TRANS-SAFE

TRANSFORMING ROAD SAFETY IN AFRICA

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Radical improvement of road safety in low- and medium-income countries in Africa

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List of Abbreviations

Acronyms	Full meaning
BAC	Blood Alcohol Concentration
BRT	Bus Rapid Transit
CHW	Community Health Worker
CNSR	National Road Safety Committee
DBE	Department of Basic Education
DHET	Department of Higher Education Training
DOH	Department of Health
DOJ	Department of Justice
DVLA	Driver Vehicle Licensing Authority
EU	European Union
FRSC	Federal Road Safety Corps
GRSF	Global Road Safety Fund
GRSP	Global Road safety Partnership
IRAP	International Road Assessment Programme
ITDP	Institute for Transportation and Development Policy

ITS	Intelligent Traffic Management System
JAES	Joint EU – Africa Strategy
MOH	Medical Officer of Health
MT	Motorised Transport
NACTO	National Association of City Transportation Officials
NRSA	National Road Safety Authority
NRSC	National Road Safety Commission
NRSS	National Road Safety Strategy (2016 – 2030)
NMT	Non-motorised Transport
RDA	Road Development Agency
RoW	Right of Way
RTMC	Road Traffic Management Corporation
RTSA	Road Transport and Safety Agency
SAPS	South African Police Service
SDG	Sustainable Development Goals
SSATP	Africa Transport Policy Program
UN- Habitat	United Nations Human Settlement Programme

UNDA	United Nations Decade of Action for Road Safety 2011-2020
UNEP	United Nations Environment Programme
WB	World Bank
WHO	World Health Organisation
ZRST	Zambia Road Safety Trust

EXECUTIVE SUMMARY

This policy and regulatory framework assessment reviews the current road safety policies in four African countries: Rwanda, Ghana, Zambia, and South Africa. It aims to identify a set of proven policies, strategies, and best practices that impact the safety of all street users, as well as to identify the gaps noticed through the evaluation of these different policies. The current document contains part one, 'Policy and regulatory framework assessment', and is followed by part two, 'A best practice toolkit for mitigating road accidents in Africa'.

The policies have been grouped based on similarities in gaps in implementation. While each country having a road safety policy or strategy has positively impacted road safety, further action is needed in the following areas:

- Ineffective road safety management due to the absence of a centralized organization responsible for implementing road safety laws nationwide. There is inadequate coordination in road safety efforts, a lack of a central funding structure, and a lack of accountability. This results in poor post-crash response and inconsistent application of traffic safety regulations.
- The lack of safe streets, stemming in part from the absence of a dedicated manual to guide the design of urban streets. Most countries use highway manuals to design both highways and urban streets, resulting in monomodal roads that lead to conflicts between different road users, predominantly affecting vulnerable road users (pedestrians, cyclists, children, the elderly, people with restricted mobility, and users of mobility devices).
- Inconsistency in the implementation of safe speeds, usually caused by non-compliant road users and a lack of education among road users, as well as the failure to enforce speed limits by responsible authorities.
- The presence of unsafe vehicles on the streets, due to poor enforcement of regulations for age and quality standards of imported vehicles. This issue is further worsened by unreliable crash data and inadequate road safety management.

Each of the countries should adopt, review, and enforce standards for street design that supports complete streets. Complete streets are designed for all users, including bicyclists, pedestrians, users of public transportation, and drivers of private automobiles. They also incorporate street vendors, trees, lighting, street furniture, and other amenities. Conversely, urban motorways result in high speeds, stressful travel, low walkability, neighbourhood severance, segregation, and harmful emissions. Building complete streets instead of urban motorways makes cities safer, healthier, more prosperous, and more sociable. The street design guidelines adopted at the national and city levels should reflect these principles.

Effective road safety requires coordination across multiple sectors and stakeholders. Typically, a lead agency performs this coordination, having the authority and resources to oversee the implementation of a national road safety policy. Stakeholder engagement is essential when creating a long-term vision, strategy, and specific targets for road safety. The key society sectors, including health, transport, law enforcement, and non-profits, should be included to ensure that everyone is invested in the strategy's success.

This report concludes with recommendations that suggest how to address the identified deficiencies in the implementation areas. Then, the second part of this report presents a best practice toolkit, informed by this policy assessment. The focus is on pre-crash measures to reduce the occurrence of road accidents and the risk of traffic injuries, particularly fatal injuries, with the expectation that this

will decrease the pressure over post-crash measures, and ultimately reduce the loss of life, productivity, and prosperity.

1. INTRODUCTION

This policy and regulatory framework assessment performs a review of the existing road safety policies in four African countries: Rwanda, Ghana, Zambia, and South Africa. Its objective is to identify a set of well-proven policies, strategies, and recommendations in terms of best practices that impact the safety of vulnerable key road users.

About TRANS-SAFE

The TRANS-SAFE project encompasses national, regional, and city-level demonstrations aimed at testing various innovative and integrated Safe System solutions. These demonstrations are complemented by a comprehensive toolbox, capacity development initiatives, policy support, and replication activities. To maximize impact, the project brings together a consortium consisting of highly committed cities, road safety agencies, and experts from both Europe and Africa. Drawing on the synergies of multiple projects, networks, and the extensive technical expertise of its partners, the consortium aims to promote road safety policies and practices.

The project aligns with the recommendations of the Road Safety Cluster of the African-EU Transport Task Force, adopted in 2020. The consortium members possess experience and expertise in Africa-related research as well as development-related research in collaboration with local actors across various African countries and at multiple levels. Ultimately, the project aims to contribute to the Joint EU-Africa Strategy (JAES) and advance countries' progress towards the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). TRANS-SAFE leverages existing partnerships to collaboratively design sustainable interventions that seek to fundamentally transform road safety systems in Africa.

1.1. PROJECT BACKGROUND

According to the World Health Organization's Decade of Action for Road Safety 2011-2020 report, in 2015, the African region had the highest estimated road traffic fatality rate, despite having the lowest level of motorization in the world. Today, the region continues to have the highest road traffic injury death rates. Interventions are necessary across key road user behaviour, road infrastructure, and institutional factors to improve road safety outcomes. As of 2015, 40 countries had a lead agency to coordinate a long-term vision and strategy alongside all relevant stakeholders. Furthermore, 29 countries had a national strategy for road traffic safety that was either fully or partly funded.

This report aims to map out road safety and traffic policies in the selected countries, identify gaps in road safety policies and strategies, understand the extent to which these policies and regulatory instruments are implemented, and explore measures for better implementation. The outcome of this review will be a best practice toolkit that outlines intervention areas for policy, design, and implementation.

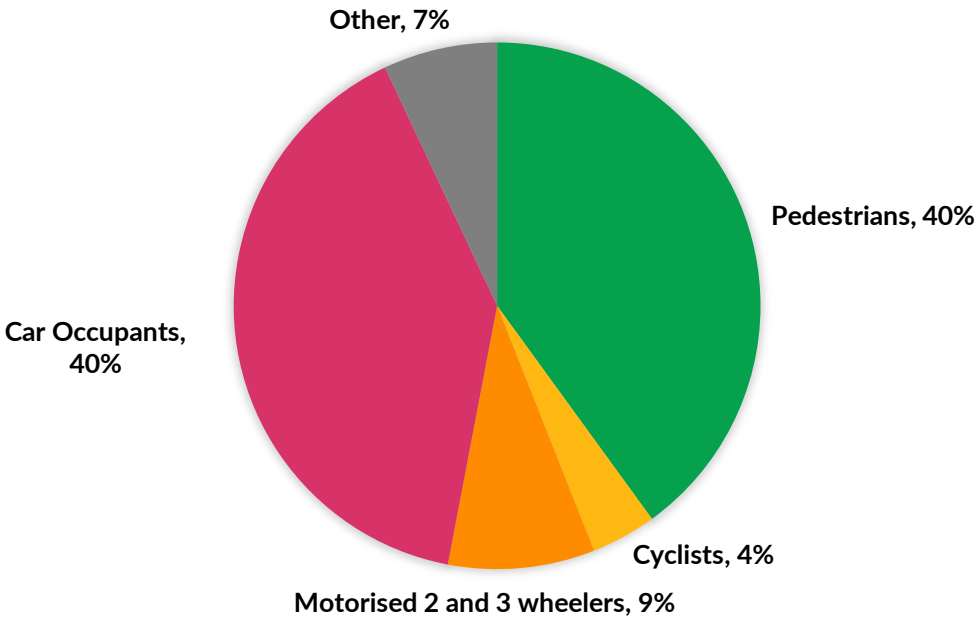
1.2. EXISTING ASSESSMENT ON THE ROAD-RELATED CRASH

Road crash deaths primarily affect vulnerable road users, such as pedestrians, cyclists, and motorcyclists. Therefore, our priority is to address crash-related issues that disproportionately impact these vulnerable groups. Firstly, the focus is on road and street design that prioritizes vulnerable users; ensuring the presence of adequate footpaths and crossings to protect pedestrians, dedicated cycle tracks and motorcycle tracks to safeguard motorcyclists, and well-designed intersections to prevent collisions.

Secondly, road user behaviour should adhere to best practice laws that protect vulnerable users, in conjunction with appropriate road and street infrastructure. This includes maintaining safe speeds, which may vary based on road type and the volume of road users in the area. It also entails implementing effective laws on drink-driving, motorcycle helmet usage, seatbelt use, and child restraint systems, which, when enforced, significantly save lives. To ensure compliance with these laws, robust and sustained enforcement efforts are crucial, accompanied by education campaigns that encourage citizens to comply. Thirdly, it is vital to invest in post-crash treatments and improvements to reduce the number of fatalities resulting from road traffic injuries.

Lastly, an essential component of these interventions is the establishment of a clear and effective institutional framework, with a lead agency that coordinates efforts among all relevant stakeholders.

Figure 1. Proportions of road traffic deaths by type of road users in Africa. (World Health Organization, 2018).



1.3. PROJECT GOAL

The primary objective of the project is to conduct a policy and regulatory framework assessment that includes a comprehensive review of the current road safety policies in the four countries selected for TRANS-Safe's living labs. This assessment aims to identify key policy gaps, analyse best practices, and provide a set of recommendations in the form of a road safety toolkit. The implementation of these recommendations would effectively promote road safety for vulnerable key road users and reduce road crashes. The goal is to identify well-proven policies, strategies, and suggestions that have a positive impact on the safety of all road users.

