



How to improve
**the road
network
in Jamaica**

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Through this series of case studies, INE intends to share its work in the region, the problems addressed, the project implementation challenges faced and the lessons learned. **How to improve the road network in Jamaica** was written by Alejandro Tarre, external consultant, and Christopher Persaud of the Transport Division.

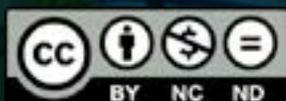
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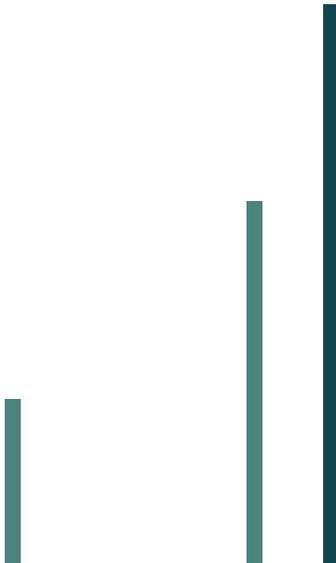
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A scenic coastal road in Jamaica. In the foreground, a silver SUV is driving on a paved road that curves to the right. To its right, a white tuk-tuk with a canopy is also on the road. The background features a clear blue sky, a bright blue ocean, and several palm trees. A utility pole with many wires is on the right side of the road. A sign for 'Gleaner STAR' is attached to the pole. A large green graphic of a road sign is overlaid on the image, containing the text 'How to improve the road network in Jamaica'.

How to improve
**the road
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in Jamaica**

Identifying the problem



Jamaica’s road system is both extensive and dense. But this system, the country’s main means of transport and mobility, began to decline in the nineties due to lack of maintenance. Torrential rains, hurricanes and subsequent flooding exacerbated the damage.

A 2005 study on the condition of the island's roadways looked at half of the main roads and concluded that just 12% of the network could be categorized as "good", a level much lower the previous study in 1999. In just six years, the number of roads in "good" condition [fell by 57%](#).

The costs are enormous and go far beyond the pain felt by victims' families. There are social and financial costs related to physical disability, medical expenses, rehabilitation for injured individuals who cannot work and material damages stemming from the loss and repair of vehicles and road infrastructure.

