and 3) each country level considering the importance to tackle the regional issue. To select the priority projects in three territorial level, the respondents were asked to suggest one project in each level in the free answer. Figure 12.2.4 and Table 12.2.2 show the collected answers of Central American level by sectors. In Central American level, projects related to railway sector were the most common answers.



Source: JST

Figure 12.2.4 Number of Projects by Sectors in Central America Level

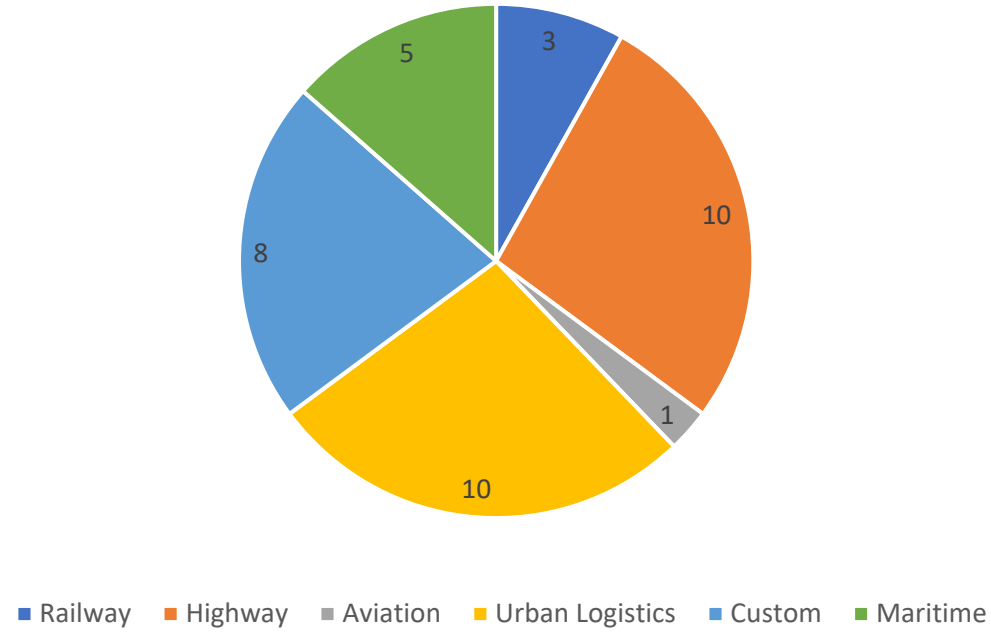
Table 12.2.2 Detailed Answers in Central America Level

Sector	Answer
Aviation	Updating and improving of airport infrastructure. Updating of radio aid equipment such as satellite guides. Certification and verification of approach and landing equipment. Optimized routes. Development of sustainable aviation fuel generation projects and an aviation alert system in case of extreme natural disasters.
Custom	Trade facilitation measures at border crossings to expedite procedures.
Custom	1. Simplified process for intra-regional customs clearance for Authorized Economic Operators by the different Customs Services that are part of the Mutual Recognition Arrangement on the AEO figure (Guatemala, El Salvador, Honduras, Costa Rica and Panama).
Custom	The Central American digital trade platform
Custom	Retake the guidelines established in the Central American Strategy for Trade Facilitation and Competitiveness, with emphasis on Coordinated Border Management (ECFCC), which is complemented by the Regional Framework Policy for Mobility and Logistics in Central America, but prioritizing projects in a staggered manner based on the 5 priority measures of the ECFCC, for example, measure by measure. To achieve this requires the commitment of each State Party.
Custom	1. Harmonize procedures in a technological platform to have a Central American level control.
Custom	Customs modernization in technology and infrastructure
Highway	The countries should respect the Central American Agreement on Road Circulation.
Highway	Improvement of road infrastructure

Sector	Answer
Highway	At the Central American level, it is definitely necessary to develop a Central American regional land corridor with four lanes (two westbound and two eastbound), using already operational sections, building by-pass segments in high density areas to improve the regional average speed. This project should be accompanied by border crossings with integrated facilitation processes. In addition, this corridor should contain a special lane in each country, which establishes rules for it to be open 24/7 and that cannot be closed or blocked under any circumstances, except for force majeure events(weather, disasters, etc.).
Highway	Standardize the road inventory system at the Central American level.
Highway	Survey of the Central American road network, to determine its condition and program improvements and maintenance and georeferenced.
Highway	Standardization of the road inventory system.
Maritime	Short Sea Shipping.
Maritime	Reactivation of the Port of La Unión Centroamericana
Railway	Central American railroad project to unify the railroad connection parameters of each country, which would allow for agile and effective transportation.
Railway	Train network to connect CA at the Mesoamerican level; multimodality.
Railway	Regional railroad
Railway	Study the feasibility of a railroad infrastructure from Guatemala's border with Mexico to Panama.
Railway	The cargo and passenger railway project.
Railway	Cargo railroad.
Railway	Study the technical, administrative, environmental and social (right-of-way) aspects of the Central American railroad as a mode of transportation integrated with other modes.
Railway	The fast train would be very important to boost trade and the mobility of people (tourism and labor) in the region and has been an aspiration of the Presidents for several years. In addition, the effective integration of the ports for cargo movement (modification of CAUCA and RECAUCA to integrate maritime documents to DUCA) would be vital to reduce emissions and expand the short sea shipping scheme that has already been approved by all countries. And mutual recognition of AEOs so that more companies can make use of this facility that boosts intra-regional trade
Railway	Railroads throughout Central America
Railway	railway line
Railway	Rehabilitation of abandoned railroads.
Railway	Railway interconnection of the northern triangle countries
Urban Logistics	Central American regional mandatory insurance for cargo transportation
Urban Logistics	Sustainable and digital logistics services on infrastructure, especially the Pacific Corridor.
Urban Logistics	Comprehensive expansion with the 2025 vision of Corridor D (infrastructure, services, chains, nearshoring, sustainability, equity, technology).
Urban Logistics	Multimodal transportation of commodities and the use of ferries to transport cargo units, making transportation alternatives available at the regional level.
Urban Logistics	Regional/ national mobility and logistics database and information system or a Regional Mobility and Logistics Observatory
Urban Logistics	Updating of transportation laws in the region and establishment of regional indicators that allow for standardized time measurements.

Source: JST

Figure 12.2.5 and Table 12.2.3 show the collected answers of corridor level by sectors. In corridor level, projects related to highway and urban logistics sector were the most common answers.