The specific objectives of the project are to:

1. Identify key policy gaps in the existing road safety policies.
2. Study and analyse best practices in road safety in African cities and internationally.
3. Develop a set of recommendations for the best possible policies and manuals that can effectively promote road safety.
4. Provide a comprehensive toolkit of interventions and measures to enhance road safety.

2. ASSESSMENT OF EXISTING ROAD SAFETY POLICIES

This section details information from the assessment of road safety policies in Rwanda, South Africa, Ghana, and Zambia, the African countries where the pilot projects will be implemented. The assessment of the policies was based on the existing road infrastructure design and speed management, road user behaviour and vehicle design, and inspection and enforcement of road safety policies in the four selected countries.

The assessment of road safety policies relies on available information and data, including reports, studies, and the relevant national laws and guidelines. The policies were evaluated based on secondary data sources. These sources may be limited in terms of scope and reliability, as underreporting of road safety incidents and data inaccuracies can occur.

Expanding on the assessment process, we evaluated each country's road infrastructure design and speed management policies. This involved examining the adequacy of footpaths, crossings, dedicated cycle tracks, and motorcycle lanes to protect vulnerable road users. The assessment also considered the design of intersections to minimize the risk of collisions.

Furthermore, the assessment analysed road user behaviour and vehicle design policies. This included an evaluation of compliance with best practice laws, such as safe speed limits based on road type and user volume. We focussed on the presence and enforcement of laws related to drink-driving, motorcycle helmet usage, seatbelt use, and child restraint systems.

Lastly, we assessed the inspection and enforcement of road safety policies. This involved examining the strength and effectiveness of enforcement mechanisms, such as police presence, traffic monitoring systems, and penalties for non-compliance. Additionally, the assessment considered educational campaigns and initiatives aimed at promoting road safety awareness and compliance with regulations.

2.1. RWANDA ROAD SAFETY POLICIES

The recently estimated number of road traffic fatalities in Rwanda is 3,535 people for 2016 (World Health Organization, 2018). The WHO uses modelled estimates when limited details are provided by national statistics to describe officially recorded road deaths. During 2016, the official statistics note 593 road deaths in Rwanda, seven times lower than the WHO estimates for the same year (National Institute of Statistics of Rwanda, 2019).

As part of this assessment, the following policy documents have been reviewed: the National Transport Policy and Strategy for Rwanda (2021), the Presidential Order No 25/01 of 25/02/2015, that compliments the Road Traffic Act 2002, and establishes the National Road Safety Committee (CNSR); the and the Rwanda Road Act of 2011 (Republic of Rwanda, 2011). For a specific outlook on post-crash care policy, we have also reviewed the Fourth Health Sector Strategic Plan July 2018-June 2024 (HSSP4). Official gazettes published by the Ministry of Justice indicate the specifics of the Ministry responsible for the implementation of various policies (Government of the Republic of Rwanda, 2023).

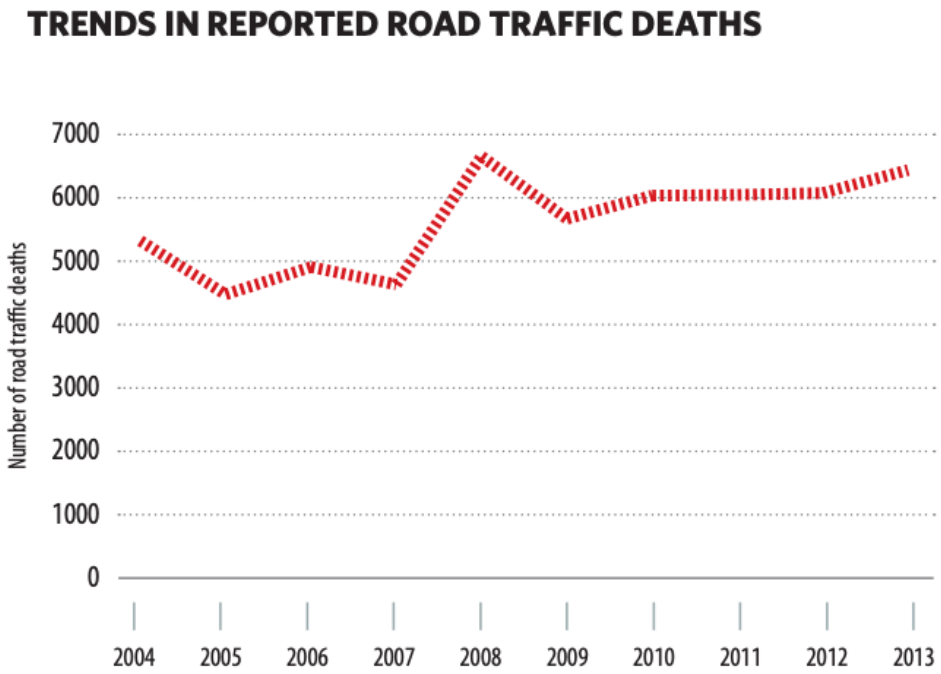
Additionally, the Lake Victoria Transport Program to construct new roads along a strategic corridor from 2017-2023 included a consultancy to describe the current status and advise a costed improvement plan for the post-crash response along this new corridor, anticipating that higher speeds would increase the need for high-quality post-crash care (The World Bank, 2023). The team also reviewed the consultant's report describes the current capacity for post-crash response (Frey, Muderevu, & du Toit, 2020).

Road engineering firms are obliged to abide by the policies during the design, construction, and maintenance of road projects. During the design phase, road engineering firms are required to consider factors such as the provision of adequate footpaths and crossings for pedestrians, dedicated cycle tracks and motorcycle lanes, and well-designed intersections to minimize the risk of collisions. These measures prioritize the safety of vulnerable road users, such as pedestrians, cyclists, and motorcyclists.

In the construction phase, adherence to safety standards is essential to ensure that the road infrastructure is built in accordance with the prescribed guidelines. This includes aspects such as proper signage, road markings, traffic calming measures, and the incorporation of safety features like guardrails and lighting.

Additionally, the maintenance phase emphasizes the regular inspection and upkeep of roads to address any potential hazards or deterioration that could compromise safety. Road engineering firms are responsible for identifying and rectifying issues promptly to maintain the safety standards set forth in the policies.

Figure 2. Trends in reported road traffic deaths in Rwanda. (World Health Organization, 2018)



2.1.1 Safe Infrastructure (Streets and Roads)

The following road safety aspects are included in the street designs and construction in cities across Rwanda.

- Roads in urban areas are to incorporate non-motorised transport (NMT) facilities, at least minimum provision of footways, and provision of traffic calming that regulate the speed of vehicles on such roads.
- Rural roads are to provide for the safety of road users and those living on the roadside.

Current practices include the use of lane markings, painted pedestrian crossings, and appropriate signage to ensure optimal visibility and guidance for motorists, pedestrians, and cyclists. In built-up areas, roads often incorporate basic sidewalks. In some cases, the cross sections include cycle tracks.

In addition to NMT facilities, traffic calming measures such as speed humps raised pedestrian crossings, and chicanes are utilized to encourage motorists to drive at appropriate speeds, reducing the likelihood of crashes and ensuring the safety of vulnerable road users.

However, there are a number of gaps in street design that compromise the safety of road users:

- In Kigali, many streets lack adequate footpath with a clear width of 2 meters or more, which poses challenges for pedestrian movement. Additionally, open drains at the roadside force pedestrians to walk on the carriageway or on the dusty surface near the street, as footpaths are frequently unavailable where drains are present.
- Despite having a considerable number of cyclists, Kigali lacks bicycle infrastructure on most corridors. A few streets have cycle tracks, but the network is poorly connected. Cycle track widths are generally below 2 m, which is the preferred minimum width for a one-way cycle track.

- Most intersections in Kigali are oversized and pose major challenges to pedestrians and cyclists for the following reasons: longer crossing widths, absence of refuge islands, lack of zebra markings to indicate the locations of pedestrian crossings, chaotic vehicle movements in the absence of channelization, and vehicles turning at high speeds due to the large turning radii. These factors collectively contribute to an unsafe and difficult experience for pedestrians and cyclists at intersections in the city.
- Pedestrian crossings in Kigali lack traffic control measures such as signal lights and zebra markings, leading to safety concerns. Drivers may not yield to pedestrians, and inconvenient placement of crossings can force pedestrians to take longer routes or cross at unsafe points.

2.1.2 Safe Speeds

Rwanda has a national speed limit of 60 km/h for public transport vehicles and goods vehicles, and in urban areas, speed limit signpost is fixed at 40 km/h, which is lower than neighbouring Kenya and Uganda, at 80 km/h. This is as per article 2 of the presidential order 25/01 of 2015 that compliments the Road Traffic Act (2002), which required that all public transport and goods vehicles should have a functioning speed governor installed, to ensure that they do not exceed recommended speeds (Republic of Rwanda, 2002).

For reducing speeding, the policies advocate for increased road users' awareness of road safety. For the drivers, national speed limits were set in urban areas, roads going through settlements and markets, and open rural roads. The speed limits are also enforced to ensure their adherence among drives, with speed cameras reportedly reducing the number of road accidents (Iliza, Uproar over low speed limits, traffic fines in Rwanda, 2021).

2.1.3 Safe Road Users

The Road Traffic Act (2002) advocates for legislation on the conduction of road safety education and campaigns and the coordination of road safety programmes. The Rwandan government followed up legislative reform with public awareness campaigns in 2003 with the WHO joining to raise community awareness for road safety from 2004 (Brown, 2007). These campaigns were also followed by further penalties for the lack of seatbelt use as well as helmet use, this seems to have been particularly effective as Rwanda has one of the highest helmet-wearing rates.

Enforcement of behaviour that will promote road safety and reduce road traffic incidents remains challenging. However, Rwanda did initiate a crackdown on police corruption, a potential major challenge to effective enforcement in 2004, which resulted in over 100 police officers being sacked for taking bribes (Brown, 2007).