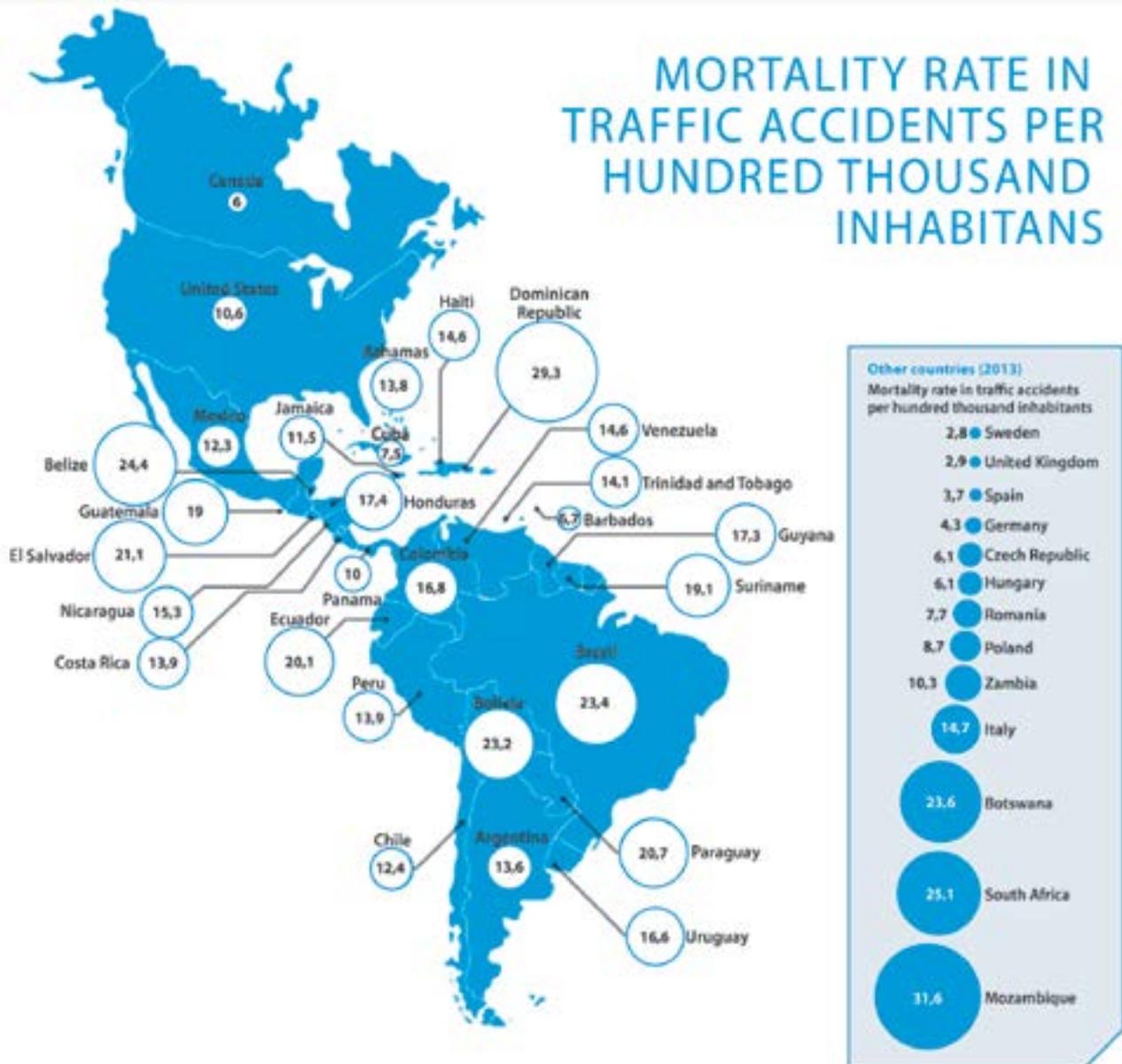
At the same time, the number of vehicles increased considerably, which, in addition to the deterioration of the roads, led to other problems: longer travel times, greater fuel consumption, high transport costs, road closures and increased pollution. These factors impact quality of life, interfere with access to schools, hospitals and other social services, and limit the population's movement to places with greater economic activity and employment. The decline of the roadways also aggravates another problem that threatens millions of lives in Jamaica and around the world: road safety.

Approximately 1.3 million people [die every year](#) globally as a result of traffic accidents, and three out of four victims are men. Another 50 million incur injuries that cause total or partial disability. Every six seconds, a traffic accident [causes a death](#) or a serious injury. [90% of traffic deaths occur in developing countries](#), even though these countries have just 54% of the world's vehicles.

Approximately 1.31 million people die every year globally as a result of traffic accidents.

In Latin America and the Caribbean, the annual fatality rate for traffic accidents [is 19.2 per 100,000 inhabitants](#), nearly double the average in high-income countries. The average number of traffic-related deaths in one year is equal to deaths caused by natural disasters [from 1993 to 2013](#). These accidents are also the leading cause of death among young people ages 15 to 19.

MORTALITY RATE IN TRAFFIC ACCIDENTS PER HUNDRED THOUSAND INHABITANS



Source: [Road Safety Strategy](#) (IDB, 2017).

Jamaica is no exception. [Between 2001 and 2008](#), 98,000 collisions and 3000 deaths were recorded on the island—a traffic fatality rate of [13 per 100,000 residents](#). Compared to other countries, Jamaica’s risk rating is medium (10-20 deaths per 100,000 residents). Between 2006 and 2008, the number of vehicle collisions [increased 13%](#), and the direct and indirect economic costs of collisions rose to US\$100 million in 2005.

Jamaica needed to act. The country sought to fix its deteriorating roads and safety issues and create an attractive environment for investment to fuel its growth.

WHAT IS ROAD SAFETY?

Road safety is the use of a set of actions to reduce the risk of injury or death caused by traffic accidents. These injuries and deaths cause harm to many families and communities, and affect health systems, divert national resources away from harder-to-prevent priorities and cause significant productivity losses. Their social and economic repercussions are profound, and represent an unacknowledged public health crisis in many countries.