Source: JST

Figure 12.2.5 Number of Projects by Sectors in Corridor Level

Table 12.2.3 Detailed Answers in Corridor Level

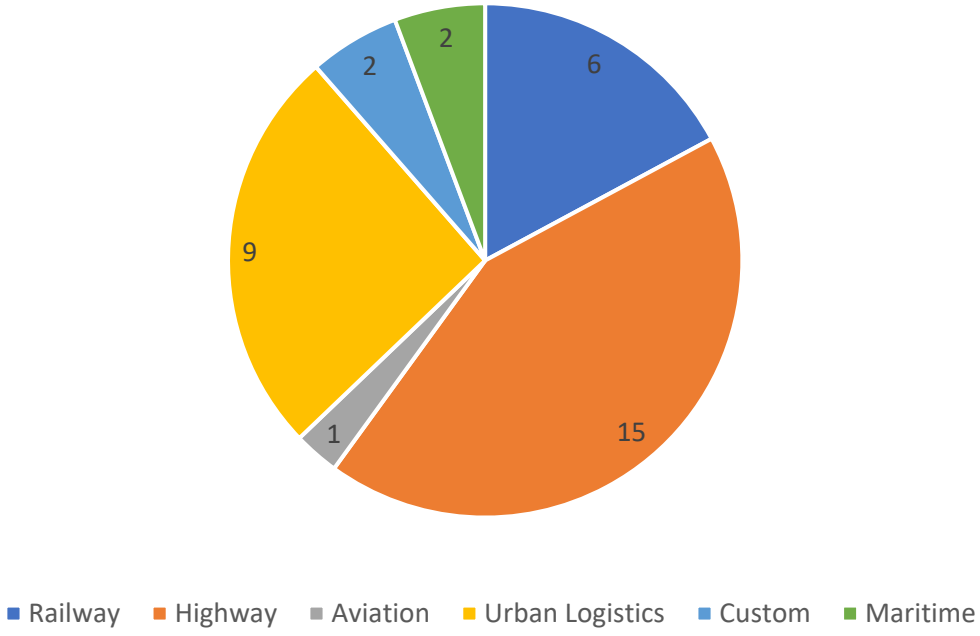
Sector	Answer
Aviation	Multimodal airport infrastructure
Custom	Expansion of border crossing points between Guatemala-El Salvador, El Salvador-Honduras
Custom	Improved customs conditions
Custom	Customs modernization of the Northern Triangle.
Custom	Study of the Customs Union connected to all modes of transport.
Custom	Program for the maintenance, rehabilitation and expansion of Central American regional road corridors; promotion of multimodal customs procedures;
Custom	Expansion and investment in infrastructure and equipment of the Guatemala-Pedro de Alvarado border post.
Custom	Smooth passage of transits between Guatemala and El Salvador through the Pedro de Alvadorado-La Hachadura / La Ermita-Anguiatu intraregional customs offices using GPS or RFI technology, a process of this nature would reduce delays at these border crossings, provide effective monitoring and take advantage of available technology. Streamlined transit between Guatemala and Honduras through the Entre Rios - Entre Rios intraregional customs offices using GPS or RFI technology, a process of this nature would reduce delays at these border crossings, provide effective monitoring, and take advantage of available technology.
Highway	A corridor parallel to the Pacific
Highway	COMPLETION OF A 4-LANE HIGHWAY CONNECTING PUERTO CORTEZ (HONDURAS) WITH PUERTO CUTUCO (EL SALVADOR).
Highway	Dynamic weighting stations

Sector	Answer
Highway /Urban Logistics	Transformation of the Pacific Corridor into an Economic Integration Corridor (1.5 billion USD). Component 1 PC: Road Investments (1 billion USD), Component 2 PC: Border Crossings (300 million USD), Component 3 PC: digitalization and logistics optimization, cargo monitoring (200 million USD). Optimization of the Bioceanic Corridor in Guatemala CA9 (1 billion USD) Optimization of the Troncal Norte (El Salvador) and CA4 (Honduras) corridors. Optimization of Pan-American corridor (El Salvador) and CA5 (Honduras) Optimization of Managua-Esteli corridor (Nicaragua) and CA5 (Honduras)
Highway	The expansion of roads to comply with the technical specifications (weights and dimensions) of the Manual of Weights and Dimensions approved by the countries. And the road network maintenance fund scheme, which is imperative to maintain roads in good condition and facilitate trade. In addition, the stops for carriers, which could follow the methodology of the 'caminoishi' (I think that is the name) that we observed in Japan, where communities manage and benefit from offering these services to carriers and tourists.
Highway	Improving the capacity of the Pacific corridor highway network
Highway	Pan-American network rehabilitation and improvement project
Highway	Standardization of road inventory
Highway	To harmonize in the member states, by modernizing through the installation of an automatic weighing system for cargo vehicles, thus opting for an improvement in the development of infrastructure aligned with the policies of the Central American region in its main corridors.
Highway	Enabling alternative fiscal routes to speed up traffic flows
Highway	Standardization of the road inventory system for the interoceanic corridor.
Maritime	As mentioned above, at least one interoceanic canal
Maritime	At the corridor level, I am leaning towards the interoceanic corridor for the purpose of creating added value and taking advantage of the new 'nearshoring' trend. In this sense, there is already an interoceanic corridor in Panama, by sea, pipeline and land. The next corridor to be promoted is in the area of Guatemala, El Salvador and Honduras, as they are countries that produce manufactured and agricultural goods. Part of this corridor is already advanced in Honduras. The proposal should involve a kind of dual corridor between the Pacific of Guatemala, El Salvador and Honduras with the Caribbean coast of Honduras and Guatemala. Puerto La Union and Quetzal on the Pacific and Cortes and Santo Tomas de Castilla on the Caribbean.
Maritime	Establishment of inter-oceanic corridors between the countries of the northern triangle, which would imply integrated border coordination, improvement of physical and digital infrastructure, strengthening of deep integration, etc.
Maritime	improvement of the river network
Maritime	Implementation of the Industrial Development Plan in the Gulf of Fonseca (Nicaragua, Honduras and El Salvador).
Railway	Interconnection between Puerto Quetzal and San José aerodrome, both in Guatemala, and subsequent railroad to El Salvador to connect with the ports of such country.
Railway	Interconnection between Puerto Quetzal and San José aerodrome, both in Guatemala, and subsequent railroad to El Salvador to connect with the ports of such country.
Urban Logistics	Road and network improvement project in eastern El Salvador to guarantee the fluid traffic of commodities between El Salvador and Honduras, given the opening of its dry canal that connects the El Amatillo border with Puerto Cortés;
Urban Logistics	I consider that the most feasible route at this time should be El Salvador -Guatemala.
Urban Logistics	A dry cannal
Urban Logistics	Automation and harmonization of standards in the Pacific corridor and paralell corridors, e.g. Ca9 and Ca4
Urban Logistics	Agricultural Corridor (HO-NI), Central Corridor (NI-CR)
Urban Logistics	The dry canal between Puerto Cortez in Honduras and Puerto de La Union in El Salvador, which will enhance regional and national connectivity, as well as the establishment of new logistics centers for the international distribution of goods.

