AN INVESTIGATION OF THE CENTRAL AMERICAN MOBILITY PROBLEM

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Introduction

In past and recent history, nearly all Central American countries (Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama) have faced extreme political and economic instability, costly civil wars and boundary disputes. With a great deal of monies historically spent on military interests, the basic health care, education and infrastructure needs of people residing in Central America are not adequately addressed. Inadequate transportation is a precipitate of this spending problem, and is now a problem in and of itself.

In rural, indigenous regions, people must walk long distances to gain access to markets. In some locations, when the six month rainy season is in full force, entire communities are isolated from health care, education and economic centers. In urban, more developed regions, poor planning has led to gridlock. A well planned transportation system aids in providing access to markets, health care and education, and often opens the door to other infrastructure improvements. In other words, solving the mobility problem can aid in relieving the broader health care, education and infrastructure problem.
This report summarizes an investigation into the current problem of unsafe, unreliable and inefficient mobility of people and goods in Central America. Further, this report defines and addresses the need for, resource requirements for, and expected results of well planned transportation systems in Central America by the Year 2050.

Instability in Central America

A Historical Perspective

To understand the mobility problems of Central America in detail, it is important to know a brief history of the Central American region. The Spanish conquests of Mexico and Panama took place from approximately 1509 to 1526 and grew “inward” to the remainder of Central America through the 1540’s.1 With the conquests and an influx of European diseases, many of the indigenous empires of Central America were either eliminated or taken from power by war, slavery and illness. By the Year 1821, when much of the region gained its independence, a few social classes had appeared. Most notably, these classes included: 1) those of European descent; 2) those of European-indigenous blood; and 3) those of pure indigenous race.2 These strata are still noticeable today, as those of European descent are generally much wealthier than the indigenous peoples.

From the early 1800’s through the early 1900’s, established governments in Central America were volatile as leadership often switched between extreme liberal and extreme conservative ways of thinking, fostering political instability.3 From the mid to late 1900’s, Guatemala, Honduras, El Salvador, Nicaragua and Panama faced a range of political and social strife, such as costly civil wars (the 36-year civil war of Guatemala) and/or harsh dictators (Manuel Noriega of Panama).4 In addition to the loss of lives attributed to such strife, these challenges often resulted in a misappropriation of monetary funds from the infrastructural, educational and health needs of the region.

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1 Grahn, Dr. Lance, Overview of Central American History in the 20th Century, [Lecture], Marquette University, February 6, 2002.


3 Grahn.

A Current Political Perspective

Officially, all countries in Central America have sovereign governments with citizen-elected officials, with the exception of Belize which is ruled by Queen Elizabeth and appointed officials. According to Eduardo Vasconcellos, co-author of The Earthscan Reader on World Transport Policy & Practice, “Most states in Latin America are weakly institutionalized, with powerful small groups controlling public policy decisions.” Further, with the exception of Panama, all seven countries of Central America have at least one boundary dispute with a neighboring country. While rarely violent, these disputes are sometimes used to distract constituents from other issues confronting the State.

Paul Johnson is a retired civil engineer from southeastern Wisconsin and a board member of the PAVA Foundation, an organization that works to provide infrastructure aid to rural communities in the highlands of Guatemala. Paul has traveled to several Central American countries multiple times to work with local officials and help build bridges, schools and sanitary water systems. When provided a questionnaire regarding sustainable transportation needs in Central America, one of Paul’s responses was “at the local level, the local mayors control all government funds and act much like dictators. Some are good, many are not. A mayor controls the finances of between 40 to 80 villages.” That is, at a local government level, it appears that mayors take all monetary control with little or no checks and balances.

A Current Economic Perspective

While many of the Central American countries have maintained political stability since the mid-1990’s, the effects of the past are still seen throughout much of the region. Table A, presented below, summarizes several variables with respect to economies in the Central American region as taken from the CIA World Factbook.