The principal road safety risk factors are:

Speed. There is a strong correlation between an increase in average speed and the likelihood of a traffic accident. An increase in a vehicle's average speed of just one kilometer per hour leads to an increase of approximately 5% in the incidence of fatal accidents.

Driving under the influence of alcohol or other substances. Even low levels of blood alcohol content increase the risk of traffic accidents. The risk rises significantly at higher blood alcohol concentration (BAC) levels and the chances of recovery of the injured decreases.

Unsafe road infrastructure and vehicles. Improvements in planning, maintenance and roadway operations contribute to user safety. So does adopting technologies that make vehicles safer.

Incorrect use or non-use of protective measures (i.e. helmets, seat belts, and child restraint systems). A motorcyclist can reduce their risk of dying in a traffic accident by 40% by wearing a helmet. For vehicle users, the risk of death drops significantly with the use of seat belts (between 40 and 50% in the front seat) and child restraint systems (between 54 and 80%).

Absence of adequate medical care after an accident. The possibility of providing timely and qualified pre-hospital and hospital care to traffic accident victims can save lives and reduce the severity of injuries.

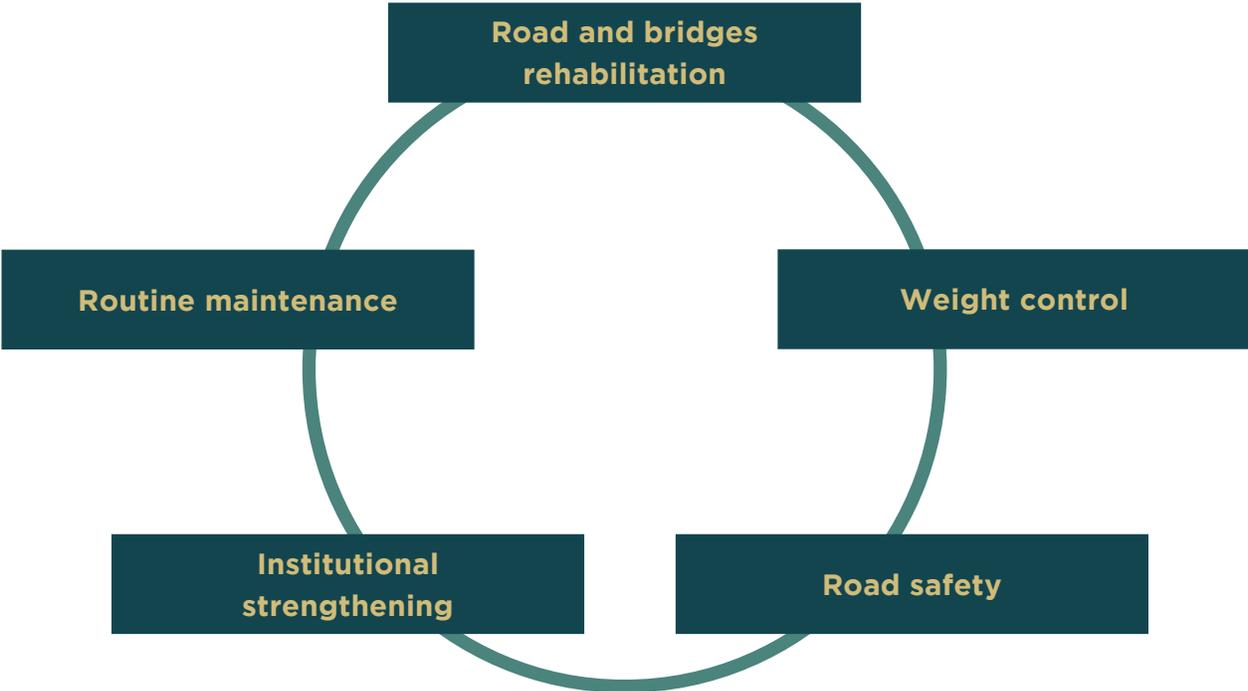
How the problem was addressed

Jamaican authorities have been refining a comprehensive strategic framework for improving their roadways and developing the transport sector since the late nineties. They have developed plans and studies outlining national policies that were subsequently used to direct interventions.

The IDB has provided several loans to support the Government's transport strategy.