Sector	Answer
Urban Logistics	Development of a logistics chain between the Ports of La Unión and Cortés
Urban Logistics	Taking into account that SIECA has specialized studies in the transportation sector at the Central American level, which are included as a reference in the document Methodology for measuring speeds for land transit of goods in the Pacific Corridor of Central America Second Edition for the period 2016-2020, this can be a reference to improve the speeds of this sector at the Central American level in this Pacific corridor and complement the Action Plan of the Regional Dispatch Times Study for a better convergence of the instruments and projected results.
Urban Logistics	Intermodality of transportation services in the region

Source: JST

Figure 12.2.6 and Table 12.2.4 show the collected answers of each country level by sectors. In country level, projects related to highway sector were the most common answers.



Source: JST

Figure 12.2.6 Number of Projects by Sectors in Each Country Level

Table 12.2.4 Detailed Answers in Each Country Level

Sector	Answer
Aviation	At the discretion of the honorable COCESNA Board of Directors
Custom	Implementation of Port Community System in Empresa Portuaria Quetzal, so that this Temporary Customs Warehouse can take on the national and regional challenge of increasing trade with Asia and we can as a country and region provide excellent service, which will reduce time and costs. It is suggested if it is feasible to carry out the same process simultaneously in Empresa Portuaria Santo Tomás de Castilla, so that we can strengthen the process and attend the growth of trade we have with the United States of America and the European Union and be able to provide an excellent service, which allows to reduce time and costs.
Custom	The use of technologies such as non-intrusive equipment, automation in customs processes including automated lanes for better control and streamlining of the process.
Highway	Expansion of the entire coastal and Pan-American highway to 4 lanes, providing it with complementary logistics infrastructure.
Highway	The implementation of bypasses in the CA routes that cross congested urban areas, for example. Cuyotenango, San Bernardigo, Cocales, Retalhuleu; Los Amates, El Rancho and the need for a route to cross the capital city at different cardinal points.
Highway	An important project would be to have a 4-lane highway connecting Guatemala with Honduras (either the CA-01 or the CA-02).
Highway	Improving conditions of the Pacific Corridor and the Pan-American Highway
Highway	Mandatory weighing control for all corridors in the countries.
Highway	Road improvement, widening of lanes for cargo traffic.
Highway	Expansion of the existing road network
Highway /Airport /Urban Logistics /Maritime	Costa Rica, Construction of the new road to San Carlos - (CR-O0005) (US$205 million) Costa Rica, Expansion and improvement of the San José - Cartago road (Route 2) (US$180 million) Costa Rica, Widening and improvement of the San José - Río Frío road (Route 32) (US$365 million) Costa Rica, Expansion and improvement of the San José - San Ramón road (Route 1) (US$550 million) Costa Rica, Liberia Airport (100 million USD) Costa Rica, New Orotina Airport (US$3 billion) Costa Rica, Expansion, improvement and concession program for the Port of Caldera on the Pacific (US$250 million) Costa Rica, Limón Port Improvement Program (US$300 million) Costa Rica, Pacific Railroad (US$100 million) Guatemala, CA-9 North Corridor Development Program, El Rancho-Puerto Barrios Section (US$150 million) Guatemala, Expansion of San José Airport (US$20 million) Guatemala, Modernization of La Aurora International Airport ($113 million USD) Guatemala, Industrial Park in Puerto Barrios (US$150 million) Honduras, Rehabilitation and improvement of Strategic Road Corridors (CA-5, dry corridor, CA-4) (US$200 million) Honduras, Northern Logistics Conglomerate Investment Program (US$1.5 billion) Mexico, Puerto Chiapas: Dredging, Construction of warehouses, Construction of logistics platform (US$100 million) Nicaragua, Program for the Development of Productive Opportunities on the Caribbean Coast ($175 million USD) Nicaragua, Reactivation Program for Logistics and Regional Productive Integration - Phase I (USD 250 million) Nicaragua, Reactivation Program for Logistics and Productive Regional Integration - Phase II (US$170 million) Nicaragua, Sustainable Road Infrastructure Expansion Program I. (USD 180 million) Nicaragua, Sustainable Road Infrastructure Expansion Program II (200 million USD) Nicaragua, Border Road Integration Program (US$90 million) El Salvador, CA01E: Road Rehabilitation. Section: Sirama-Desvío A Santa Rosa De Lima, Municipality of La Unión, San Alejo and Pasaquina, Department of La Unión (US$5.85 million). El Salvador, Reconstruction of bridge over Huiza River (5.3 million USD).