5 Ibid.
8 CIA – The World Factbook.
Table A
Central American Economic Indicators

<table>
<thead>
<tr>
<th></th>
<th>Belize</th>
<th>Guatemala</th>
<th>Honduras</th>
<th>El Salvador</th>
<th>Nicaragua</th>
<th>Costa Rica</th>
<th>Panama</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Total</td>
<td>266,440</td>
<td>13,909,384</td>
<td>6,669,789</td>
<td>6,470,379</td>
<td>5,128,517</td>
<td>3,896,092</td>
<td>2,960,784</td>
</tr>
<tr>
<td>Population Below Poverty Line Total</td>
<td>33%B</td>
<td>75%C</td>
<td>53%E</td>
<td>48%B</td>
<td>50%D</td>
<td>21%B</td>
<td>37%B</td>
</tr>
<tr>
<td>Household Income or Consumption by Share</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest 10%</td>
<td>N/A</td>
<td>1.6%E</td>
<td>0.6%E</td>
<td>1.4%D</td>
<td>0.7%E</td>
<td>1.7%D</td>
<td>1.2%G</td>
</tr>
<tr>
<td>Highest 10%</td>
<td>N/A</td>
<td>46.0%E</td>
<td>42.7%E</td>
<td>39.3%D</td>
<td>48.8%E</td>
<td>34.6%D</td>
<td>35.7%G</td>
</tr>
<tr>
<td>Consumer Price Inflation Rate Total</td>
<td>1.9%C</td>
<td>8.1%C</td>
<td>7.7%C</td>
<td>3.8%D</td>
<td>3.7%C</td>
<td>9.1%C</td>
<td>1.1%D</td>
</tr>
<tr>
<td>Trade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports (US Million)C</td>
<td>$290</td>
<td>$2,700</td>
<td>$1,300</td>
<td>$3,000</td>
<td>$637</td>
<td>$5,100</td>
<td>$5,800</td>
</tr>
<tr>
<td>Imports (US Million)C</td>
<td>$430</td>
<td>$5,600</td>
<td>$2,700</td>
<td>$4,900</td>
<td>$1,700</td>
<td>$6,400</td>
<td>$6,700</td>
</tr>
<tr>
<td>Surplus/(Deficit)</td>
<td>($140)</td>
<td>($2,900)</td>
<td>($1,400)</td>
<td>($1,900)</td>
<td>($1,063)</td>
<td>($1,300)</td>
<td>($900)</td>
</tr>
<tr>
<td>External Debt (US Million)</td>
<td>$475C</td>
<td>$4,900C</td>
<td>$5,400C</td>
<td>$5,600D</td>
<td>$5,800C</td>
<td>$4,800C</td>
<td>$7,000C</td>
</tr>
</tbody>
</table>


Approximately 39.3 million people live in the Central American region. The population living below the poverty line ranges from 21-percent in Costa Rica to 75-percent in Guatemala. If one was to multiply the population of each country by the percentage of those living below the poverty line, over 21.6-million Central Americans (over 55-percent) are living in poverty. This is not surprising, seeing that the lowest 10-percent of all consumers in Central America earn or spend only 0.6-percent to 1.7-percent of the money in circulation, while the highest 10-percent earn or spend approximately 34.6-percent to 48.8-percent of the money in circulation. These indicators show major disparities between the poor and rich in Central America.

The economic sustainability of nations appears weak. Every country in Central America is experiencing what is termed a “declining terms of trade” condition. That is, these countries are importing goods of greater value (machinery and processed goods) than they are exporting (primarily agricultural and raw goods) while growing further into debt to outside lenders. As the cost for primary goods drops and the need for finished goods increases, these countries continue to increase their debt.

The currency in most of Central America is weak. For example, what cost a Costa Rican the equivalent of $10.00 in the Year 2001 may have cost $10.91 in the Year 2002. If this rate of inflation were to continue into the future, the equivalent of $10.00 in the Year 2001 would double to $20.07 by the Year 2009 and triple to $31.02 by the Year 2014.
Unsafe, Unreliable & Inefficient Mobility: The Problem and its Role on Society

The function of a good transportation system is to accommodate the movement of people and goods in a safe, reliable and efficient manner. The following sections describe the overall existing transportation system in Central America with respect to existing facilities, travel choices and behavior, and its role on society.

