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Pilot studies in road safety measures directed to road users in selected African countries

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Executive summary

The pilot activities carried out in Work Package 5 (WP5) of the AfroSAFE project aimed to demonstrate how the Safe System principles can be transformed into practical road safety actions in African contexts, with focus on vulnerable road users (VRUs) and local capacity building. The pilots combined infrastructure measures, professional training, field observations, surveys and baseline and follow-up evaluations. It was key to involve local partners throughout the pilots, from identifying safety problems and collecting data to developing and assessing interventions.

The pilots provided important lessons. First, relatively small and feasible interventions can produce meaningful safety improvements and a snow-ball effect. In the Zambian school zone pilot, the combination of pedestrian separation, zebra crossing and speed hump produced the highest impact, including a reduction in vehicle speeds of approximately 15 km/h and improved perceived safety among pupils. Second, the pilots demonstrated the importance of combining objective indicators, such as speeds, traffic volumes and yielding behaviour, with road users' experiences and perceptions. This provides a more complete understanding of both the safety problem and the effects of an intervention.

Another lesson is that early local involvement is essential for adapting Safe System measures to actual travel behaviour and local conditions. The Tanzania and Ghana pilots show the importance of observing how pedestrians actually use the road environment before selecting measures. This also shows that infrastructure or traffic management solutions must respond to pedestrians' needs rather than expecting that road users will adapt to infrastructure that might not meet their needs. Finally, the experience showed the importance of early local authority involvement. For example, where interventions were delayed within the project period, as in Tanzania and Ghana, the possibility of conducting a full baseline/follow-up study was limited.

Overall, the pilots presented in this deliverable show that Safe System thinking can be adapted to African contexts through collaborative approaches. The pilots have also strengthened local knowledge and provided methods to local partners that can be applied and scaled beyond the individual pilot sites.

1 Introduction

The primary aim of AfroSafe is to make a significant progress in promotion of the Safe System *modus operandi* within the road safety work context in African countries. This is reached by exposing the local practitioners and decision makers to the state-of-the-art knowledge and practices within road safety management based on Safe System principles, focusing on safe vehicles, safe infrastructure, safe road users and post-crash responses. The long-term goal is a system free from death and serious injury. The fundamental principles of Safe System are universal, yet there are many ways to implement them. To combat the argument ‘this works in Europe, but Africa is different’, AfroSAFE will work on translating the tools and practices adopted in Europe to the African context, as well as supporting them by sharing necessary knowledge, tools and methods for road safety improvement—adjusted to the African conditions and in tight cooperation with the local actors.

Within the project, several pilot activities have been carried out to demonstrate in practice how small changes in the transport system can provide benefits and improve users’ safety while at the same time not making it more difficult to use modes of transport other than cars. The pilots will provide the local authorities with the tools and insights to replicate similar activities in other contexts and at larger scales, having applied Safe System principles to improve road safety in the challenging African conditions. Three areas get particular attention and are emphasized in this deliverable, namely:

1. **Vulnerable road users.** VRUs are the largest but most underprivileged road user group in Africa, disproportionally impacted by traffic accidents. Creating safe environments for VRUs has a direct positive impact on several of the Sustainable Development Goals, such as related to health and well-being (Nr.3), gender equality (Nr.5), sustainable and liveable cities (Nr.11) and climate action (Nr.13).
2. **Local expertise building.** To achieve Safe Systems in Africa, it is necessary to reach a critical mass of both road safety professionals and road users with the right knowledge and attitudes. It is a long-term process, and the local educators play the key role in it. The project thus adopts a ‘train-the-trainer’ approach, creating the initial momentum and concentration of local expertise that will continue to spread after the project end.
3. **Safe System implementation in different local contexts.** The pilot activities also addressed how the Safe System principles can be applied to different contexts. For example, protecting VRUs in connection with major roads and BRT corridor, including access to and crossing near BRT stations as well as improving pedestrian conditions near school zones and in busy street market areas by small changes in the infrastructure, transport management and reallocating road space.

1.1 Background

Road traffic crashes are a major global public health problem, causing about 1.16 million deaths each year and 20 to 50 million non-fatal injuries, many of which result in long-term disability. More than half of fatalities are among vulnerable road users, including pedestrians, cyclists, and motorcyclists. They are the leading cause of death among people aged 5 to 29 years (WHO, 2026).

Low- and middle-income countries bear the greatest burden of global road traffic injuries, accounting for more than 90% of road traffic deaths worldwide (WHO, 2026). Road traffic fatality rates are highest in the WHO African Region, at approximately 19 per 100,000 population, and lowest in the WHO European Region, at around 7 deaths per 100,000 population (WHO, 2023). This is even though they have fewer vehicles and much less road infrastructure than high-income countries.