Sector	Answer
	El Salvador, ET. RN13W- El Coco-Chalchuapa, Santa Ana (10.82 million USD) El Salvador, Apaneca - Quezalapa - San Pedro Puxtla, Department of Ahuachapán (7.4 million USD) El Salvador, AHU15S San Pedro Puxtla - Guaymango section, Ahuachapán Dept. (6.8 million USD) El Salvador, SAV27, Tecoluca - 'El Playón' (7.65 million USD) Belize, George Price Highway Rehabilitation Project - Section 4. San Ignacio - Belize-Guatemala border crossing section (US$10 million) Guatemala, Expansion to 4 lanes Section: Coatepeque - Start of Mazatenango Bypass (235 million USD) Guatemala, Expansion and Rehabilitation to 4 lanes Section: Km 114+790 - Access to Siquinala (plus 4.08 km to Escuintla) (66 million USD) Guatemala, Expansion to 4 lanes Section: Escuintla - Chiquimulilla (147 million USD) Guatemala, Rehabilitation of Section: Mazatenango - Km 126+190 Maintain 2 lanes and 2-lane Mazatenango City Bypass (USD 58 million) Guatemala, Circunvalación Ciudad Cuyotenango - 2 lanes (36 million USD) Guatemala, Pajapita and Tilapa City Bypass - 2 lanes (43 million USD) El Salvador, 'Construction of viaduct and widening of CA01W highway (Los Chorros section), between Monseñor Romero and CA01W highway; municipalities of Santa Tecla, Colon and San Juan Opico, department of La Libertad' (US$266 million) El Salvador, construction of the General Manuel José Arce bridge, La Hachadura - Pedro de Alvarado border, municipality of San Francisco Menéndez, department of Ahuachapán (US$35 million). El Salvador, La Libertad By-pass, eastern section (US$132 million). El Salvador, Highway Expansion. La Hachadura - Acajutla (US$79 million). El Salvador, widening of highway CA02W, from Playa El Obispo to Playa El Zonte, on coastal tourist road SURF CITY (Phase I), Department of La Libertad (145 million USD). El Salvador, Expansion to 4 lanes San Vicente - Moncagua (71 Km.) (43 million USD) El Salvador, By-pass of La Libertad, Western section (58 million USD) El Salvador, New route El Delirio-El Carmen (Opening, joining CA2 with CA1) (43 million USD) El Salvador, Improvement of the Acajutla-Anguiatú axis (extension to Sonsonate-Anguiatú primary road) (US$207 million) El Salvador, Expansion of 4-lane Troncal del Norte section Apopa - Frontera El Poy (82 Km) (135 million USD) El Salvador, Rehabilitation of highway CA01E, section: Sirama-desvío a Santa Rosa de Lima, municipality of La Unión, San Alejo and Pasaquina, department of La Unión (US$24 million). El Salvador, Expansion to four lanes east exit from San Miguel to Sirama (36 km) (US$65 million). El Salvador, Expansion to three lanes of RN04E San Vicente - CA01E road (US$150 million) El Salvador, RN18E: Road widening. San Miguel - Pasaquina (88 million USD) El Salvador, Opening of interconnection CA8 (Sacacoyo) - CA1 (Sitio del Niño) (11 Km) + Overpass (30 million USD) El Salvador, Expansion to 4 lanes Santa Ana - San Cristobal Border (28 Km) with Guatemala (- million USD) El Salvador, Loading and unloading terminals (Valle San Andres area; Nejapa corridor and Comalapa highway corridor) (0 million USD) El Salvador, Reconstruction to 2 lanes Section: Guatemala Border - CA-12S (77 million USD) El Salvador, Rehabilitation of section: Zacatecoluca - Desvío a Jiquilisco. Maintain 2 lanes (26 million USD) Nicaragua, Construction of the Port of Bluefields (US$594 million) Nicaragua, Expansion of the Nandaime-Peñas Blancas Corridor (US$157 million) Nicaragua, Improvements to Corinto Port: Gantry cranes and frontal ship unloading equipment (US$70 million) Nicaragua, Expansion of runway to 3,100 mts (US$50 million) Nicaragua, ZAL de Puerto Corinto: with space for inspection, silos and various logistic warehouses (28 million USD) Nicaragua, Cold Storage Warehouse (USD 8 million) Nicaragua, Nejapa - Empalme Izapa Upgrade Lanes ($17 million) Nicaragua, Rehabilitation of La Curva - Nueva Guinea - Naciones Unidas Highway (213 million