The first four financed road improvement projects and important reforms, including the creation of a Routine Maintenance Management Information System that provides data, information and analysis to determine the optimal level of maintenance spending. These loans also included explicit road safety components.

As a whole, the Bank's loans, which began in 2001, have covered the following areas:



The IDB has worked in partnership with other development institutions such as the Caribbean Development Bank, the World Bank, and the European Commission.

Ongoing efforts

In late 2009, the IDB approved a fifth loan for a Road Improvement Program through the Transport Division of the Bank's Infrastructure and Energy Sector. A continuation of previous programs, the project's objectives were to improve mobility and driving conditions, reduce transport costs, increase communities' access to markets and services and reduce the number of deaths and injuries caused by traffic accidents.

Box II

PROGRAM INFORMATION

Name

Road Improvement Program — Jamaica

Borrower

Government of Jamaica

Amount

US\$10 million

Project start date

December 2009

Last disbursement date

June 2015

Site of implementation

Jamaica

Executing agency

Ministry of Transport and Works (MTW) through the National Works Agency (NWA)

To achieve these goals, the program was split into three components. The first was designing and implementing performance-based routine maintenance contracts.

The National Works Agency (NWA), the implementing arm of the Ministry of Transport and Works (MTW) was responsible for routine roadway maintenance for a long time. But centralizing the work in this one entity made it hard to achieve the level of service needed to maintain the roadways. The Government of Jamaica decided to conduct a pilot program on “test” corridors, where local communities would help maintain the roads through performance-based contracts.

The purpose of performance-based contracts is to ensure quality service without the need for expensive or continuous oversight—as is typically required for other types of contracts. This is done by linking payments to the completion of maintenance activities and a set of service indicators that have previously been agreed upon with the contractor. There were two reasons to bring in local workers: to reduce maintenance costs and to create jobs and income to the communities near the highways.



The second component of the program was the completion of civil works to improve road safety across the island. The projects included sign placement, the construction or improvement of pedestrian crossings and a program to eliminate critical spots.

The third component focused on institutional strengthening. One of the Government of Jamaica’s main challenges is improving the collection, storage and analysis of data on traffic accidents. Each stage in this process has its own challenges. The program backed several initiatives to solve them, including updating and modernizing the database and providing training in collecting and analyze information, as well as designing and implementing interventions.

Project challenges

Community involvement in routine maintenance

Nearly 300 kilometers of the Northern Coastal Highway selected for the pilot program required an initial clean-up before local communities could do any maintenance. The National Works Agency (NWA) assigned the task to the National Solid Waste Management Authority (NSWMA).



Once the preliminary clean-up was complete, the plan was that communities near the roadway would receive training and be responsible for routine maintenance for the duration of the program. These individuals would organize themselves into microenterprises that would receive a fixed, performance-based amount each month to clean drains, sweep streets, repair and replace traffic signals, and pave roads.

Although the microenterprise plan had been successful in other countries, it faced several barriers in Jamaica.

The first was legal; the Government of Jamaica's procurement policy did not include the legal provisions required to hire microenterprises. Even if it had, there was no quick and efficient way for the NWA to make timely payments to local workers.

Secondly, the NWA lacked the experience and institutional capacity to set up microenterprises and use them to directly manage routine maintenance with the communities.

This hybrid model worked. The NWSMA successfully carried out routine maintenance activities for the remainder of the program. However, the project team was forced to make changes midway through the program.

Faced with this difficult situation, the project team had a choice. They could forget about involving local communities and hire a company to perform routine maintenance, or they could look for an alternative approach, one that still included community participation. The second option was better, but more complicated. It needed an innovative and original solution.

Many factors prevented community members from doing paving work. Among them were high costs, the difficulty of training community members to do this task, and the safety risks involved in using the paving equipment.

They found one. The NSWMA, which had done the initial repairs on the pilot section of highway, would take over routine maintenance under the NWA's supervision. But the agency also agreed to work under a performance-based contract and to hire and train local workers. It assembled a mixed work force instead of using exclusively its own employees. Thus, they achieved the plan's two initial objectives using an approach other than microenterprises.



Why chose the NSWMA? As the agency responsible for solid waste management, it has experience working with local organizations for cleanup and sanitation activities. The NSWMA is also in charge of park maintenance and beautification, and has employees who specialize in gardening and landscaping.