Existing Transportation Infrastructure

Table B summarizes the existing Central American transportation infrastructure.9

<table>
<thead>
<tr>
<th>Table B</th>
<th>Existing Transportation Infrastructure in Central America</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Belize</td>
</tr>
<tr>
<td><strong>Railways (kilometers)</strong></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
</tr>
<tr>
<td><strong>Highways (kilometers)</strong></td>
<td></td>
</tr>
<tr>
<td>Paved</td>
<td>490</td>
</tr>
<tr>
<td>Unpaved</td>
<td>2,390</td>
</tr>
<tr>
<td>Total</td>
<td>2,880</td>
</tr>
<tr>
<td><strong>Waterways (kilometers)</strong></td>
<td></td>
</tr>
<tr>
<td>Navigable Year-round</td>
<td>0</td>
</tr>
<tr>
<td>Seasonally Navigable</td>
<td>825⁹</td>
</tr>
<tr>
<td>Total</td>
<td>825</td>
</tr>
<tr>
<td><strong>Airports</strong></td>
<td></td>
</tr>
<tr>
<td>Paved Runways</td>
<td>4</td>
</tr>
<tr>
<td>Unpaved Runways</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
</tr>
</tbody>
</table>

Notes: A – Navigable by shallow draft vessels only; B – Includes the 82-km Panama Canal; C – Calculated based on available information.

As shown in Table B, approximately 3,149-km of railways with different rail gauges exist in Central America. Because different rail gauges are used, they cannot currently be linked in a continuous system. This causes inefficiencies for the mobility of goods by rail within the region.

Of the 107,412-km of highways in Central America, approximately 78-percent are unpaved. Unpaved roads, which typically demand slower speeds on curves and greater stopping distances, pose a safety problem for this region of mountainous terrain, steep slopes

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9 Ibid.
and sharp horizontal and vertical curves. During the 6-month rainy season unpaved highways become increasingly slippery and rutting may occur. Further, streams and rivers are observed to rapidly rise and make highways (paved and unpaved) impassible, isolating communities for months at a time. These conditions not only add to the unsafe nature of highways, but also make the highways unreliable & inefficient. Nearly all highways located outside major cities are two-lane undivided roadways without shoulders, passing lanes and adequate passing sight distance. Problems are compounded by the fact that the majority of rural constituents cannot afford motorized transportation and use the edge of pavement for walking and bicycling.

Of the 6,122-km of waterways that exist in Central America, 63-percent are navigable year-round while 37-percent are navigable during either the rainy or dry season only. Approximately 21-percent of the total waterways are navigable by shallow draft vessels only (12-percent on year-round waterways and 9-percent on seasonal waterways). Unlike other transportation means, waterways must rely on the environment (rain) and topography (watershed) of the region to make them functional for transportation use. Communities that depend on seasonally navigable waterways may face stage levels that are too low during the dry season or too high and turbulent during the rainy season for them to be a reliable means of transportation.

Finally, Central America has 113 airports with paved runways (10-percent of total) and 1,022 with unpaved runways. It cannot be determined if these airports meet their function as safe, reliable and efficient means for transportation.

**Travel Choices & Behavior**

In poor, rural regions of Central America, people have few choices for mobility. The first and most popular method of travel is walking. Goods need to be moved from one place to another, so men and women will carry large and heavy objects on their heads. For example, on a recent trip to Guatemala, two men were seen carrying a tree trunk approximately 3-meters long on their heads. While walking can be a great means for exercise, carrying a large load like a tree trunk on one’s head is an unhealthy and unsafe way to carry goods. Further, many highways have two-lane undivided cross-sections without shoulders and with varying degrees of pedestrian use. This may prove to be an unsafe traveling condition for pedestrians.