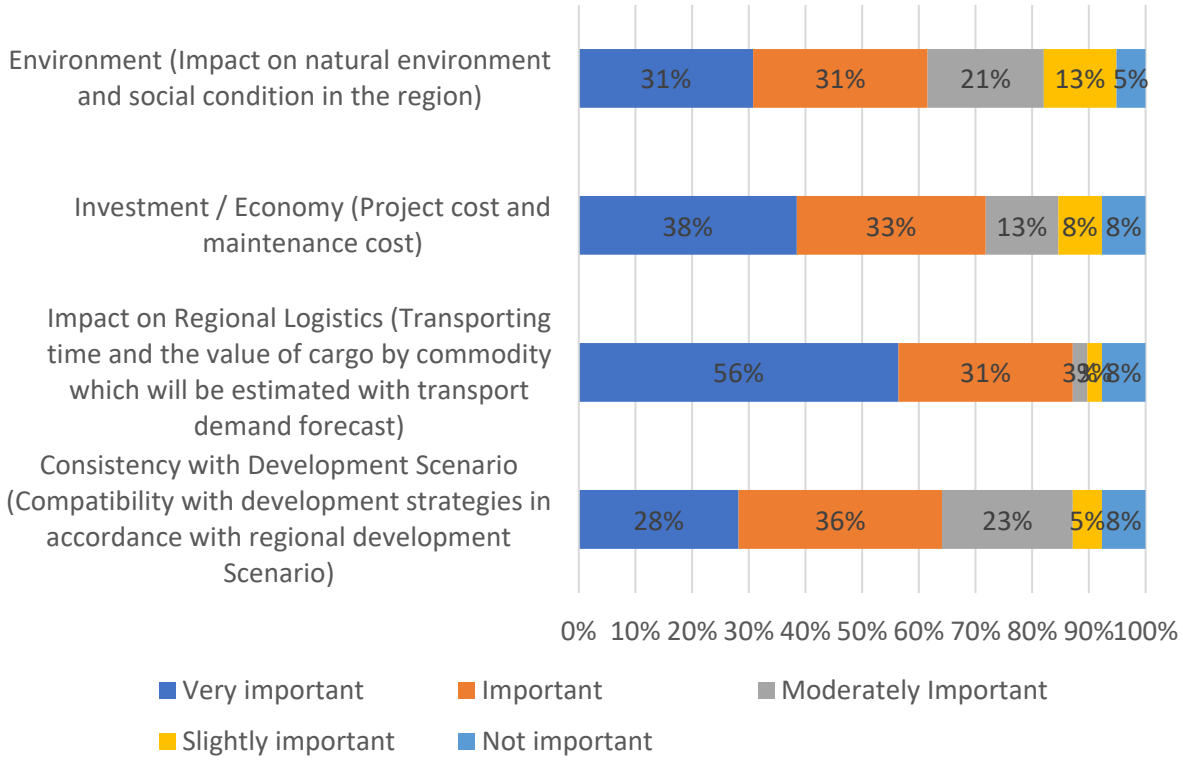
Sector	Answer
	USD) Nicaragua, Operational design and technological equipment for the Mesoamerican Pacific Logistics Priority Corridor (El Guasaule - Peñas Blancas) (US$7 million) Nicaragua, ZAL de Puerto Corinto: laboratories for various inspections (US$2 million) Nicaragua, Construction of the Empalme Boom Sirpi - Empalme Moss road (US$125 million) Nicaragua, Improvements to Puerto Corinto: Dredging and widening of the access channel to 15 m (US$28 million) Nicaragua, Rehabilitation of the Empalme Telica - Empalme San Isidro Road (174 million USD) Nicaragua, Rehabilitation of the Pájaro Negro - El Almendro - El Triunfo Highway (US$43 million) Nicaragua, Duplication of the Managua-Chinandega Corridor (US$144 million) Nicaragua, Study of Port Development Opportunities on the Pacific Coast (0 million USD) Nicaragua, Sterilization of the Primary Zone (0 million USD) Nicaragua, Rehabilitation of the Acoyapa-San Pancho section ($85 million) Nicaragua, Construction of El Naranjal - Empalme Moss - Waspám highway (US$175 million) Nicaragua, Circunvalación de las Ciudades de Diriamba - Jinotepe (US$30 million) Nicaragua, El Guasaule Border Logistics Support Zone (US$6 million) Nicaragua, Expansion of the San Benito - Sébaco highway (US$168 million) Nicaragua, Pre-Port Puerto Corinto (US$6 million) Nicaragua, Puerto Corinto Access Bypass (US$38 million) Nicaragua, Sébaco - Estelí Highway Expansion (US$95 million) Nicaragua, Improvements to Managua Airport: Equipment-Lift Truck (0 million USD) Nicaragua, Sébaco City Bypass (US$20 million) Nicaragua, Centro de servicios a Transportistas-Nadaime (US$4 million) Costa Rica, Caldera- San José, RN27 ($600 million) Costa Rica, Tablillas - Guápiles road corridor improvement, known as the 4-35 project. Costa Rica, Río Frío - Limón freight railroad, known as TELCA: Tren Eléctrico Limonense de Carga (450 million USD) Costa Rica, Rehabilitation of Section: Radial Pozón - Quebrada Ganado (US$14 million) Costa Rica, Expansion of RN23, Caldera - Barranca section (junction with RN1) (US$43 million) Panama, Action 1.2.B.3 Puerto Armuelles Terminal Concession Tender (project) (US$20 million) Panama, Tocumen Free Trade Zone Development Phase 3 (48 million USD) Panama, Tocumen Free Trade Zone Development Phase 2 (US$17 million) Panama, Expansion and renovation of the Tocumen Air Cargo Center (200 million USD)
Highway	Improvement and widening of the road between the port of La Unión and the El Amatillo Land Customs Office.
Highway	Making changes to the road inventory system and adapting it to corridor standards
Highway	Improvement of the Panamerican Highway as it passes through provincial cities
Highway	Conditioning of a dry channel that will improve dispatch times throughout the country and provide a high degree of orderliness.
Highway	The project may consist of improving the infrastructure of Guatemala's internal road network, since the main roads used for heavy transport lack the quality to improve the speed of the means of transport that move goods to Central America, but this depends on the competent authority for road infrastructure (MICIVI). This problem in the case of Guatemala also extends to the corridor to the Atlantic (Ports Santo Tomás de Castilla and Puerto Barrios, each with its respective customs).
Highway	Improvement of national highway infrastructure
Highway	Mapping of areas for improvement and identification of new road projects needed to improve connectivity.
Maritime	Interconnection between the Port of Champerico and the tourist zone of the department of Retalhuleu. Interconnection between Puerto Quetzal and San José Aerodrome, both in the department of Escuintla.
Maritime	Deepwater port in the Caribbean side.
Railway	Nicaragua: Start from scratch, regulation, feasibility study for a possible cargo and passenger train, a short route.
Railway	Use of the railroad network to MOIN for complementarity of cargo with RN32. Organization and regulation of logistic land use.
Railway	Assembly of the railroad for connectivity with Central America.
Railway	Rail connectivity between the Pacific coast ports of Guatemala and El Salvador; El Caribe of

Sector	Answer
	Guatemala and Puerto Cortes in Honduras.
Urban Logistics	Connections to the current ports
Urban Logistics	Duplication of the Nicaragua Pacific Corridor, North and South Corridors with the Caribbean Region of Nicaragua.
Urban Logistics	In this case, I consider it important that country projects for corridors should be developed in Costa Rica and Guatemala, as well as inter-oceanic corridors.
Urban Logistics	Study of a national transportation plan that includes the improvement of existing modes and the proposal of new modes with the development of railway transportation.
Urban Logistics /Highway	Implementation of economic development zones, cargo transhipment zones, metropolitan ring road and other aspects related to improving the mobility of commodities and people.
Urban Logistics	Institutional capacity building at the national level to implement the PMRML, its Master Plan, update and articulation of national logistics plans with the PMRML (generate institutional structures for intermodal planning of transport systems, update regulatory and institutional frameworks, national logistics observatories, training and capacity building at the national level, etc.).
Urban Logistics	Approval of the Road Infrastructure Law; approval of a port authority law that defines the guidelines for a National Ports Policy and investment in port infrastructure in line with the growth of foreign trade.
Urban Logistics	The expansion of the Inter-American highway and the railroad that connects the city with the interior. As well as internal ports that promote short distance maritime transportation with ports in Central America and the Caribbean, which will benefit the commercial exchange, under FTA, that can occur internally between the countries of the region.
Urban Logistics	Development of a logistics chain between the Ports of La Unión and Cortés, which will allow the prompt activation of the Port of La Unión.

Source: JST

(2) Criteria

To select the priority projects in the M/P, four criteria, namely 1) Consistency with Development Scenario, 2) Impact on Regional Logistics, 3) Investment / Economy and 4) Environment were proposed. To compare the importance of each criterion, respondents were asked to rank each criterion in order of importance with five point scales. Figure 12.2.7 shows the importance of each criterion. “Impact on Regional Logistics” was ranked most important. Also, respondents were asked to specify other aspects which should be considered in the free answer as shown in Table 12.2.5.