Therefore, paving was removed from the initial list of maintenance work. This was a relatively easy decision, as the section of road selected for the program was in good condition and didn't require paving work in the short term.

Modernizing the data collection system

There are several steps to collecting data on traffic accidents. The first takes place when the accident occurs and includes how the accident data is collected; the second is the storage of that data in a database; the last step is the analysis of that data to develop and implement actions and policies.

Each step has challenges that must be overcome for the system to work.

Usually, the police takes the lead in the first step, when they collect data about the accident in a form—almost always a paper form. These forms are not always specifically designed for collecting road safety data (they are more focused on the legal aspects of traffic accidents) and they are typically passed around several times before being entered into the database—from the site of the accident, to the local police station, to police headquarters, to ministry headquarters, etcetera. This means that data is sometimes lost, accidentally changed during transcription, or takes a long time to arrive at its destination, causing a backlog (as occurred in the case of Jamaica).



Another common problem is that there is no follow up on injuries sustained in these accidents. In many cases, injured parties may die in the hospital days or weeks after the traffic accident, and these deaths are not recorded as traffic fatalities.

The people who collect data can also present a challenge. The police are usually the first to arrive on the scene of an accident, but every so often the ambulance arrives first, the fire department, the insurance carrier or an individual who witnesses the accident and decides to take the victim to the hospital instead of waiting for the authorities. These people do not record data about these incidents in the same way as the police, nor do they store it in the same place.

Collecting and analyzing data is crucial to identifying and prioritizing problems, developing interventions to solve them, and monitoring and evaluating the results of these interventions. Therefore, addressing these issues is important.

But which ones should be addressed first? This was one of the project team's initial quandaries. Answering this question required them to determine the main issues with collection, in order to determine where they had the capacity and resources to implement actions that would have good outcomes.

They decided to act in several areas. Firstly, they optimized the form that police use to record data on accidents, following the standards used by international agencies that collect road safety data regionally and globally.

Jamaica and the TRL

Concurrently with the Road Improvement Program, the IDB backed a cooperation initiative between the MTW's Road Safety Unit in Jamaica and the TRL. This initiative was driven by the [International Traffic Safety Data and Analysis Group](#) (IRTAD), a permanent working group of the International Transport Forum of the Organisation for Economic Cooperation and Development (OECD) that collects and analyzes road safety data, and has a database with validated data from 32 countries. IRTAD encourages "twinning" between countries that have successfully reduced their traffic-related mortality rate and countries that aspire to do the same.

Secondly, they held numerous training courses on collecting and analyzing this data, including courses on accident reconstruction and impact force analysis (see the Outcomes section).

Next, the traffic accident database, managed by the MTW's Road Safety Unit, was updated. It had previously had a two-and-a-half-year backlog.

This update, assisted by the United Kingdom's [Transport Research Laboratory](#) (TRL) was one of the most innovative parts of the program because not only did it eliminate the current backlog, it helped create a system that will avoid future backlogs and improve data quality.



THE IDB AND ROAD SAFETY

In 2009, the United Nations (UN) held the First Global Ministerial Conference on Road Safety in Moscow. It was the first time that poor road safety and its tragic consequences had been discussed in such an important international forum.

At the conference, the IDB joined a group of development institutions, governments and private and non-governmental organizations to alert the world of the hundreds of thousands of deaths caused by traffic accidents each year. This call eventually led the UN to declare 2011-2020 the Decade of Action for Road Safety, with the goal of saving five million lives by reducing 50% the number of deaths from traffic injuries.

The IDB officially launched its Road Safety Strategy (RSS - IDB) soon after. The strategy's objectives are listed below:

- 1) Incorporate road safety components into all transportation operations.
- 2) Promote transport operations exclusively focused on improving members countries' road safety.
- 3) Facilitate regional and intersectoral dialog among governments in Latin America and the Caribbean.
- 4) Establish road safety as a priority on the political agenda of the region's national governments.
- 5) Promote a cultural shift towards personal responsibility regarding road safety.

One priority in the strategy is to improve data collection systems,. This is why the IDB promotes national road safety observatories and has joined the World Bank and the OECD—through IRTAD—to expand the Ibero-American Road Safety Observatory (OISEVI).