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Occasionally a few people in a village will own pick-up trucks\textsuperscript{11}, which can be used as a “ridesharing” mode. It is not uncommon to drive on a highway in rural Central America and see 10 to 15 people sitting and/or standing in the box of a pick-up truck with a series of parallel bars placed for the riders to stabilize themselves. In a region with mountainous terrain, steep slopes and sharp horizontal and vertical curves, accidents with this many people sitting/standing unprotected in the back of a pick-up truck can be devastating.

Perhaps the best mode for use in rural regions is the “chicken bus”, which is a privatized fleet of old school buses from the United States without route schedules or marked stops. Rural users can usually go to town to catch the bus or catch it along a highway. The bus usually doesn’t stop for long, if at all—sometimes it slows down just enough for a passenger to run and jump on.\textsuperscript{12} This appears to be the safest means of transportation for travel between towns. However, without route schedules or marked stops, this mode needs improvements to make it more reliable.

Finally, the use of personal vehicles is more popular among the wealthy constituents of large Central American cities. Buses are also used in the cities, but primarily by the poor at the fringe of the city. With the use of private vehicles increasing in cities, traffic congestion runs high, preventing the effective use of buses. That is, in cities there exists private ownership dominance and public transport submission.\textsuperscript{13}

Well Planned Transportation Systems: What’s Missing in Central America?

The Global Development Research Center (GDRC), an “organization that carries out initiatives in education, research and practices, in the spheres of environment, urban community and information,” has identified eight principles of sustainable transportation systems.\textsuperscript{14} Transportation services in Central America will be measured against these principles.

\textsuperscript{11} Johnson.


\textsuperscript{13} Haq, pg. 169.

\textsuperscript{14} Guiding Principles for Sustainable Transportation, \url{http://www.gdrc.org/uem/sustran/sustran-principles.html}, accessed on November 4\textsuperscript{th}, 2003.
**Principle #1: Access**

“People are entitled to reasonable access to other people, places, goods and services”

For the most part it appears that those living in the inner urban areas of Central America are provided with reasonable access. This may be due to greater investment in these facilities by local and foreign governments for economic purposes. On the other hand, those living in indigenous and remote areas have very poor access, especially to markets, due to little infrastructure investment. Pathways may be the only connection between communities. During the rainy season, rivers and streams swell making pathways and roadways impassable and isolating communities from each other and centers of economic activity.

**Principle #2: Equity**

“Nation states and the transportation community must strive to ensure social, interregional and inter-generational equity, meeting the basic transportation-related needs of all people including the women, the poor, the rural, and the disabled.”

Patrice Franco states in her book, *The Puzzle of Latin American Economic Development*, that “if an economy magnetized by growth neglects the plight of the poor, people without assets are marginalized by the growth process and made even worse off.” A majority of government investment is placed in providing transportation facilities to the wealthier sections (central business districts) of major cities while the poor sections of cities and rural areas are provided with very little investment. For example, in Guatemala it is estimated that approximately 8-percent of the federal income is distributed to the poor rural communities. With a low distribution of funds to the poor and rural areas, their needs are not being met. Poor regions of Central America consist of a greater proportion of indigenous peoples than urban areas. It is also interesting to note that, as transportation improvements are provided within and between rural communities, electrical services often follow, as does the establishment of schools.

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15 Johnson.


18 Johnson.
Most transportation systems in Central America do not equally serve individuals with disabilities. Michelle Schuh, a physical therapy professor at Marquette University, has traveled to El Salvador to work with people with disabilities. Her observations are that there exist “significant access limitations for individuals with disability.” For example, she notes that buses do not provide access to those in wheelchairs, and curb-cuts are not commonplace. She further notes that improved infrastructure exists in urban and vacation areas, but even then ramps and curb cutouts are not present.

**Principle #3: Health and Safety**

“Transportation systems should be designed and operated in a way that protects the health (physical, mental and social well-being) and safety of all people and enhances the quality of life in communities.”

A colleague who has traveled to Central America several times studies air quality and emissions for a living. Based on his observation, “people living in urban areas (in Central America) are subject not only to the poor air quality which results from the predominant wood burning, but also from the unregulated tail pipes of diesel buses and trucks and gasoline automobiles.” These operational deficiencies pose respiratory problems for those living in urban areas. In addition to the lack of vehicle emission standards, vehicle safety standards are not enforced. In rural areas it is not uncommon to find 10-15 people riding in the back of a pick-up truck without safety harnesses. Pedestrians are given little consideration in rural areas as they must walk on two-lane highways with steep slopes, sharp curves and no passing lanes.