Source: JST

Figure 12.2.7 Importance of Each Criterion

Table 12.2.5 Other Aspects Which Should Be Considered

Comment
The logistics, economic, social and environmental impact of each country must be considered, since the categories of importance present a regional approach, which is fine, but each country has its own particularities that must be considered.
DEGREE OF PROGRESS OF EACH COUNTRY'S PROJECTS UNDER THE MASTER PLAN
Impact on closing social gaps, focusing on the impact on small and medium-sized enterprises.
Supply Chain Optimization & Nearshoring
Since the Master Plan includes all modes of transportation, the intermodality criterion should be an integral part of all priority projects.
It is recommended that the results of the regional prioritization work done with the countries within the framework of the Mesoamerica Project and with the technical support of the IDB be recovered. The criteria that were taken into account are mentioned below: 'RESILIENCE 1. Resilience Aspects: does the project enable new routes and/or alternative logistical support elements to guarantee the flow of transport in the event of local disruption events?' 'RESILIENCE 2. Resilience Aspects: Does the project increase the capacity of existing transport routes allowing for increased flow and size of vehicles during crises affecting other usual routes?' 'RESILIENCE 3. Resilience Aspects: Does the project strengthen information and telecommunication systems in efficiency and reliability to ensure continuity of information flow in case of crisis?' 'RESILIENCE 4. Resilience Aspects: Does the project implement or is it part of solutions that guarantee the flow of necessary resources, material and human, destined to the adequate functioning and/or recovery of the transportation system and logistical support in crisis situations?' ECONOMIC 5. Economic Aspects: Amount of total investment required for the project (US$ millions):" ECONOMIC 6. Economic Aspects: Net Present Value of the project (US$ Millions):' 'ECONOMIC 7. ECONOMIC 7. Economic Aspects: Reduction of total travel time (valued in hours):' 'ECONOMIC 8. ECONOMIC 8. Economic Aspects: Reduction in Transportation and/or Logistics Cost (valued in US$/year):' 'ECONOMIC 9.

Comment
ECONOMIC 9. Economic Aspects: Estimated number of direct and indirect jobs created by the construction of the project (valued in number of jobs):' 'ECONOMIC 10. INTEGRATION Aspect valued by default for each project. SAFETY 10. Safety Aspects: Estimate of the reduction in the annual number of serious injuries and fatalities in road accidents that can be attributed to the implementation of the project (No. of events reduced):' SAFETY 11. 'SAFETY 11. Safety Aspects: Does the project improve the safety of cargo in terms of loss or damage en route?' 'EXTERNALITIES 12. Aspects of Externalities: Does the project affect the immediate surroundings of the project in terms of economic damage to residents, business owners or any type of facility?' SOCIO-ENVIRONMENTAL STUDIES 1. Level of progress in socio-environmental impact studies:' 'SOCIO-ENVIRONMENTAL STUDIES 1. SOCIO-ENVIRONMENTAL STUDIES 2. The project has a generic environmental license granted by the authority:' 'SOCIO-ENVIRONMENTAL STUDIES 3. 3. The project has the following level of progress in technical feasibility studies:' 'TECHNICAL STUDIES 3. The project has the following socioeconomic cost-benefit analyses or financial studies:' 'ECONOMIC/FINANCIAL STUDIES 4. PROFITABILITY Internal Rate of Return COUNTRY EFFECTIVENESS Global INFRASCOPE Indicator (The Economist) 'PRIVATE ELIGIBILITY a. Is the project attractive to different financial institutions?' 'PRIVATE ELIGIBILITY b. Is the project attractive to private investors?' 'PRIVATE ELIGIBILITY c. It is estimated that the project will have the following level of competition during the bidding process from different bidders:' 'PRIVATE ELIGIBILITY d. There is the following level of certainty that the project will have significant participation from domestic companies:' 'PRIVATE ELIGIBILITY e. The risks presented by the project have been identified, quantified, assessed, and have a mitigation plan in the following proportion:' 'PUBLIC FEASIBILITY a. Is the project included in the Government Plan of the current administration?' 'PUBLIC FEASIBILITY b. Does the project have the acceptance of the public entities involved?' 'PUBLIC FEASIBILITY c. Is there a responsible executing entity, with technical capacity and leadership to ensure coordination, interaction and cooperation among the entities involved?' 'PUBLIC FEASIBILITY d. The executing agency has the following proportion of the financial resources needed to carry out the prefeasibility and feasibility studies:'
Development of strategies aimed at taking advantage of infrastructure such as the Panama Canal, which will strengthen transportation logistics at the regional level, allowing the strengthening of value chains in their positioning in intra- and extra-regional markets.
That it can be implemented in the shortest possible time (political support, feasibility, possibility of financing, etc.).
Impact and social indicators
Integration of each country's development measures
To ensure, as far as possible, the execution of projects in the short term.
Evaluation of the volume of cargo per transport unit transiting Central America.

Source: JST

12.3 Questionnaire Form

SIECA
SECRETARÍA DE INTEGRACIÓN ECONÓMICA CENTROAMERICANA

JICA ジャイカ

COMITRAN
CONSEJO SECTORIAL DE MINISTROS DE TRANSPORTE DE CENTROAMÉRICA

Encuesta sobre la estrategia, el escenario de la futura red de transporte y los proyectos prioritarios

Información del entrevistado

* (1) Nombre

(2) Cargo

(3) Número de celular

* (4) Dirección de correo electrónico

Questionnaire survey (ESP) -Submission

QuestionPro

Introducción

La propuesta de estrategia del Plan Maestro Regional de Movilidad y Logística, 2035 se redactó en el Informe Intermedio 2, distribuido por la vía oficial a los países. Este informe suponía ser explicado y revisado junto a las Contrapartes durante la misión de febrero y marzo de 2022. Sin embargo, ha sido difícil sostener varias reuniones debido a los tiempos que conlleva algunos cambios institucionales en los países de la región y la situación de la pandemia del COVID 19. Las sugerencias y recomendaciones recibidas se verán reflejadas en el Borrador Informe Final 1 que se espera entregar en el mes de agosto de 2022.

Además, es necesario asegurar el tiempo suficiente para que las Contrapartes lean detenidamente el Informe Intermedio 2 y así hagan sugerencias. Esto asegura la transparencia en la formulación del Plan Maestro y crea un consenso con las Contrapartes y hace más participativo el proceso de construcción del Plan Maestro Regional.

Objetivo

Con el fin de promover el consenso entre las partes interesadas, esta encuesta se lleva a cabo para:

• Recibir comentarios y sugerencias sobre el proyecto de estrategia y la futura red de transporte.

• Recopilar opiniones y sugerencias sobre los posibles proyectos regionales prioritarios.

• Ponderar los criterios para seleccionar y priorizar los proyectos.

*** Estrategia**

En el Informe Intermedio 2, se propuso la siguiente visión para el Plan Maestro basada en la Política Marco Regional de Movilidad y Logística (PMRML).

Visión: *Centroamérica será una región integrada y competitiva, cuyas actividades y cadenas de suministro funcionan orgánicamente, con un comercio diversificado, con complementariedades y cadenas de valor regionales reforzadas, balanceadas, sostenibles y con un desarrollo territorial y una calidad de vida mejorados.*

Para lograr esta Visión, se propusieron doce lineamientos generales de la estrategia regional.