The goal of this initiative is to build a regional system with standard requirements for data collection that will enable a uniform assessment of Latin America and the Caribbean's road safety issues. The IDB is encouraging the gradual inclusion of all countries in the region into the Observatory.

The TRL conducted a multisectoral study of Jamaica’s data collection process and came up with a proposal to modernize it: replace paper forms with a digital system that uses mobile devices (tablets or phones) to compile data. Under the new system, police officers, using the mobile app, would enter information directly into the database from the site of the accident. This would eliminate one of the main causes of backlogs: the long distance data must travel from its origin to its final destination.

The proposal was accepted and the TRL developed the app. It was tested in a pilot program with a limited number of police officers who had been trained to use the new system. The app was first introduced to the police because they are the principle actors involved in the first step of data collection, but others can use the system as well.

The pilot was a success; officers had no issues entering data into the mobile devices.



The TRL conducted a multisectoral study of Jamaica’s data collection process and came up with a proposal to modernize it.



Outcomes

The National Solid Waste Management Authority (NSWMA) successfully completed the routine maintenance work, demonstrating the plan’s viability. During the program, the NSWMA completed 20 planned six-week cycles and was able to reach the level of service required during the last eight. To do this, the NSWMA trained approximately 100 people and used a mixed labor force that included 70 workers from communities near the highway.

What did this achieve? With drains and roadsides maintained, the number of days per year with road closures caused by storms [fell by almost 20%](#) and travel times and vehicle operating costs were reduced.

Resources were used to improve road safety [in several areas](#). The NSWMA completed 200 kilometers of road marking, including center lines, edge lines, and raised markers. They added or improved 200 pedestrian crossings, installed three pedestrian signals (and replaced six) and placed more than 2000 warning and directional signs across the island. Three kilometers of handrails and 9500 meters of cable barriers were installed as part of a plan to eliminate critical spots

However, the most innovative accomplishment from this part of the project was the interconnection of 16 traffic lights through fiber optics and the installation of traffic cameras, video monitors, computers and software to create a Traffic Management Centre. Though consistent with the project's objectives, this was not part of the original plan and had unexpected benefits (See section "Identifying and Exploring Opportunities with an Open Mind").

How much did these actions help reduce the number of traffic-related fatalities? The statistics show that [there was a 12% reduction](#) in the average number of traffic fatalities per year over the program period. In 2012, the number of fatalities fell to 260, [the lowest number in two decades](#). Nevertheless, the 12% reduction was less than expected. There is still much work to be done. But together with the work already underway, it could lead to more significant declines.

The program's third component [was implemented according to the original plan](#). Almost 50 people were trained in accident investigation and reconstruction and 35 were trained in managing road safety audits. The Ministry of Works organized courses and conferences on topics such as signage, safe roads by design and project management. They also created and distributed informational materials to educate the public about road safety.



This project component was also able to update the database and support a pilot program for collecting data through mobile devices to find a solution to various data collection issues, including delays in data entry. The new system worked well in the pilot phase and shows potential.



Main lessons

The importance of gauging institutional scope

Besides improving routine maintenance through performance-based contracts, the first component had another objective: to involve local communities in road maintenance.

The initial plan was to foster the creation of community microenterprises that the NWA would hire to maintain the section of road selected for the pilot project. But this plan did not work and it was decided that the NSWMA would be responsible for maintenance. They would also hire and train local workers for these jobs.

Thus, a creative solution was found that achieved the program's overall goals, without closing the door on the possibility of forming microenterprises in the future. In fact, the hiring and training of local workers will make it easier if the other obstacles can be overcome.

The experience taught a lesson: the importance of timely gauging institutional scope.

Not having recognized the institutional barriers to creating microenterprises from the beginning was not a problem in this case, because the team acted quickly and innovatively and met their goals using an alternative approach. But the experience did teach them a lesson: the importance of timely gauging institutional scope.



It is crucial that the capacity of government agencies to implement programs not be overestimated; this also matters when examining the ins and outs of the law to find potential obstacles and assess how difficult it will be to get past them.

The problem-solving potential of new technologies

One of the problems in collecting, storing and analyzing traffic accident data is the long route the data must take from the accident site to its entry into the database.