2.1.4 Safe Vehicles

The Road Traffic Act (2002) provides guidelines on the minimum standards for safety for motor vehicles, those used for public transport, those imported into the country, and others. As per the Road Traffic Act, vehicles imported to the country should not be more than 10 years from the date of their manufacture and used vehicles attract a taxation of 50% on the original value of the vehicle. Moreover, in 2016, Rwanda further changed its laws on importation of used vehicles in the country to ensure that substandard used vehicles are not dumped into the country (The EastAfrican, 2016). This brought about several changes that aimed at ensuring the vehicles imported into the country were safe by making the costs of importing vehicles that have been used for longer periods very punitive.

The depreciation of vehicles that were 10 years from their date of manufacture and older was set at 80%, leaving the current value of the vehicle at 20%. Vehicles that were 4 years would be charged at a depreciation rate of 40% while those that were newer would be charged at a depreciation rate of 20%. This lowered the costs of importing newer vehicles while it increased the cost of importing used vehicles, which manages the quality vehicles are imported to the country.

More recently, Rwanda has removed the tariff on imported electric and hybrid vehicles, which will encourage the use of electric vehicles and promote sustainable mobility in the country, by lowering vehicular emissions, especially from vehicles powered by fossil fuels. In response, new industries are developing to sell vehicles, create a charging network and specialized repair garages, as illustrated by Rwandan company Kabisa (Kabisa Electric Ltd, 2023).

The National Transport Policy and Strategy for Rwanda (2021) also introduced various guidelines on electric vehicles and autonomous vehicles, some of which are listed below:

- The periodic inspection and testing of vehicles to ensure that they comply with safety and emissions.
- That the country would set standards for electric mobility, incentivise electric mobility, improve reliability on the electric grid, business models on establishment of charging infrastructure, collecting statistics, and creating a database of the same in the country.
- Established further regulations and guidance on road-based freight (Republic of Rwanda, 2021).

The Policy highlights the significant opportunities for the implementation of electric vehicle technology in shared transport services such as bike sharing and public transportation. The policy direction suggests the implementation of incentives to facilitate investments in electric mobility. These incentives aim to encourage individuals, businesses, and organizations to adopt electric vehicles and contribute to a more sustainable and environmentally friendly transportation system (Republic of Rwanda, 2021).

2.1.5 Post-crash Care

The National Transport Policy and Strategy acknowledged that the country experiences a high rate of grave injuries and fatalities, with inadequate post-crash care being one of the contributors to this, as road crash victims are not able to receive adequate health care (Republic of Rwanda, 2021). Frey, Muderevu, & du Toit (2020) describe many interviews and facility observations they conducted to understand the status of the post-crash response system and capacity for care existing in Rwanda during 2019. An important note from the report reflects the limitations of the data available to describe the status and advise the way forward:

> In the absence of any existing / accessible, detailed post-crash response epidemiological data, it is much more difficult to recommend a defensible improvement plan: If we do not know the frequency, severity and urgency of injuries sustained in road traffic accidents, we cannot accurately recommend what levels of medical and related care are currently required or would be in the near future. (Frey, Muderevu, & du Toit, 2020, p. 89)

The Fourth Health Sector Strategic Plan 2018-2024 (HSSP4), presently in effect, defines targets related to the post-crash response at different levels. As noted in table 1, below, most but not all categories of responders are clearly appointed:

Table 1. Notes from Rwandan HSSP4 for post-crash care

Classification of responders / facilities	Notes from the Rwandan HSSP4 on 2024 ambitions for post-crash care
Household *Lay people*	Basic first aid techniques and self-medication Basic over-the-counter medications (e.g., burns, drowning, muscular-skeletal accidents, head injuries; wild animal bites; alcoholic comas, poisoning) Health education on emergencies, their causes and management Emergency phone contacts: ambulance services, police & closest MOH-registered health facilities and health workers Legal implications of emergencies
Community *Local government committees and community health workers (acknowledged volunteers)*	Clear Definition of roles and responsibilities of the First Responder Contacts of Ambulance Services, Police, nearest health facilities, CHWs, and close health professionals
Health Posts *Nurse staffed with minimal diagnostics and therapeutics, focused on primary healthcare and obstetrical services*	N/A
Health Centres *Nurse staffed sometimes with physicians, more but still limited diagnostics and therapeutics, focused on primary healthcare and obstetrical services*	N/A
District Hospitals	Upgrade all Emergency Service Units to competently handle referred emergencies, high dependency units, emergency medical technician/ pre-hospital emergency care packages, Safe transfer mechanisms /Specialised Ambulance care, Basic life support & Advanced cardiac support, competent surgical and anaesthetic teams to manage critical surgical patients (e.g., Laparotomies, reduction of open fractures, etc.)
Provincial Hospitals	Provide advanced critical care services.
Referral Hospitals	N/A
Teaching Hospitals	Provide advanced critical care services including teaching and research.

Furthermore, there are ongoing post-crash care initiatives, supported by guidance found in the HSSP4, that extends beyond regulations and policy. For instance, a current partnership between the Rwandan Ministry of Health and the American College of Surgeons has a designated trauma systems development task force developing a plan to categorize all healthcare facilities across the country per trauma centre levels. This effort will lead to policy that will guide transport decisions, depending on the severity of the road crash injuries, the required capacity of physical and human resources within

each trauma centre, and the training requirements for certification as trauma care providers (Newman, 2023).

2.1.6 Road Safety Management

Rwanda's dedicated efforts in road safety management have implemented comprehensive measures such as revising laws, enforcing seatbelt use and speed limits, conducting vehicle inspections, and launching public awareness campaigns. These initiatives have led to a significant reduction in road accidents and fatalities, demonstrating the country's commitment to creating safer roads for its citizens (World Health Organization, 2018).

2.2. SOUTH AFRICA ROAD SAFETY POLICIES

The recent estimated number of road traffic fatalities for South Africa is 14,507 people, 2016 (World Health Organization, 2018). As part of the assessment, the following policy documents have been reviewed, including: the National Road Safety Strategy 2016-2030 (NRSS), and the South Africa Road Safety Manual, Volume 7: Design for Safety (1999).

The National Road Safety Strategy 2016-2030 (NRSS) serves as a comprehensive framework to guide road safety initiatives in South Africa over a 15-year period. The strategy aims to reduce road traffic fatalities and injuries through a multi-faceted approach that encompasses various aspects of road safety, including education, enforcement, engineering, and emergency medical services.

Figure 3. Deaths by road user category in South Africa (World Health Organization, 2018).

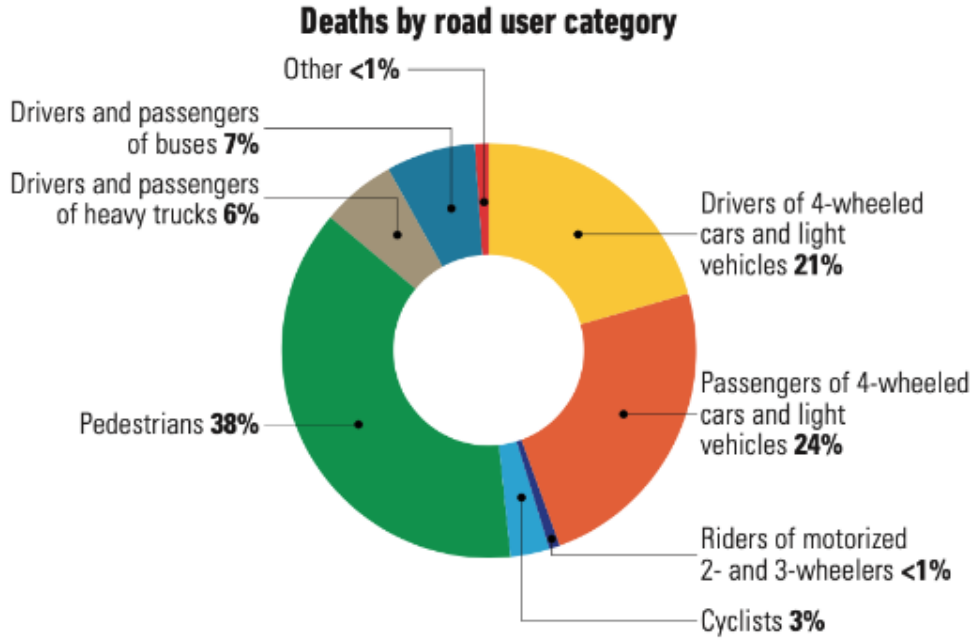
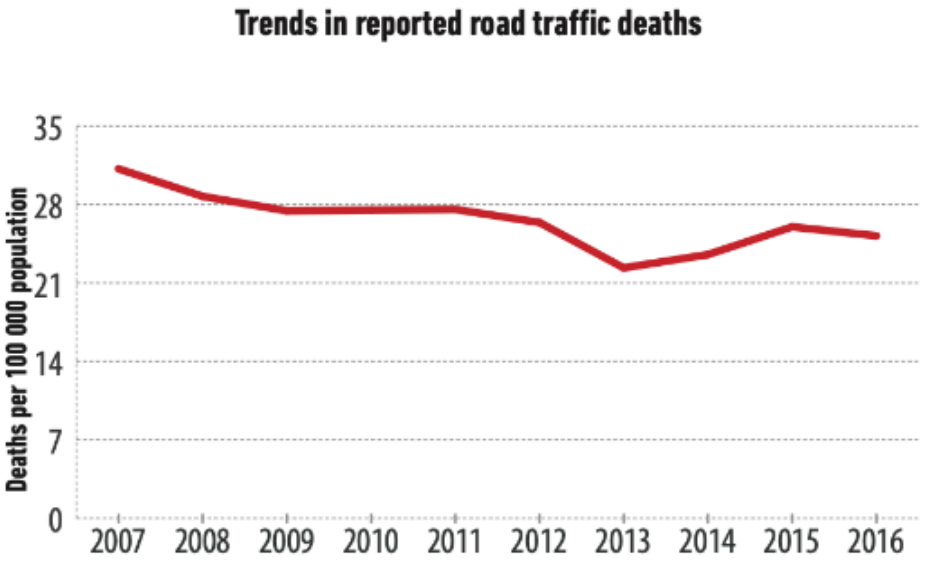


Figure 4. Trends in reported road traffic deaths in South Africa. (World Health Organization, 2018).