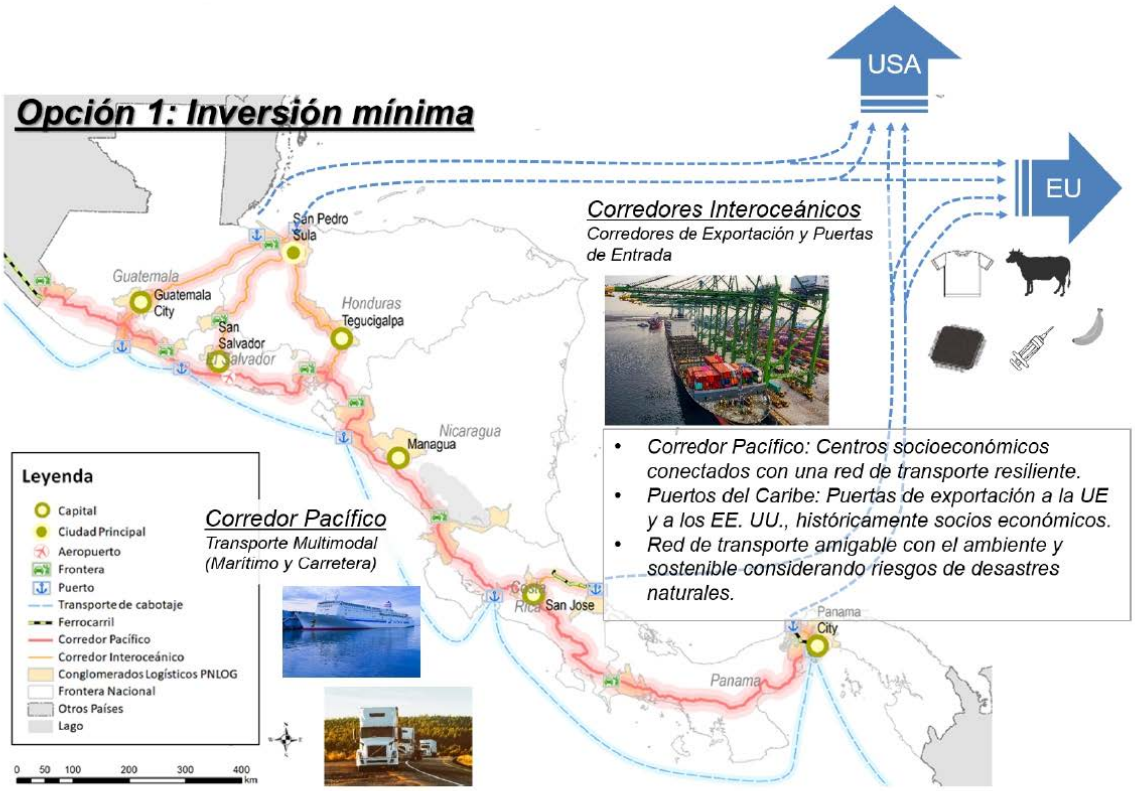
1) Por favor, seleccione tres (3) enunciados que sean efectivos para lograr la Visión.

- [ ] 1. Asegurar la consistencia entre los planes regionales ylos planes nacionales
- [ ] 2. Establecer un sistema de monitoreo y evaluación
- [ ] 3. Reducir el costo y el tiempo de logística y de la movilidad
- [ ] 4. Mejorar la disponibilidad y la calidad de la infraestructura y de las instalaciones
- [ ] 5. Reducir los impactos negativos sobre el ambiente y sobre la sociedad
- [ ] 6. Lograr una integración modal sostenible
- [ ] 7. Mejorar la eficiencia de la logística con tecnología de avanzada y la Transformación Digital
- [ ] 8. Reducir la incertidumbre en la logística
- [ ] 9. Integración sostenible con actividades económicas
- [ ] 10. Asegurar marcos regulatorios e institucionales integrados y coherentes
- [ ] 11. Coordinación con las políticas y planeamiento sectorial
- [ ] 12. Fortalecer la industria de logística, los recursos humanos y las instituciones regionales relacionadas con el sector de logística

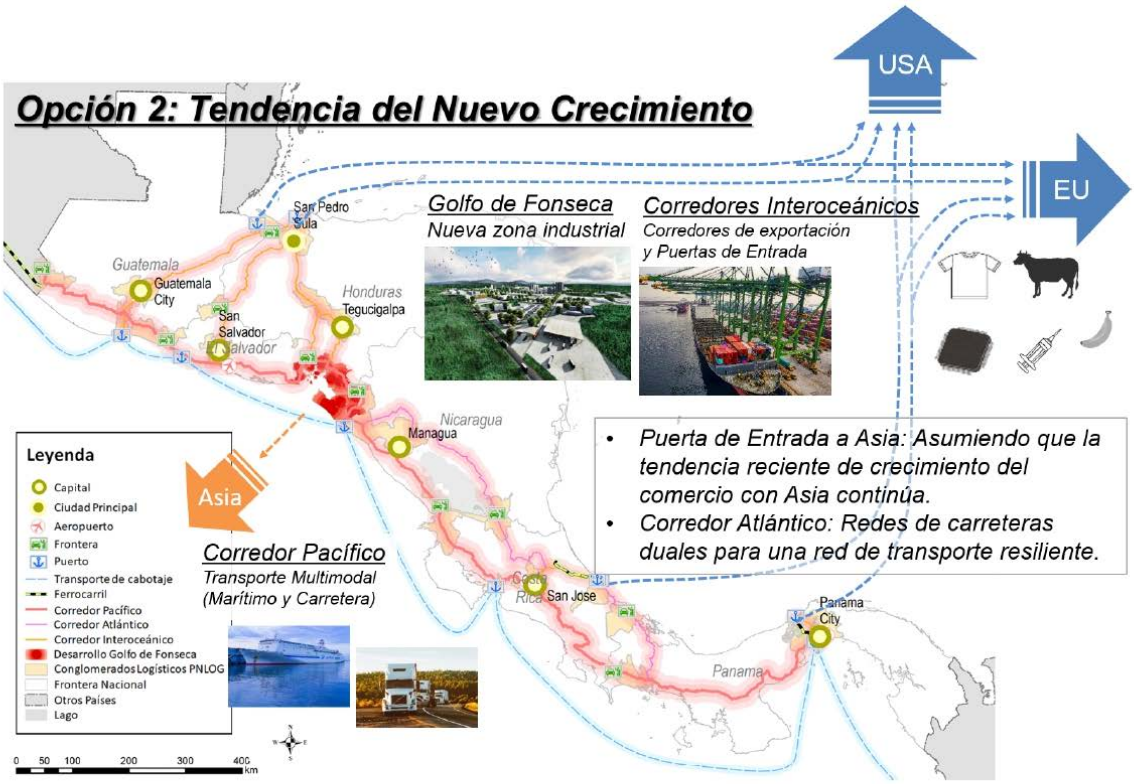
2) Si hay otro aspecto que considere necesario, especifíquelo brevemente.