To overcome this challenge, control mechanisms can be implemented at each step to ensure that data gets to its final destination quickly and does not get lost or delayed along the way. The Road Improvement Program decided to test a much more innovative approach: eliminate the steps and shorten the data's journey as much as possible. They tested a data input system with an app for mobile devices (phones and tablets) that police and other actors can use to enter information directly into a database.

The new system reduces the risk to lose valuable information by eliminating one of the causes of the problem.

But it also has other advantages. The app has automated methods of ensuring that accident data is complete and consistent. The precise location of the crash can be automatically obtained using GPS on the mobile device; the same device can take videos and photos of the accident, which can be included in the electronic forms.

Thus, the new system also improves data quality.

The Road Improvement Program decided to test a much more innovative approach.

The pilot program to test the system achieved its expected results, which is an encouraging sign that it could work over a wider geographical area with a larger number of police officers and others entering data.





Identifying and exploring opportunities with an open mind

The idea to support the creation of a Traffic Management Centre came about after a visit to a small office.

The Road Improvement Program team was visiting public agencies and institutions to gather information when they came across a small MTW office where a handful of employees were using a laptop and a system of cameras to monitor a few intersections in Kingston, Jamaica's capital. Despite the operation's small size, the team members saw an opportunity. This makeshift system, expanded and fortified, could have a big impact on the roadways.

At that time, the Government of Jamaica had already carried out traffic studies on certain intersections and planned to install and connect a series of traffic lights, with the goal of controlling them from a central hub. Because this plan was consistent with the objectives of the Road Improvement Program, the IDB decided to include it in the second project component.

Today, the Traffic Management Centre collects images from 14 cameras, controls 16 traffic lights and has a “hyperwall”—a video wall developed by the U.S. National Aeronautics and Space Administration—that allows them to obtain, display, and analyze data to develop and implement interventions and policies.

Using the Centre, a recurring congestion problem at a certain intersection can be solved “in real time” by changing how the traffic lights are programmed. During a special event—a concert, a political event, a holiday—traffic can be monitored to detect problems and fix them. Routine patterns in traffic flow can be identified more easily. The Centre can also clear the way for ambulances by reprogramming traffic lights to quickly relieve traffic congestion on certain roads.

But improved traffic safety and reduced congestion are not the only potential benefits. Just as problems on the roadways have multiple causes, they have multiple solutions.

Jamaica depends on imported petroleum products for 95% of its power generation, making it extremely vulnerable to fluctuations in oil prices. The transport sector is the country's second-largest consumer of these products. From an energy perspective, road congestion not only reduces vehicle speed, it increases vehicle downtime, leading to a substantial increase in gasoline consumption.

Therefore, the IDB decided to include the Traffic Management Centre in a new loan, the [Energy Management and Efficiency Program \(JA-G1003\)](#). This program will finance the Centre's expansion and modernization. The idea to include energy and transport in one program came from the Government of Jamaica and their appreciation for the multisectoral nature of development challenges. Just as road safety can't improve without the police, the legal system and the health, education, urban development sectors, energy efficiency cannot be addressed without bringing together the sectors that consume the most energy, including transport.¹

What have we learned from this experience? Initially, the Traffic Management Centre was not a priority. Now the project has greater scope and potential thanks to two loans focused on interrelated, though distinct, problems.



The Centre highlights the importance of keeping the mind and eyes open to opportunities where the capacity and resources for action exist and where solutions can be found.

¹ The IDB estimates that expanding and modernizing the Traffic Management Centre could increase average vehicle speed in the Kingston Metropolitan Area by 35%. This could reduce annual gasoline consumption by 104 million liters, which would also mean a significant decline in CO₂ emissions (however, this could also increase the risk related to road safety—speed increase—as well explained above).

Improving road safety requires an integrated approach

The five pillars of the UN Decade of Action for Road Safety highlight the importance of working on multiple fronts to reduce the number of traffic-related injuries and deaths. Countries must improve road infrastructure and encourage the adoption and use of technology to improve vehicle safety. They must educate road users and improve medical care for victims. They must encourage legislation for roadway audits and inspections, for drug and alcohol enforcement, for seatbelt and helmet use (cyclists and motorcyclists), and much more.