2.2.1 Safe Infrastructure (Streets and Roads)

The NRSS outlines how the country aims to achieve safe roads and mobility based on the Safe System Approach (Ministry of Transport, 2016). The strategy is based on legislative mandates and policies such as The White Paper on National Transport Policy (Ministry of Transport, 1996), which sets out the vision for South African transport; the National Road Traffic Act (Act 93 of 1996) (Parliament of the Republic of South Africa, 1996), which provides requirements for various road safety matters; and the National Land Transport Act (Act 5 of 2009) (Parliament of the Republic of South Africa, 2009), which covers the process of transformation and restructuring the national land transport system including transport planning.

Taking these legislative mandates and policies alongside lessons from previous strategies, the NRSS advocates a Road Safety Audit and a Road Safety risk assessment to identify how road users can be better protected and to design more intelligent and forgiving roads as a result.

The availability of comprehensive and accurate crash data is critical because it assists in adequately defining the problems causing crashes and devising sustainable remedies. Studying crash statistics and patterns allows road designers to identify and concentrate on hazardous locations with a view to safety-conscious design.

The roadside design may mitigate crash severity even when a vehicle leaves the road due to driver error or mechanical failure. However, the lack of funding allocated to walking and cycling infrastructure results in difficult, unpleasant and potentially dangerous journeys for pedestrians and cyclists. That is, the most representative mode of transportation in the country, walking, is not represented in the budget priorities, which aggravates road safety conditions (Benton & Jennings, 2023).

Pedestrians, being the most affected group of road users that records the highest number of fatalities during road crashes, have brought about the realisation of the need to develop and refine infrastructure design and construction in a way that protects vulnerable road users and, more specifically, pedestrians (South Africa Committee of Land Transport Officials, 1999).

2.2.2 Safe Speeds

In South Africa, the national speed limit is enforced both manually and in automated manner, with the current speed limits set at 60 km/h in urban. This limit is significantly higher than the recommended from a Safe Systems point of view, by a margin of 30 km/h.

For traffic calming, the country has generally streamlined vertical deflection devices – speed humps, speed bumps and cushions. However, wider street design measures such as narrow carriageway lanes, extended footpaths and kerb expansions, chicanes and pedestrian refuges are not commonly used (Global Road Safety Facility, 2023). In conclusion, there is room for improvement in the provision of street design guidelines and projects for safer speeds in South Africa.

2.2.3 Safe Road Users

The NRSS is largely focused on addressing road user behaviour and therefore lays out a plan that includes improving educational initiatives, increased involvement in the community and more effective enforcement of road safety laws. Studies by the lead agency, RTMC, highlight excessive speeds and drinking under the influence as some of the most pressing human factors leading to fatalities, which the NRSS proposes both education and stricter enforcement to combat. The NRSS also spotlights the human behaviours that lead to fatalities and need to be addressed by the necessary infrastructure, such as footpaths and crossings to protect pedestrians. Most crashes usually result from the human factor, mostly errors road users make. The policy advocates for raising awareness of road safety among all road users: drivers, pedestrians, and cyclists to help prevent and reduce the number of crashes and their severity. Initiatives in line with the National Learner Transport Policy (2015) includes specific road safety content in basic education curriculum by 2017, the introduction of driver re-testing by 2022 and the development of bi-annual conference for youth on road safety (Department of Transport, 2015).

Ensuring the safety of road users requires two aspects:

- That road users are educated and trained using consistent road campaigns evaluated for efficiency and effectiveness.
- This should be complemented by strict and consistent enforcement to deter road users from not complying with road safety practices. Enforcement of traffic rules with minimal corruption is also essential in ensuring better user behaviour. Technology like Intelligent Traffic Management Systems (ITS) can be used to ensure adherence to speed limits, and automated data collection and processing aids in the detection of offenders.

In South Africa, 'Arrive Alive' is a well-known and widely recognized road safety campaign. It is an initiative led by the Road Traffic Management Corporation (RTMC) in collaboration with various government agencies, law enforcement bodies, and non-governmental organizations.

- The 'Arrive Alive' campaign in South Africa aims to reduce the high rate of road accidents, injuries, and fatalities in the country. It focuses on raising awareness about key road safety issues and promoting responsible behaviour among all road users.
- The campaign utilizes various strategies to achieve its objectives. These include public awareness campaigns through television, radio, print media, and social media platforms. The campaign's messages often emphasize the importance of obeying traffic laws, wearing seat belts, avoiding drunk driving, and adhering to speed limits (Department of Transport, 2023).

2.2.4 Safe Vehicles

The NRSS outlines a need to develop more effective law enforcement strategies to ensure vehicles are roadworthy and do not suffer from vehicle factors that result in fatalities such as poor tyres and brakes, overloading passengers, and faulty steering. Great emphasis on enforcement is required to ensure enhanced vehicle safety standards are set, more frequent inspections on older vehicles and less corruption at vehicle testing centres among other areas.

To address this issue, it is crucial to emphasise monitoring and enforcement to ensure that vehicles being driven on roads are roadworthy and meet a certain minimum standard, particularly for those being imported. Monitoring vehicles that are written off and later fixed, re-registered and resold to ensure that they are subjected to South African Police Services (SAPS) compliance testing, and do not pose a risk on the roads. Enforcement of drivers' behaviour, including ensuring that drivers under the influence of alcohol and other substances are not driving in that state. The successful enforcement of the above requires minimal weaknesses in law enforcement.

2.2.5 Post-crash Care

The NRSS under the pillar of post-crash care aims to simplify access to post-crash care through for example implementing a single, national emergency response number by 2018. Secondly, the NRSS wants to see an increase in the effectiveness of first responses through improving training and resources and completing annual audits of skills and equipment per area.

2.2.6 Road Safety Management

The development of a national road safety management strategy in South Africa is based the Constitution of South Africa (Act of 1996) which assigns the road safety related functions as highlighted by the NRSS (Constitutional Assembly, 1996). The Act specifies other departments that are crucial in road safety strategy including the Department of Basic Education (DBE), Department of Higher Education and Training (DHET), Department of Health (DoH), the South African Police Services (SAPS), Department of Justice (DoJ) and National Treasury.

2.3. ZAMBIA ROAD SAFETY POLICIES

The current estimated number of road traffic fatalities is 3,586 people (World Health Organization, 2018). As part of the assessment, the following policy document has been reviewed: the National Road Safety and Action Plan (2016). The current road safety landscape in Zambia appears to be a critical need for stronger political will and increased resources and funds into the road safety agenda according to a representative from the Zambia Road Safety Trust. Therefore, it is crucial to start by improving the organisational structure of road safety management and which will assist in providing greater powers to implement road safety laws and initiatives, as well as provide a recognised political vehicle for funding allocation (Ministry of Transport and Communications, 2016).

Figure 5. Road-related death with the road users' group in Zambia. (World Health Organization, 2018)

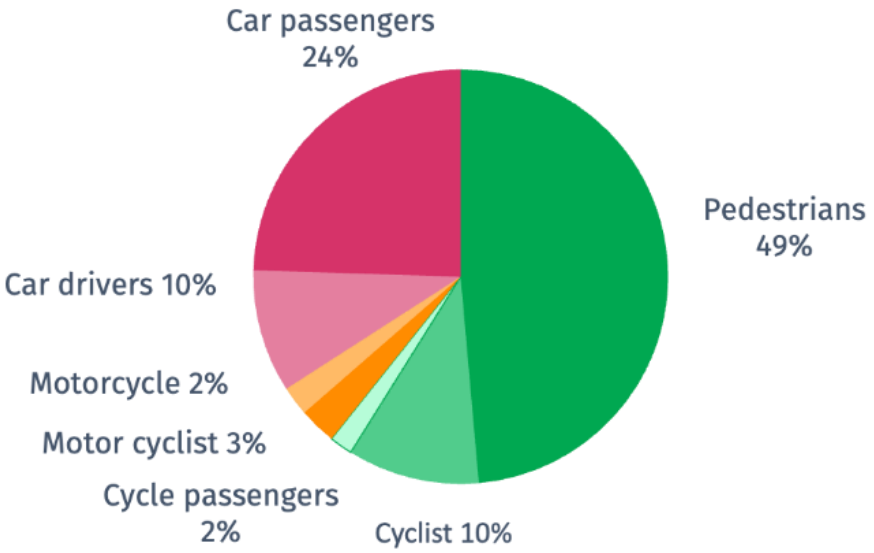
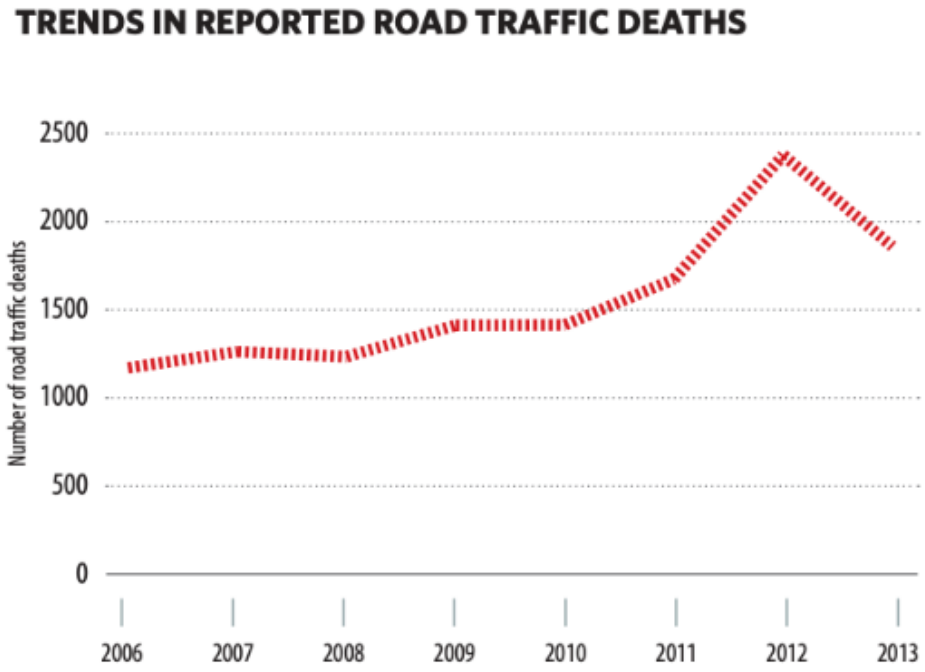


Figure 6. Trends in reported road traffic deaths in Zambia. (World Health Organization, 2018)



2.3.1 Safe Infrastructure (Streets and Roads)

The Road Development Agency (RDA) is responsible for the design, construction, and maintenance of the road network in urban Zambia (Ministry of Transport and Communications, 2016).