**Principle #4: Individual Responsibility**

“All individuals have a responsibility to act as stewards of the natural environment, undertaking to make sustainable choices with regard to personal movement and consumption.”

There are several problems regarding individual responsibility towards the natural environment in Central America, especially in poor, rural communities. First, people who are worried about surviving to the next day cannot think about how much land they use or how much sewage and waste they dump into streams. This can be devastating as communities downstream must rely on the same water source for bathing and drinking as communities located upstream without proper treatment. Individuals are not educated about how their choices—transportation related or not—affect their environment.

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21 Franco, pg. 15.
Energy consumption by fossil fuels is low in most rural regions. However, there appears to be a lack of vehicle emission standards and enforcement. As the economies of Central America improve, consumption is expected to increase. “Chicken buses” are currently well utilized by rural residents traveling from town to town. If well regulated and subsidized, mass transit systems will most likely operate with the least environmental impact.²²

**Principle #5: Integrated Planning**

“Transportation decision makers have a responsibility to pursue more integrated approaches to planning.”

Many of the older cities in Central America were well planned during times of colonial rule. However, they cannot meet the increasing demand of motorized traffic. Rural roads may often be designed by “the seat of the pants” of dozer operators and a majority of transportation related work is implemented by politicians for voter support.²³

Perhaps one of the underlying problems of implementing proper planning is a dearth of educated scientists and engineers in research and development. According to the World Bank, in the Year 2002 in the United States of America there were approximately 4,100 scientists and engineers in research and development per one-million people. In Europe and Central Asia there were approximately 2,070.²⁴ For the purpose of comparison, it was calculated that in Central American countries alone there were approximately 110 scientists and engineers in research and development per one-million people—most of which were located in Costa Rica.

**Principle #6: Pollution Prevention**

“Transportation needs must be met without generating emissions that threaten the public health, global climate, biological diversity or the integrity of essential ecological processes.”

As stated under Principle #3: Health and Safety, diesel buses and trucks and gasoline vehicles in Central America are currently unregulated or regulations are not enforced, threatening the health of the public and environment. Waterways are heavily polluted

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²² Duncan.

²³ Johnson.

due to the lack of wastewater treatment. In places where wastewater treatment plants are located, some are not operated due to lack of funds and/or knowledge in plant operations.

**Principle #7: Land and Resource Use**

“Transportation systems must make efficient use of land and other natural resources while ensuring the preservation of vital habitats and other requirements for maintaining biodiversity.”

When compared to metropolitan areas in the United States, many Central American cities are compact with little urban sprawl, most likely due to the mountainous terrain in much of the region. Similarly, rural centers of economic activity are well defined by roadways and/or waterways. Highway infrastructure itself does not appear to overburden or overuse land and natural resources, as few highways between municipalities are bigger than two-lane undivided facilities. These are positive indicators. Many transportation infrastructure users, on the other hand, heavily pollute roadsides and waterways, as well as deforest the land for conventional use.

**Principle #8: Fuller Cost Accounting**

“Transportation decision makers must move as expeditiously as possible toward fuller cost accounting, reflecting the true social, economic and environmental costs, in order to ensure users pay an equitable share of costs.”

According to the GDRC, transportation systems must be cost effective and costs must be equitably shared based on the impacts different travel choices incur. It is uncertain if cost accounting is occurring in Central America, as this task often involves intense research into different modes of travel, the identification of existing transport policies and subsidies, and measurement externalities (i.e. the effects on society and the environment). Due to high levels of poverty and the need to attract or retain businesses, it may be difficult for Central American governments to charge users for the costs their choices incur.

**Transportation 2050: Solutions for Central American Mobility**

Due to the complexity of problems that exist in Central America, many factors will need to come into play to make Central American transportation systems safe, efficient and reliable for people and businesses by the Year 2050. The following is a discussion of a few of the factors as they relate to transportation.