Box IV

THE DECADE OF ACTION FOR ROAD SAFETY: THE FIVE PILLARS

- I** Road safety management: Strengthen operational and institutional capacity to reach national road safety objectives.
- II** Safer roads and mobility: Improve the planning, design, construction and operation of roadways to increase safety for all users. Encourage investment in sustainable modes of transportation.
- III** Safer vehicles: Speed up the introduction and use of technologies that make vehicles safer. Strengthen information systems for consumers.
- IV** Safer road users: Give priority to vulnerable users (motorcyclists, cyclists and pedestrians) in road safety policies. Encourage helmet and seat belt use. Establish and enforce speed limits and restrictions on driving under the influence of alcohol.
- V** Post-accident response: Increase the capacity to respond to emergencies caused by traffic accidents and improve health systems to provide victims with treatment for their injuries and long-term rehabilitation.

These actions, in turn, can't happen without the participation of multiple sectors, including health, transport, security, education, public works, urban design, as well as civil society organizations. Ensuring safety standards for imported vehicles is difficult without involvement of the transport and commerce sectors. The health sector obviously plays an important role, both in the prevention and care of victims. The ministries of public works are key to improving infrastructure and services. And in the implementation of control points and justice delivery, the police play an important role.

The Road Improvement Program illustrates the importance of addressing road safety with comprehensive and multisectoral policies. For example, collecting data on traffic accidents through mobile devices has several advantages. The system can significantly improve the data collection process of traffic accidents as well as the data quality. The Traffic Management Centre can generate valuable data that can be used not only to implement actions in “real time” but also to plan and execute long-term policies.

But adoption of these technological tools must be accompanied by other actions, including the creation of mechanisms to track the evolution of injured to 30 days in hospitals, or for different actors to enter information with the same technology and the same methodology in a unique database or to develop mechanisms to bring together the information of different systems.



All this requires an institution with its own resources to lead road safety, with the ability to design and coordinate multisectoral policies spanning not only data collection, but all of the areas outlined in the UN Decade of Action.

The Road Improvement Program illustrates the importance of addressing road safety with comprehensive and multisectoral policies.

This lesson is not new; it was part of the project's design and implementation. But these challenges and the way they were addressed reaffirms their validity and importance



The challenge of sustainability

All governments have long lists of priorities, and very rarely do they have the resources to address all of them. Compared to other tasks, viewed as more urgent, maintaining the roadways is often not considered important. In times of crisis, when resources are scarce, budget allocations to road maintenance are often cut.



This is a mistake. Road deterioration often starts with lack of maintenance on roadsides and drains, which causes water to accumulate. It seeps through the pavement and expands, causing damage which then contributes to a rise in traffic accidents. Tasks as simple as regularly sweeping streets, cleaning drains, and cutting vegetation can have an impact on road safety.

The Road Improvement Project devised a plan to reduce costs and involve the community. But it will need to be adapted if employed in a wider context. For example, paving was not a priority in the pilot project because the chosen section of road was in good condition. What happens if this plan is implemented for roads that need paving work? The plan also depends on whether authorities commit to providing sufficient funds to continue maintenance.



Maintaining a road is more than cleaning drains and sweeping streets; it involves taking care of, repairing and replacing road markers. The program installed several kilometers of road markers, created pedestrian crossings and hung traffic signs. Thermoplastic was used for the road markers, and, unlike paint, this material lasts between eight and ten years. The traffic signs were also made with hard-wearing materials. However, their long lifespans are contingent on a certain level of sustained maintenance.

It will also be hard to keep improving the roads without a continued emphasis on training. Trained individuals not only have the knowledge to manage and perform tasks to improve the roadways, but they can also transfer this knowledge to other people and build institutional capacity to face present and future challenges.

Sustainability should also be an important consideration in improving the process of data collection and analysis. One of the principle advantages of collecting data through mobile devices is that it simplifies the process and therefore makes collection more sustainable over time. But this system should go hand in hand with other measures, some of which involve other sectors. Therefore, it is important that everyone who participates in data collection be on the same page. Everyone must understand how a better system benefits each sector and how hard it is to improve and refine the process without multisectoral cooperation. If key stakeholders don't have strong incentives to work together, it will be harder to continue building a comprehensive system.



The Road Improvement Program in Jamaica achieved important goals. But this will mean nothing if these improvements are not sustained.