The current road safety policies highlight the importance of ensuring road safety engineering aspects are compulsory in the construction, rehabilitation, and maintenance of roads. Policy also advocates for the design of roads that sufficiently address the safety of all road users and road safety in the development and maintenance of road infrastructure.

The design of roads in urban areas should incorporate non-motorised transport facilities, at least minimum provision of footways. Whilst the design of all rural transport infrastructure improvements should provide for the safety of road users and those living on the roadside. According to a representative of the Zambia Road Safety Trust implementation of policies have come in the form of work by the RDA alongside other stakeholders such as NGOs like the Zambia Road Safety Trust to improve road safety infrastructure using speed bumps and speed limit signs particularly in school zones.

2.3.2 Safe Speeds

National speed limits are set in different areas: urban areas, roads going through settlements and markets, and open rural roads. The default speed limit is 50 km/h in urban areas. Speed limits are signed by the RDA in consultation with Road Transport and Safety Agency (RTSA) and enforced by the Police and RTSA (Ministry of Transport and Communications, 2016).

In 2020, the Statutory Instrument No 7 of 2020 was signed that brought about the following regulations on speed limits, and consequently revoked the speed limits in the Road Traffic Regulations (2016) (Government of Zambia, 2020):

- The First Schedule contained the national speed limits on paved roads in the country.
- The Second Schedule contained the national speed limits on unpaved roads in the country.

Zambia also enacted a law that led to the reduction of speed limits to 30 km/h on school zones and areas with high pedestrian volumes and activity, to ensure their safety (Child Health Initiative, 2020).

2.3.3 Safe Road Users

The Road Traffic Act No. 11 of 2002 provided power to licence drivers in the interest of safety (Parliament of Zambia, 2002). To assess road user behaviour there are pedestrian surveys monitoring random risk factors of people's behaviour and attitude in Lusaka City and a seatbelt baseline survey in Lusaka City. However, these surveys are not carried out routinely (Ministry of Transport and Communications, 2016).

In terms of road safety awareness and education RTSA is very active in several programmes and activities including establishing 858 road safety clubs at schools that have been selected along high-risk corridors. RTSA has also worked with the Ministry of General Education and the Curriculum Development Centre to implement a standard road safety curriculum for primary and high schools.

2.3.4 Safe Vehicles

The Road Traffic Act No. 11 of 2002 provided power to register and licence vehicles (Parliament of Zambia, 2002). Physical examinations of motor vehicles are carried out and an obligatory test certification is a legal requirement for all motor vehicles which are 5 years or older from their manufacture date. Inspections of motor vehicles are either carried out at mechanised vehicle inspection stations or through visual inspections of which there are 4 state-of-the-art mobile inspection units (Ministry of Transport and Communications, 2016).

2.3.5 Post-crash Care

Currently the Ministry of Health's Health Information Management System in all the Zambian hospitals and clinics register trauma admissions, but no distinction is made to the underlying causes such as road traffic crash (Ministry of Transport and Communications, 2016).

The nation had one trauma centre under construction in 2016 and another four to be constructed by 2018, several ambulances and multiple emergency numbers. Key first responders are trained in first aid including Road Traffic Inspectors, the Zambia Police traffic officers, and patrons of the RTSA road safety clubs in varying degrees of frequency from regular refresher courses to on-off basic courses.

2.3.6 Road Safety management

The Road Traffic Act No. 11 of 2002 established the Road Transport and Safety Agency (RTSA), which has several functions: implementing policy on road transport, traffic management and road safety; registering motor vehicles; issuing licenses and permits; paying a proportion of its fees and charges into the Road Fund; conducting road safety education and campaigns; coordinating road safety programmes; approving road safety programmes undertaken by other bodies; coordinating with local authorities to conduct road safety programmes; and contributing to the cost of road safety programmes carried out by other bodies (Parliament of Zambia, 2002).

To overcome ineffective attempts to implement previous road safety action plans, there was a need to enhance collaboration and multisectoral action. Therefore, the Zambia Road Safety Memorandum of Understanding (MoU) was developed in 2013 by key stakeholders including the lead agency (RTSA), the Sub Saharan Africa Transport Policy programme, the Global Road Safety Partnership (GRSP) Zambia, the Road Development Agency, the Zambia Red Cross Society, Ministry of Transport, Works Supply and Communications, Ministry of Education, Science, Vocation Training and Early Education, Zambia Police and others from the civil and private sector (Ministry of Transport and Communications, 2016).

2.4. GHANA ROAD SAFETY POLICIES

The current estimated number of road traffic fatalities is 7018 people (World Health Organization, 2018). As part of the assessment, the following policy documents have been reviewed including: the National Road Safety Policy, and the Road Safety Report 2019-2020 (Accra Metropolitan Assembly, 2021).

Figure 7. Deaths by road user category in Ghana. (World Health Organization, 2018)

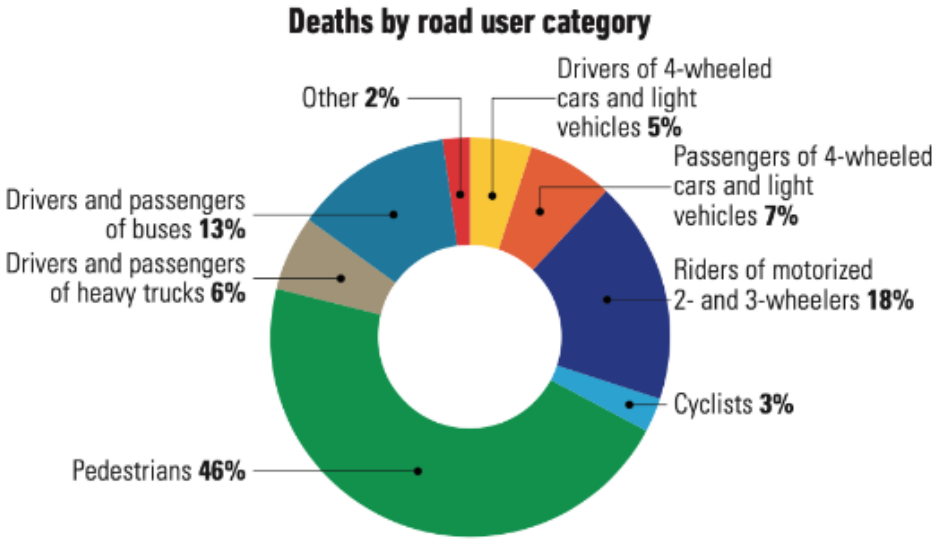
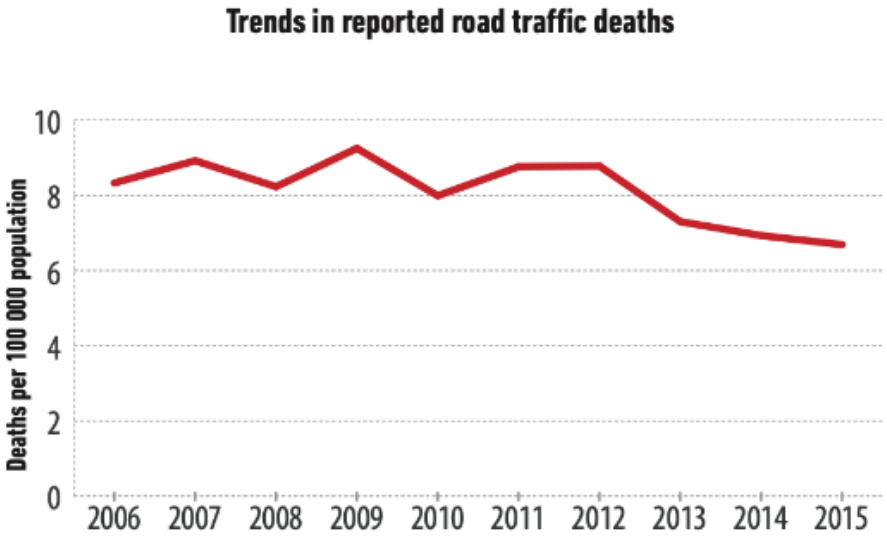


Figure 8. Trends in reported road traffic deaths in Ghana. (World Health Organization, 2018)



2.4.1 Safe Infrastructure (Streets and Roads)

The policy indicates that the government should undertake steps to promote best safety practices on trunk, urban and feeder roads. The National Road Safety Council (NRSC) would ensure that such safety practices will be applied through the planning, design, construction, maintenance and operation of roads and related devices. The various strategies that need to be adopted to ensure this is achieved are as follows:

- Undertake road safety audits at all road development stages, both for new and rehabilitated roads.

- Identify black spots on all existing roads and undertake spot improvements to reduce the number of road crashes.
- The incorporation of the best global practices for road safety where necessary by the review of road design standards, guidelines, codes, recommended practices, access, and development controls that are used by engineers in the country.
- Safe engineering is critical and there are road safety implications inherent in road planning, design, and construction. Increased training to improved capacity and awareness among stakeholders involved in these processes was thus critical.
- Consideration of land use and transportation policies when designing urban roads to minimise road user conflicts.
- The installation of appropriate road signages at the required locations on roads, good road marking and coming up with realistic speed limits.
- The design and construction of roads infrastructure will incorporate the provision of facilities for pedestrians and vulnerable road users' movements to ensure their safety.

IRAP accreditation refresher training on survey and coding was conducted to accredit road agency staff to enable them to undertake IRAP assessments independently, apply the protocols to enhance safety, conduct specific road inspections, and make recommendations for road improvement (Ministry of Transportation, 2008).