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25 Guiding Principles for Sustainable Transportation
**Economic Investment**

Inadequate transportation systems are a precipitate of the historical spending problem in Central America. Economic investment will play a large role in solving the Central American mobility problems. However, the economies of Central America are in a declining terms of trade, meaning they are growing further into debt to outside lenders. To meet the conditions for sustainable transport, investment from outside sources in the form of grants rather than loans should be considered for providing education and a basic sustenance to the poor in Central America, as well as for building and maintaining transportation systems.

**Education**

It is understood that the more education people receive, the more productive those people will be, and thus those people will have greater potential to make informed choices and earn more income in a wider variety of jobs. In many newly industrialized countries (NIC’s) such as Singapore, South Korea, Taiwan and Hong Kong, large investments have been made in education with noticeable success. Education will need to be readily available to all people of Central America—including the poor living in rural regions—to provide a basic level of literacy and technical skill in transportation systems planning, design and construction. In addition to higher incomes, equal education can help the poor gain greater dignity, respect and freedom within their society. The education of engineers and planners will play an integral role in providing an adequate and maintainable transportation infrastructure.

As educated generations earn more money, that money can be taxed to provide a national income for better education, transportation and other facilities. Further, with a more educated constituency, Central America can move towards providing more finished goods which may help the region reverse its declining terms of trade. As Juan Enriquez said in an article published in *Foreign Policy*, “A nation's success in the global economy is not determined by the quantity of its natural resources, but by the quality of its human resources.” In addition to basic education, the International Monetary Fund (IMF) and individual outside countries/grassroots organizations may consider giving monetary grants for research and development, free tuition to outside universities (i.e. the United States and Europe) in the fields of science, engineering and economics, and mobilizing organizations like the Peace Corps in rural Central America to help build schools, roadways and other basic infrastructure.

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Infrastructure

Patrice Franco, in her book *The Puzzle of Latin American Economic Development*, references the World Bank and states “investments in infrastructure can support economic growth, reduce poverty, and make development environmentally sustainable.”

Most Central American transportation facilities do not serve their function in providing safe, efficient and reliable mobility. One of the many steps to solving the mobility problem will include equitable investment in transportation systems. That is, transportation investment in Central America must be more equally distributed to both the cities of the wealthy and the rural communities of the poor.

Transportation infrastructure improvements should begin with safer highways for drivers and pedestrians alike. This may include paving more highways, providing small bridges between communities affected by the rainy season, updating roadways to handle large and heavy vehicles, and providing roadside traffic barriers, warning signs and safe walking areas for pedestrians. It is important that Central America adopt a transportation standard unique to its climate, topography and needs. Central America should not strictly adopt the standards of the United States and/or Europe, though standards in these countries may serve as a starting point.

Finally, Central American governments must cooperate to provide a more efficient and uniform system. For example, Central American governments may consider adopting a regional rail gauge, preferably similar to North and/or South America for purposes of trade, and update its system to accommodate the interregional shipment of goods. Seaports and airports should be operated and maintained to provide the efficient and reliable movement of goods by air and sea. Government investment in large infrastructure (dams, bridges and highways) played an important part in providing jobs to the poor and lifting the United States out of the Great Depression. Perhaps it can do the same for Central America.

**Standards and Policies**

To provide a more sustainable transportation system, Central American governments will need to cooperate in adopting standards and policies that are easily translated and implemented.

**Facilities Design**

Developed countries have spent a great deal of time and money in developing guidelines and standards for facility design. Many of these guidelines and standards may be used or modified by Central American governments to accommodate the mobility needs of their people and goods. Examples include the design of superelevations and curves, design features to accommodate people with

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28 Franco, pg. 271.
disabilities, and other basic highway design considerations. As a region with intense seismic activity, structural design codes for steel, concrete and soils may prove invaluable. Caution should be used to adapt standards that work within the context of Central American life and do not overburden the cultural identities of indigenous peoples.