* **Escenario de la futura red de transporte**

En el Informe intermedio 2 se proponen tres (3) escenarios alternativos que podrían definir la futura red de transporte.



Este escenario está enfocado en el fortalecimiento de las exportaciones centroamericanas hacia Estados Unidos y Europa, a su vez, requiere enfocarse en el mejoramiento de la infraestructura vial existente, el impulso del transporte marítimo de corta distancia (TMCD), la conectividad de los puertos del Caribe con la red vial del pacífico y la resiliencia de la infraestructura a los efectos del cambio climático.



Este escenario está enfocado en fortalecer las exportaciones centroamericanas hacia Estados Unidos y Europa, así como potenciar el intercambio comercial con el mercado asiático. Para ello se requiere desarrollar una nueva puerta comercial con Asia en el Golfo de Fonseca, vinculándola con el corredor del atlántico para no tener una dependencia exclusiva con el corredor pacífico, reduciendo la vulnerabilidad y el riesgo de la infraestructura en casos de emergencias naturales, principalmente.

Este escenario está enfocado en mejorar la conectividad de las regiones pacífico y atlántico, con el propósito de reducir las disparidades económicas y sociales entre ambas áreas geográficas, aprovechando las oportunidades de comercio con los países del caribe. Se fortalecerá la conectividad vial intrarregional y se impulsará la rehabilitación de la red ferroviaria en el triángulo norte de Centroamérica y Costa Rica.

3) ¿Cuál cree usted de los 3 escenarios anteriores podría considerarse para la definición de la futura red de transporte centroamericana?

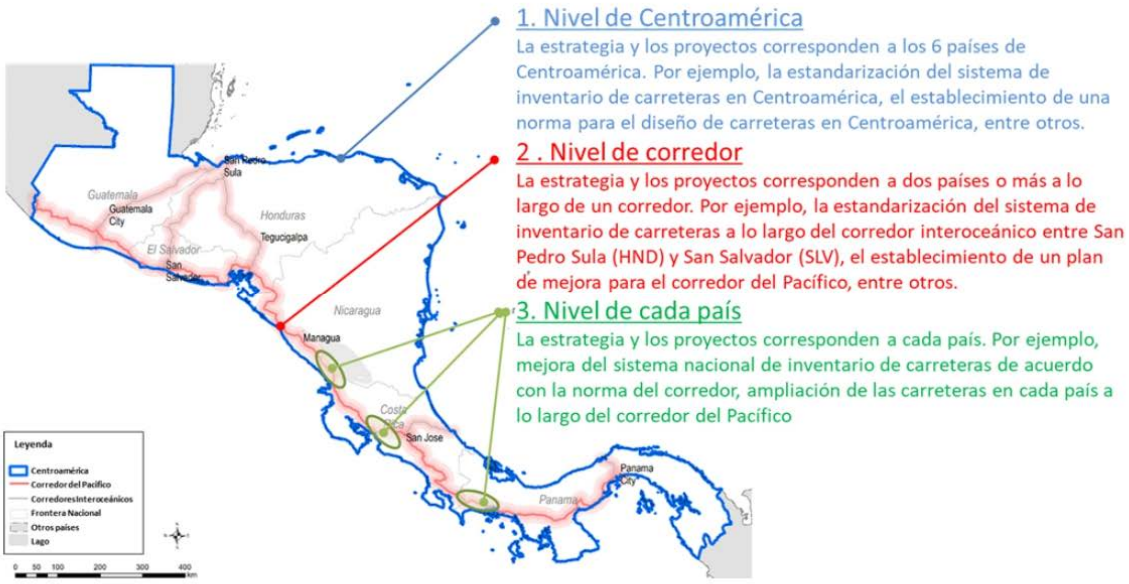
- ○ Opción 1: Inversión mínima
- ○ Opción 2: Nueva tendencia de crecimiento
- ○ Opción 3: Crecimiento equitativo

*** 4) ¿A qué plazo considera que debería mejorarse la conectividad con cada región teniendo en cuenta el equilibrio de la futura demanda de carga y las limitaciones presupues**

	Corto Plazo (al 2025)	Mediano Plazo (al 2030)	Largo Plazo (al 2035)
Norteamérica / UE	○	○	○
Asía	○	○	○
Dentro de C. A.	○	○	○
Otra región	○	○	○

Proyectos Prioritarios

Se han propuesto tres niveles territoriales, denominados: 1) nivel de Centroamérica, 2) nivel de corredor y 3) nivel de cada país, considerando la importancia de abordar el tema regional.



*** 5) Por favor, sugiera un proyecto que debería implementarse en el nivel de Centroamérica**

*** 6) Por favor, sugiera un proyecto que debería implementarse en el nivel de Corredor**

*** 7) Por favor, sugiera un proyecto que debería implementarse en su País**

* Para seleccionar el proyecto prioritario en el Plan Maestro se proponen los siguientes criterios:

8) Por favor, pondere en orden de importancia cada criterio, en el entendido que 1 es el criterio más importante y 5 el de menor peso.

	1	2	3	4	5
Coherencia con el escenario de desarrollo (Compatibilidad con las estrategias de desarrollo de acuerdo con el escenario de desarrollo regional.)	○	○	○	○	◉
Impacto en la logística regional (El tiempo de transporte y el valor de la carga por mercancía que se estimará con la previsión de la demanda de transporte.)	○	○	○	○	◉
Inversión / Economía (Costo del proyecto y costo de mantenimiento.)	○	○	○	○	◉
Medio ambiente (Impacto sobre el medio ambiente y la condición social de la región.)	○	○	○	○	◉

	1	2	3	4	5	N/A
Otros (*Por favor, especifique si es el caso*)	○	○	○	○	○	○

* *Otros (Por favor, especifique si es el caso)*

SIECA – Secretaría de Integración Económica Centroamericana
JICA – Agencia de Cooperación Internacional del Japón
COMITRAN - Consejo Sectorial de Ministros de Transporte de Centroamérica

Proyecto para el Fortalecimiento de las Capacidades en la Elaboración del Plan Maestro Regional Indicativo de Movilidad y Logística para el Desarrollo Económico Regional Sostenible en el Marco de la Integración Centroamericana