According to the Global Road Safety Facility (2023), 26% of roads in Ghana do not have formal footpaths, and 77% of all roads do not have pedestrian crossings. Pedestrian travel, however, amounts to 77 million km along the roads surveyed. It is estimated that the investment required for both safe street infrastructure and speed management is of USD 2.14 billion, yielding an economic benefit of USD 15.35 billion (Global Road Safety Facility, 2023).

2.4.2 Safe Speeds

In Ghana, the speed limit for urban roads is set at 50 km/h. This exceeds the recommended for a Safe Systems approach (Global Road Safety Facility, 2023). Road agencies and other stakeholders are mandated to install speed limit signs on the different corridors. In the Ghana National Road Safety Policy (Ministry of Transportation, 2008), the policy on safe speeds is covered in various sections as highlighted:

- In the section on safe engineering, one of the strategies for ensuring safety implications that are inherent in road planning, design, construction, operation, and maintenance of roads was ensuring that realistic speed limits are set and well communicated to road users through road signages at appropriate locations.
- In the section of the strategies that would be adopted in the policy for pedestrians and vulnerable road users, one of the strategies would be the provision and maintenance of laybys, safe pedestrian crossings and traffic calming measures on all streets, roads, and highways.

While speed calming with the use of vertical deflection devices is common, wider measures to cater for pedestrian movement and create a safer realm for NMT users are not present (Global Road Safety Facility, 2023).

2.4.3 Safe Road Users

The policy advocates for safe road users which are highlighted below under the policy statements on drivers, IMTs, pedestrians and VRUs and under the policy statement for enforcement. On safe drivers, the policy also stipulates that the government will take appropriate measures to assist relevant

agencies in improving the quality of their services to ensure the best road safety practices (Ministry of Transportation, 2008).

The lead agency for road safety management NRSC launched the Stay Alive campaign, which aims to improve road user behaviour and usher in interventions to reduce road traffic incidents. This includes a target of improving road traffic awareness to 90% and reducing road traffic crashes, injuries, and deaths by a minimum of 30%.

2.4.4 Safe Vehicles

The policy gives guidelines on the minimum standards for safety for motor vehicles, those used for public transport, those imported into the country, etc. The policy requires the government to strengthen the system to ensure that safety aspects are incorporated in all stages of vehicle assembly, modification, usage, operation, and maintenance in line with prevailing international standards to minimise adverse safety and environmental effects of vehicle operation on road users and infrastructure (Ministry of Transportation, 2008).

2.4.5 Post-crash Care

The current situation in Ghana is characterised by the increase in injury-related deaths due to the inadequacy of post-crash services. This is mainly attributed to the following:

- Underfunding and poor organisation of the medical and rescue services system.
- Inadequate ambulance services for specialised transportation of those who are injured in the country and consequently they also lack first aid services when crashes occur. Many injured patients get to hospitals and other health facilities in boda bodas and minibuses.
- Poorly equipped hospitals, that lack specialised equipment and adequate well trained contribute to their lack of capacity in handling road crash victims.
- First responders lacking in first aid training to assist the victims.
- Poor co-operation and coordination between the police, emergency services in the country and the healthcare system in handling road crash victims.
- A health care system that demoralises health care workers that results in their lack of commitment while attending to road crash victims.

The National Road Safety Policy identified strategies that could be adopted to ensure better post-crash responses that would involve the upgrading of the country's capacity to handle post-crash victims. Improved and enhanced coordination between health care services, national Ambulance Services, The Red Cross, and other such organisations would result in enhanced efficiency in post-crash response. Moreover, the establishment of a National Trauma System, upgrading of hospitals especially those along major roads which would be the first recipients of road crash victims. The incorporation of first aid principles in the school syllabus would help ensure learners are well trained on the same. This would also be reflected in driving schools and police training institutions.

2.4.6 Road Safety Management

The 2019 National Road Safety Agency Act (Act 993) established the National Road Safety Authority as the lead agency in road safety management. This repealed the 1999 NRSC Act (Act 567) that established the National Road Safety Commission, as it was clearly recognised that this organisational

structure did not have the necessary legal backing to demand compliance from institutions that breached national road safety standards (Parliament of the Republic of Ghana, 2019).

The key legislation that the NRSA enforces are the Road Traffic Act 683 (2004), its amended version, the Road Traffic Regulation 2012 L.I 2180, and the Ghana Highway Code (1974) (Ministry of Roads and Transport, 1974). Other road safety organisations that work with the NRSA include the Driver and Vehicle Licencing Authority (DVLA), under Act 569 of 1999, possessing authority to license drivers and vehicles and regulate them, the Ghana Highway Authority (GHA), under Act 540 of 1997, possessing authority to develop and maintain road infrastructure, and the Ghana Police Service, under the Police Act with the mandate to establish a Motor Traffic and Transport Unit/Department to enforce Road Traffic Laws and Regulations (Parliament of the Republic of Ghana, 1997).

3. GAPS IN IMPLEMENTING ROAD SAFETY POLICIES AND STRATEGIES

Assessing present road policies in the selected countries reveals that various gaps cut across the different countries in the implementation of road safety policies and strategies. To complement the policy review, we have engaged with a local stakeholder at each of the selected countries for a semi-structured interview. Each of the interviewees belonged to a research, advocacy or civil society organisation working directly on road safety, namely: University of Cape Town, Zambia Road Safety Trust, Institute for Transport and Development Policy (Rwanda) and the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development[1].

Across the policy reviews and interviews, one of the key issues identified is poor road safety management, which is primarily attributed to the absence of a central institution responsible for enforcing road safety matters in these countries. This lack of a centralized authority leads to inadequate coordination in road safety efforts, a fragmented funding system where each stakeholder is funded differently, and a lack of accountability. Consequently, these challenges contribute to poor post-crash response and the inconsistent implementation of road safety policies.

Another critical gap is the absence of separate guidelines or manuals specifically tailored to guide the design of urban streets in most countries. Instead, many nations rely on highway manuals that are not suitable for urban contexts. This approach results in the design of monomodal roads that fail to adequately accommodate the various road users, leading to conflicts between different modes of transportation and an increased risk of crashes, particularly for pedestrians and other vulnerable road users.

Inconsistency in the implementation of safe speed measures is another concern. This inconsistency is often caused by non-compliant road users who fail to adhere to speed limits, as well as a lack of education and awareness among road users regarding the importance of safe speeds. Additionally, responsible authorities may not consistently enforce speed limits, further contributing to unsafe driving behaviours and an increased likelihood of crashes.

The presence of occasional unsafe vehicles on the roads is another area of concern. This issue arises from the poor enforcement of policies related to the age and quality standards of imported vehicles. Inadequate attention to these standards can result in the presence of vehicles that do not meet

[1] Refer to Appendices for the highlights from the interview discussions.

necessary safety requirements, posing an increased risk to road users. Furthermore, the lack of reliable and quality crash data hampers effective road safety management and decision-making in many countries.

To address these gaps, it is crucial for the selected implementation countries to prioritize the establishment of a centralized institution or authority responsible for road safety management. This would facilitate better coordination among stakeholders, ensure consistent funding mechanisms, and enhance overall accountability in the implementation of road safety policies.

Furthermore, developing separate guidelines or manuals specifically designed for urban street design would help create safer streets that accommodate the needs of all road users, reducing conflicts and improving overall safety.

Efforts should also focus on promoting education and awareness campaigns to enhance compliance with speed limits and encourage responsible driving behaviours. This includes educating road users on the importance of safe speeds and enforcing speed limits more consistently through appropriate measures.

To address the issue of unsafe vehicles, it is essential to enforce policies related to imported vehicles' age and quality standards more rigorously. This can be achieved through effective inspection and monitoring systems, as well as improved data collection and analysis to identify non-compliant vehicles.

3.1. SAFE INFRASTRUCTURE

For safer infrastructure, all four countries studied need to address the challenge of streamlining a Safe Systems approach in road safety (Ministry of Transport, 2016). This approach involves ensuring that road designs acknowledge that human beings are prone to making mistakes and aim to minimise the occurrence of crashes and/or reduce their impacts, even when they are caused by human error. Practical measures include creating pedestrian-friendly infrastructure such as sidewalks, crosswalks, and pedestrian zones, as well as cycle tracks (Moudon, et al., 2006).

Pilot interventions also create an opportunity to gather data, involve stakeholders and trial new infrastructure before investing in the long-term, network-wide measures (Institute for Transportation and Development Policy, 2020). Stakeholder consultations and surveys contribute to building knowledge on road safety improvement and results.

While street geometry design manuals guide on the technical aspects of road designs, they often lack comprehensive information required to guide road design elements and solutions for road safety (Institute for Transportation & Development Policy & United Nations Human Settlements Programme, 2018; Mitra, et al., 2021). This discrepancy arises because road design manuals and road safety manuals often differ in their focus and content. While safety is a crucial consideration when designing roads, road design manuals may not address all aspects of road safety, particularly concerning non-motorized transport users and areas with potential conflicts (Mitra, et al., 2021).

Based on the interview with local representative of the Zambia Road Safety Trust, it has become evident that there is a need to prioritize road safety in the development of road design guidelines. Currently, there is a tendency to overlook the needs of non-motorized road users, resulting in inadequate design of urban roads in Africa, and suboptimal road safety engineering, as also highlighted in the National Road Safety Strategy (NRSS).

This points to the gap in the design of roads and street planning processes in including the safety of NMT users as a priority and creating elements for safer travel. This is an issue that is evidenced in Zambia, where the Zambia Road Safety Trust interviewee notes that most of the road space is granted to car lanes, leaving only minimal space for the more vulnerable road users such as pedestrians and cyclists. For example, many streets have a 40 m ROW but only 2 m-wide footpaths, depicting the unbalanced nature of how road space is designed.

A vital shift that needs to happen to promote safe streets is to move away from car-oriented design to a comprehensive approach that integrates all road users, including pedestrians and cyclists, into street design. This shift often centres around the concept of promoting walkability, which goes beyond road design considerations and extends to holistic urban planning approaches, and specifically for African cities, entails retaining the value of walking as a transport mode and involving local communities in the planning process (Benton & Jennings, 2023; Okyere, et al., 2023). Promoting walkability involves balancing mixed land uses as well as designing streets and urban spaces that prioritize the needs and safety of pedestrians and cyclists. It includes creating pedestrian-friendly infrastructure such as sidewalks, crosswalks, and pedestrian zones, as well as cycle tracks and bike-friendly facilities, which enable lively neighbourhoods and local sociability (Moudon, et al., 2006).