**Vehicle Efficiency and Safety**

Central American governments will need to establish and enforce laws and standards in vehicle fuel efficiency and safety. Diesel and gasoline vehicles will need to be better regulated to reduce emissions and improve air quality. A means of periodically testing these vehicles to ensure they meet standards could and should be implemented. Motorized vehicles in Central America must currently carry license plates—perhaps a system of license plate renewal similar to that in many U.S. cities could be used to make sure vehicles are tested. This method may also be used as a cost accounting measure to ensure motorized vehicle users pay an equitable share of social, economic and environmental costs associated with transportation infrastructure. With regard to vehicle safety, governments must require the licensing of drivers and the upkeep of vehicles. Municipal policing will be necessary to enforce these laws.

**Transportation Options/Mobility Management**

In rural areas of Central America the predominant forms of transportation are currently walking and use of the bus. As constituents earn more income it will become more desirable for them to purchase and use personal vehicles. Policies must be implemented to maintain transit as a desirable means of travel. This may be done by marking stops and posting route schedules, as well as promoting transit as a safe, efficient and reliable means of travel. If done appropriately, it is likely that cost accounting will prove transit to be cheaper and thus more desirable than personal vehicle use. Buses are expected to continue to be the best form of transit for interregional (community to community) travel due to their low capital costs, their ability to use existing rural highway rights of way, and their ability to maneuver in the mountainous terrain.

According to *Deutsche Gesellschaft für Technische Zusammenarbeit* (GTZ), a German government-owned corporation for worldwide operations cooperation, “mobility management is a general term for strategies that result in more efficient use of transportation resources, as opposed to increasing transportation system supply.” In highly urbanized areas of Central America, mobility management will be crucial to reducing personal vehicle use and increasing travel options. An example of successful mobility management has occurred in Bogotá, Columbia, where the city recently added 285,500 square meters in walkways, green space, 

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road dividers and sidewalks, as well as what is considered to be a world class bus rapid transit (BRT) system. In addition to improving the mobility of people in Bogotà, improvements like these help the poor integrate into society more efficiently.

**Political Stability**

Economic investment and the development of standards and policies will be integral to improving the standards of living in Central America. However, the role of political stability and an unbiased justice system should not be underestimated. Political instability and costly civil wars have historically resulted in monies spent on personal and military interests rather than the basic health care, education and infrastructure needs of people residing in Central America. The continuance of recent political stability may attract potential economic investors allowing businesses and the supply of diverse jobs to grow, as well as boost the public’s perception and trust of Central American governance. All seven Central American countries – Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama – must cooperate with one another to make the entire region more attractive and livable.

**Conclusion**

The problems of Central America are numerous and complex. As a result of historical political instability and the lack of a well educated workforce, the region continues to face high rates of poverty, poor income distribution and a deprived transportation system. Reversing these trends will initially involve a great deal of work and money in the forms of cost-free organizations and monetary grants.

Investments in education will need to occur to improve skills and raise the income levels of regional constituents. A well educated supply of engineers and scientists will play an integral role in improving the transportation infrastructure, as they will be accountable for providing a more safe, reliable and efficient means of moving people and goods.

To provide a more sustainable transportation system, Central American governments will need to cooperate in adopting standards and policies that are unique to their region, do not erode indigenous cultures, and are easily translated and implemented. Examples include facilities design standards, vehicle emissions and safety standards, and policies towards transportation options and mobility management.

Finally, well planned transportation systems aid in providing access to markets, health care and education, and often opens the door to other infrastructure improvements. If done properly, the Central American transportation system will improve the vitality of business and the standards of living of all people in the region by the Year 2050.

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References

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Useful WebPages for Additional Information

- Deutsche Gesellschait für Technische Zusammenarbeit (GTZ) GmbH: [http://www.gtz.de/english](http://www.gtz.de/english)
- Georgetown Political Database of the Americas: [http://www.georgetown.edu/pdba/](http://www.georgetown.edu/pdba/)
- Latin American Network Information Center: [http://lanic.utexas.edu/](http://lanic.utexas.edu/)
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