The absence in safe streets and roads can also be attributed to the insufficient analysis surrounding how to promote road safety in design. As a result, the University of Cape Town has noted the lack of road safety audit programmes within road authorities to proactively mitigate road safety risk for new or upgraded street design. This is coupled with the lack of road safety assessment programmes within road authorities, to identify the high risk and hazardous locations, as mentioned by the Cape Town interviewee.

Additionally, when there is road safety data collection, specific locations must be recorded. In Rwanda, police departments are currently recording crashes at a district level, rather than the specific localised incidents, which makes it difficult to justify blackspot interventions.

3.2. SAFE SPEEDS

Safe road users translate to drivers, pedestrians, cyclists, and all road users being aware of road safety and actively ensuring that they practice road safety personally, reducing the occurrence and severity of road crashes. A challenge to the policies and initiatives tackling road user behaviour is that they work in tandem with having the necessary infrastructure such as footpaths, cycle tracks, crossings to reduce human factors that cause fatalities such as jaywalking as noted by the NRSS. This is also noted by the university of Cape Town that it is important to tackle the inappropriate design of roads so that vulnerable road users can adhere to the rules of the road. This challenge is made more difficult in many countries as there are often funding constraints particularly when it comes to funding interventions for vulnerable road users. In South Africa, the gap in NMT facilities for vulnerable road users in townships as opposed to in economic hubs as a legacy from apartheid spatial planning should also be addressed. This will offer better access of funding for all and make it easier for more vulnerable users to follow the rules of the road and keep themselves and others safe.

In many of the countries like Zambia and Ghana, laws exist, but the enforcement of road safety regulations is very poor. This means that road users, more so drivers, are not held accountable for their reckless behaviour.

3.3. SAFE ROAD USERS

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3.3.1. Education and awareness

The main gap in terms of education and awareness is increasing the funding to scale up the education and awareness efforts. Many of our implementing countries have begun road safety public awareness programmes, such as South Africa's Buckle Up awareness programme, and the Traffic Care Youth Initiative Project and '*Gerayo Amahoro'* (Arrive Safely) Campaign in Rwanda. In Zambia the lead agency, the RTSA facilitates road safety programs on radios and televisions to promote awareness, which is replicated by the Rwandan Police on Rwanda television and radio. However, more is needed to increase the dissemination of road safety in national curriculums and campaigns that result in attitudinal changes. To improve driver behaviour, greater education is needed to plug the gap of inadequate driver training this is particularly emphasised as an area of improvement in Ghana. This will often require updating learners and driving testing processes as noted by the University of Cape Town to plug the gaps in road safety prevention elements.

Road crashes are largely attributed to human error. Road safety education to ensure safe road users' needs to be consistent to ensure that road safety is taken seriously among all road users and monitored and evaluated to determine efficiency and which method is the most effective. It also needs to cover all road users, drivers and NMT users.

- **Safe drivers and pillion riders** - can be achieved through:
    - Rigorous training before being issued with driving licenses.
    - Issuing renewable licences to ensure that drivers on the road are fit to drive and those who fail the test have their licences revoked.
    - Wearing of safety gear such as helmets by pillion riders.
    - Adhering to the speed limits and safety gear by both drivers and pillion riders.
    - Issuing renewable licences also ensure that drivers who are repeat offenders at causing crashes due to recklessness and driving under the influence have their licences revoked; and
    - Training drivers to respect NMT users as equal road users and they do not encroach

on NMT facilities.

- **Safe passengers** - can be achieved by:
  - Rigorous training to ensure they abide by road safety practices like pillion passengers wearing helmets and passengers wearing safety belts.
  - Using child restraints when children are on board.
- **Safe pedestrians and cyclists** - can be achieved by:
  - Training them on the safe use of roads by crossing at the designated crossings and using the dedicated NMT facilities.
  - Use of safety gear for cyclists and wearing reflective material for their safety.

3.3.2. Enforcement and technology

Adequate and strict enforcement is key to ensuring that road users uphold road safety practices when using the roads, apprehend offenders, and take punitive measures for a deterrence effect. Inadequate enforcement and corruption have greatly contributed to unsafe road users, greatly impacting the occurrence of road crashes. The reform of regulatory and monitoring institutions and their frequent training is one way to ensure consistent enforcement is upheld. The Zambia Road Safety Trust interviewee also observes that the is a gap in the level of enforcement planning which is likely impeding enforcement efforts and effectiveness.

Technology is a great way to reduce corrupt practices during enforcement, as the offenders are recorded in real-time. It is also an accurate way to record and process data ensuring quality crash data. The use of technology like ITS systems needs to be added to existing legislation to ensure that they are enforced. Additionally, positive initiatives should be encouraged, for example the Zambia Police collaborated with the RTSA to pioneer Automated Speed Enforcement (ASE) technology on some problematic roads however this was discontinued.

To improve enforcement, it is also important to tackle corruption within enforcement services, this has been keenly mentioned as an issue in Zambia by a representative from the Zambia Road Safety Trust and Rwanda. Whilst Rwanda did have a crackdown on this enforcement issue and caught many officers who had taken bribes there it is still a concern. Therefore, there is a need to change the culture around road safety and enforcement.

There is also a need for effective road safety campaigns on road user behaviour such as drink-driving to ensure it is not an accepted norm, coupled with stricter punishment for offenders to ensure they do not repeat the same behaviours. The University of Cape Town notes that weakness in law enforcement and prosecution of intoxicated drivers means there are a significant proportion of alcohol and substance related crashes. Drink driving is a major issue reported particularly in our implementation countries of South Africa and in Zambia as mentioned by a representative from the Zambia Road Safety Trust.

3.4. SAFE VEHICLES

The lack of safe vehicles is being reported to be caused by the importation of used cars from foreign markets which are not going through adequate quality control. This can be attributed to weak enforcement of legislation on imported vehicles. Gaps in enforcement to periodically inspect vehicles is permitting vehicles that are not roadworthy to be on the roads and combat corruption and fraud at vehicle testing centres are two major issues. There is also a need to enhance and set safety manufacturing standards/requirements for from neighbouring countries that don't meet local

technical requirements a problem faced by all our implementation countries as observed by the University of Cape Town interviewee.

As a result of the strong domestic vehicle manufacturing sector, the importation of second-hand vehicles has been banned, however this has resulted in drivers keeping older vehicles on the road. Similarly, in Zambia there are stiff importation taxes on newer vehicles which incentivises people to opt for cheaper, older, and less safe second-hand imported vehicles from Europe and Asia (Phiri & Chikuba, 2016), as observed by the Zambia Road Safety Trust interviewee. Having safe vehicles on the roads in each country can be achieved by:

- Strict legislation on the fitness of vehicles imported to the country to ensure quality vehicles in good working condition on the roads.
- Consistent inspection of vehicles on the road and enhancing the capacity of authorities charged with this for efficiency.
- Quality, standardised crash data - ensure that cars written off during crashes are not refurbished, reregistered and back on the roads without being inspected to ensure they are safe to be driven. This can be tasked to the institution established to ensure enforcement and accountability.

3.5. POST-CRASH CARE

The challenges surrounding post-crash care are faced in varying degrees by all our pilot countries including a lack of detailed local research into the availability and access to post-crash care often resulting in relying on case studies from other counties. Other key issues include the recording of road trauma incidents, well-trained first responders and broader medical staff, organised and well-known emergency protocols and services.

Furthermore, there are shortages in professional healthcare staff members, disparities between urban and rural healthcare facilities and the services available at these institutions, and resource limitations including the number and availability of emergency vehicles. In South Africa, from discussions with the University of Cape Town representative, it was noteworthy that the lack of adequate ambulance services and road access issues can make getting patients to health care institutions with the 'golden hour' a challenge (Vanderschuren & McKune, 2015). In terms of the structural challenges to delivering post-crash care in South Africa, the University of Cape Town notes the fragmented approach within the healthcare sector as well as the lack of oversight and control in coordinating actions to improve post-crash response. Additionally in South Africa, there are multiple emergency numbers, which complicates the process of gaining access to emergency services.

In Zambia, the Zambia Road Safety Trust (ZRST) interviewee observes that the biggest challenge is that there is no established emergency service to respond to crashes. Like in other countries, the police are known to be first responders however they lack the necessary training to provide adequate first aid and post-crash care. Whilst it is observed that citizens desire fully functional emergency services the financial constraints provide severe limitations to what can be achieved. Other issues that may be addressed more easily are the need for a national number for emergencies and appropriate training for police officers to record the causes of crashes to help with future crash reduction.

For Rwanda, the University of Rwanda interviewee notes that the major gaps include the reduced number of healthcare providers with dedicated training to improve care of crash injured patients, weak Good Samaritan laws, as bystanders hesitate to provide any care, in fear of bearing the cost of treating the injured person if they call the emergency number or arrange transport to a hospital. This

can also be understood as an awareness gap. Lastly, funding is not yet sufficient to conduct training and spread the resource.

3.6. ROAD SAFETY MANAGEMENT

In all these policies, respective countries have been working on road safety while working in silos meaning their activities and the funding of road safety efforts are not well coordinated. For example, it has been observed by the representatives from the University of Cape Town that there is a lack of cooperation between government departments. A similar situation has been reported in Zambia as the lack of coordinated road maintenance and coordinated responsibilities for road safety challenges by agencies like the RSTA and the Ministry of Infrastructure and Urban Development has been observed by the ZRST. There is this need for each of the countries to establish through legislation an agency with its management having clear roles and responsibilities on their deliverables. The representatives of the different stakeholders and institutions involved in road safety should be members of the board of that organisation.

From the policies in these different countries, one of the issues each of the countries is dealing with is the institutions tasked with road safety policies being in a developmental phase or lacking the capacity to enforce and, thus, the implementation of most of these policies is wanting. This was clearly articulated whilst speaking with a representative from the Zambia Road Safety Trust, the policy is there but the implementation minimal. Further than that the ZRST mentions the limitations in expertise to better incorporate safety standards in road infrastructure.

Another clear gap is the need for financing which can also depict the level of political will targeted at tackling road safety. For example, a representative from the Zambian Road Safety Trust mentions that road safety is not prioritised within the government budget, resources are instead often diverted to areas seen as more urgent like healthcare and education. The ZRST also observes that investment in infrastructure is defragmented and dependent on the funding to these institutions which is usually limited. Similarly, someone from the University of Cape Town highlighted the constraint in resources for road safety strategies.

Additionally, a clear gap that needs to be addressed in terms of better road safety management is more robust data collection methods and research. In Zambia this is mentioned under the umbrella of a gap in an independent road safety audit for new roads. Additionally, although the RTSA carried out a one-off crash risk mapping of traffic hotspots through a quantitative study from 21 police stations in Lusaka more extensive mapping is required. The University of Cape town observes the limitations in National Crash Data, particularly because of changes in privacy laws that have restricted geo-located crash data. Tackling this issue will lead to more informed choices in the execution of road safety interventions.

Thus, it is prudent that the various countries' road safety policies/and strategies provide for the legislation that establishes an institution charged with implementing road safety policies and strategies.

- **Coordination between stakeholders**: The institution would constitute the different stakeholders involved with road safety like road design engineers, road auditors, emergency departments, police officers and enforcement, and representatives from the healthcare systems being part of the board to ensure that the activities, decisions, and all aspects involving road safety are well coordinated.
- **Financing and accountability:** The establishment of the institution will not only help coordinate the stakeholders' activities and ease the financing of road safety implementation

activities. It also establishes an institution fully charged with the same that would be accountable for failures experienced without the usual blame game currently experienced in each country.

- **Quality road safety data:** It is also clear that the availability of up-to-date road safety data is critical to inform decisions and efforts made towards road safety practices in a country. Usually, when crashes happen, the first responders are workers from the emergency departments. The police also record crash occurrences, the fatalities, those injured, the extent of the injuries, and the cause of the crashes. The health care system is involved in treating those injured and receiving the bodies of the fatalities. Road design engineers are involved in collecting crash data which is crucial to identify black spots and proposing solutions during road design and redesign to reduce the occurrence of crashes.
    - While all these teams are involved, in most countries, the teams work in silos, greatly affecting the quality of crash data available in each country. As proposed, establishing an institution charged with road safety would lead to seamless coordination, and the data from each institution would be synchronised and systematically recorded. This would lead to quality, accurate and well-coordinated crash data that would inform decision-making, monitoring and evaluation to measure the effectiveness of road safety initiatives.
    - Most of the countries use a traditional way of data recordings on the cause of the traffic crash, and where they happen. The modern way of data collection will help to get correct information to help the decision makers be well informed during the interventions.
- **Road safety interventions:** Establishing the institution would greatly assist in precrash and post-crash road safety interventions, identifying where more effort is required and monitoring the effectiveness of initiatives established.

Clearly, each country is struggling with effective post-crash interventions. The institution would ensure that all road safety interventions are working effectively without any sector being neglected and that any sector needing more attention is handled efficiently.

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5. APPENDICES

5.1. INTERVIEW HIGHLIGHTS

Highlights from the discussions held with individual stakeholders from each of the studied countries, belonging to the University of Cape Town, Zambia Road Safety Trust, Institute for Transport and Development Policy (Rwanda) and the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development. These were held between May and July 2023, online, and had guiding questions but allowed for open discussions around the topic.

South Africa – University of Cape Town

What challenges do we have with the road safety data?

Geo-coding of the crash data although all the other attributes have remained the same.

Whose responsibility is it to implement road safety interventions?

The National government is responsible for Road Safety strategy (RTMC) under the Department of Transport. Each metropolitan area (9 of them) has their own plan, although they adopt the main strategy from the National government.

Are there targeted campaigns on road safety?

There have been road safety campaigns from big cooperates such as Pick and Pay, but Western Cape government has had a number or got involved in Road Safety campaigns.

How is road safety funding done?

There is no specific budget for road safety, but each road owner is responsible for implementing road safety interventions. E.g SANRAL is responsible for highways.

Does each municipality have its design manual, or is it done nationally and then adopted by the municipalities?

There are national guidelines for motorized transport mainly and they have been adequately adopted throughout the country but for NMT is almost ignored by the municipalities. They are however here and there adopted and changed to fit different contexts of the municipalities. This talks to why there is increased pedestrian fatalities in South Africa.

Additional resources and links:

https://journals.co.za/doi/abs/10.10520/EJC178610

https://repository.up.ac.za/handle/2263/57727

Zambia – Zambia Road Safety Trust

General context of road safety in Zambia

- Roads are made for cars. People who are driving is not as representative of the population

- 40 m wide ROW with 2 m-wide footpaths
- Speeding and drunk driving leading to accidents in most cases. Corruption in some instances, no priority of budget within the government budget. Implementation is minimal
  - Resources are often diverted to urgent areas like healthcare or education
- Challenges faced on enforcement; lack of resources allocated. Overall, a lack of priority from the government's side for road safety.

Existing interventions, e.g., AMEND school zones - which other initiatives?

- Successful interventions include the propagation of Safer journeys to school (Zambia Road Safety Trust) and constructing safer road infrastructure around school zones. 35 schools across the country. Focus on pedestrian safety.
  - Speed bumps implemented, traffic lights, speed signage and promotion of road safety awareness campaigns
  - 2019: hand in hand with the stakeholders for policy advocacy for speed reduction. Progress in advocacy.

Zambia Draft National Road Safety policy: was it adopted? Were the interventions linked to the draft?

- Before 2020, there was no specific law. In 2019 the advocacy became more specific on which policy instruments were needed (speed reduction around target areas, markets, schools, and hospitals).
- The original draft was most likely not entirely rectified signed in, but it led to the signed law number 7/2020. Final amendments to the draft policy are also pending from the government's side.

Was the Safe Systems approach guiding the draft, or did it occur afterwards?

- The organisation is advancing the approach focused on safe speeds and safer infrastructure mainly.

- The Road Safety Authority is not a central agency, and there are fuzzy lines in the responsibilities of it and other government agencies (ministry of transport, road development agency). There is no Central body of government to take concrete decisions for road safety. Each organ of government directs responsibility to the other.
  - RTSA - acts more like a partner to NGOs in the field of road safety, for enforcement and road safety awareness. If it were empowered to make autonomous decisions, and received better budged, that would be an improvement.

What are the results from the various campaigns to reduce drunk driving and raise awareness, so far?

- At the moment, there are lots of enforcement toward drunk driving and seatbelts.

General commentaries on post-crash care, besides the emergency number? Were there improvements?

- There is very minimal effort in that, where there are not enough resources to provide post-crash care. It's limited to traffic enforcement; data are collected only from the officers availing of the information on site. Other than that, it's difficult to access the information, there is no

priority from the government's side on funding. The procurement of ambulances and other resources is too limited, this issue has not been prioritised by planners - there is no funding allocated to post-crash emergency services.

Decade of road safety action

- Most of the signed commitments were not likely implemented (personal opinion - no concrete involvement from the interviewee)

NMT policy

- Has been signed and passed, but the implementation stage is challenging. The pilots, which are part of the strategy, have been started on but the government has not fully moved to the implementation stage, and it lacks so many steps.

Ghana - Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development

Guiding questions

- What are the most proponent road safety concerns? Are there any interventions worldwide that you believe would be extremely beneficial in Ghana?
- How well is road design incorporating road safety so far? Are there any challenges and what are the reasons for those?
- How well are speed limits enforced? Are there adequate measures to monitor speed or interventions to improve speed awareness?
- Has road safety been well implemented into curriculums yet and are there safety awareness programs for the community as well? What sort of campaigns have worked thus far?
- Are there any incentives that you believe would improve enforcement or road user behaviour?

Rwanda – Institute for Transportation and Development Policy

Road safety issues in Rwanda

- Speeding; driver distractions particularly from phones and other bad driver behaviour in general
- infrastructure improvements are needed in Kigali
    - potholes - trying to avoid them can end up causing crashes
    - pedestrians don't have dedicated footpaths, causing many crashes
- trying to stop importing old vehicles, but still a big issue

Road safety management

- The Ministry of Infrastructure (MININFRA) has the MoU, and their implementing agency is the Rwanda Transport Development Agency
- City of Kigali work with the MININFRA but in policy, but they don't always have the time to ensure street designs properly ensure safety

Safe roads

- Big issue: finding data to justify the blackspots interventions is difficult due to inadequate data collection

- Currently people know where blackspots are, but police are recording crashes in terms of the districts so cover a very large area rather than very specific localised incidents
- There are published papers showing GIS mapping to find blackspots, but data from the police could not be found to be considered
    - 2016 & 2020/21 Author compared data he collected himself on road crashes *vs*. that which he got from the police and there were discrepancies
- Current infrastructure projects
    - Informal settlement upgrade, interviewee did a review of project to make sure it is useable for road safety; as well as for a highway corridor that would not allow BRT access in the future.

Safe road users

- Speed cameras and speed governors are mitigating speeding offences
    - public transport was travelling at very high speeds and speed governors are mitigating this, but are not entirely effective yet
    - issue with speed camera was that people were memorising locations, so they included hidden cameras - this appears to be effective in some cases as it is changing attitudes around speeding meaning less enforcement is necessary
    - recommended speed to 40 km/h instead of 60 km/h but seems to have been issues with approval
    - fines for speeding are around $25, increased to $50 if you go over 80 km/h
    - fine information for example is usually through police announcements rather than a road safety document
- They have tried to include traffic calming as well such as speed bumps
    - Speed issues currently are now left to negligence/ignorance, some road users (those in big cars for example) may have a very *laissez faire* mindset and disregard other road users; need more sensitisation
- Kigali city is working on awareness
    - Campaign - National Police raised a campaign mainly on school zones hire people to help children cross the streets safety *(Gerayo Amahoro)* started in 2019 - from Ministry of Infrastructure but through the police, they also teach students how to cross the road, and how to use the road, churches are also joining used as a location to disseminate information
    - Police are also teaching people how to use traffic lights, how to cross safely
    - Police feature road safety videos on Rwanda Television
    - Sundays on the radio - police release an emission and people call the police to come and explain how to use the streets safely.