Despite this already substantial burden, road traffic fatalities in Africa are projected to increase by a further 68% over the next decade if effective interventions are not implemented. Such prognoses may look pessimistic, but ‘resistance is NOT futile’. The experience of many countries shows that the trend can be reversed, and positive dynamics can be achieved in a relatively short time if road safety gets proper attention and is treated systematically. The expertise and experiences of the best performing countries in road safety are highly relevant for African countries. Despite cultural differences, the risk factors, countermeasures and, most importantly, the principles for organising and prioritising road safety work (Safe System approach) are universal and work everywhere. This knowledge is readily available; however, it is crucial to achieve a critical mass of local experts and professionals who could utilise it in an efficient way, adjust it to the African context and make sure that Safe System thinking reaches all levels of road safety work and involved stakeholders.

Road users and road safety culture

Road Safety Culture (RSC) is defined as shared values and attitudes signifying what is important with respect to road user behaviour (e.g., safety, mobility, respect, politeness). RSC consists of shared norms prescribing certain road safety behaviours, shared patterns of behaviour, and shared expectations regarding the behaviours of others (Nævestad & Bjørnskau, 2012). Thus, RSC encompasses what is normal and expected concerning all aspects of road user behaviour, such as speeding, overtaking, drinking and driving, crossing behaviour, use of seat belts, helmets, etc. Given the encompassing character of the safety culture concept, it is paramount to address safety culture and the Safe System Thinking before undertaking improvements in road safety. Numerous studies also indicate a close relationship between countries’ road safety records and their RSC, which directly influence road safety behaviours and consequently accident involvement (e.g., Torfs et al., 2021).

An important aim of the pilot activities presented in this deliverable is to show local partners how small implementations based on the Safe System can achieve small gains and produce a snowball effect in changing RSC in Africa. By demonstrating the effects, the pilots addressed the current RSC status quo and let local partners experience, by participating in the pilot activities, the gains and the benefits of the Safe System, not only in traffic safety improvements but also in the mindset of road users, practitioners and local authorities’ RSC change.

1.2 Aim

This deliverable focuses on safe road users and summarizes the pilot activities carried out in collaboration with local partners. The pilots were intended to demonstrate how Safe System principles can be applied and adapted to African contexts and the main aims were to:

- Apply and adapt the Safe System thinking to African contexts by supporting local partners in planning, site inspection, data collection, analysis, evaluation and communication of the safety benefits of the pilot interventions.
- Contribute to a stronger RSC by showing the small and feasible infrastructure changes can lead to meaningful improvements in safety and can help build confidence in road safety action.
- Establish a standard procedure to conduct pilots based on the Safe System principles, so that the approach can be replicated in other local contexts.

2 Fully implemented pilot studies

In this chapter, two of the pilot projects were assessed and implemented as planned, whereas others were only assessed prior to implementation. The reason for this was that the planning process took longer than anticipated, meaning that it was not possible to carry out any post-implementation assessment within the project period. However, the lessons learned are still important and will therefore be presented as “Partially implemented pilot studies” in Chapter 3.

2.1 Pilot 1: Community empowerment of vulnerable road users

Children are particularly vulnerable road users because they often walk to school without adult supervision, increasing their exposure to traffic hazards. In many low-income countries, inadequate pedestrian infrastructure, heavy traffic, and limited road safety measures further increase these risks. In Zambia, road traffic injuries are a major concern, with approximately 350 children are killed annually while traveling to school (Road Transport and Safety Agency, 2022). The general aim of this study was therefore to increase safety outside two different schools in Zambia. Results have been published in a research report (Increasing traffic safety at schools in Zambia – a before and after study, VTI report 1226A) and presented at AfroSAFE conference in Tanzania 2024 and in Lusaka 2026.

2.1.1 Method

The infrastructure changes at Daina Kaimba and Kizito Primary School were made possible through a close collaboration with multiple stakeholders. The Lusaka City Council, Road Development Agency plus The Road Transport and Safety Agency (RTSA) played a significant role in the planning and implementation of safety measures. The local corporate company foundation InBev provided financial support. Additionally, the project collaborated with the local traffic police to conduct safety assessments.

2.1.1.1 Participants

In the before study a total of 150 pupils, 30 parents and 50 teachers responded to the survey. In the after study the number was slightly less; 149 pupils, 36 parents and 27 teachers. The average age of the pupils was 10 years old.

2.1.1.2 Procedure

Three primary schools (with pupils aged 8 to 12 years) situated in Lusaka, the capital of Zambia, were included in the study: Daina Kaimba Primary School, Kizito Primary School and Woodlands B Primary School¹. The latter was used as a control school where no measures were taken to increase traffic safety.

Observations were conducted outside the schools and consisted of speed counts carried out before and after the reconstruction of the new infrastructure measures. In addition to observations, surveys were administered before and after reconstruction to parents, teachers and pupils at the different schools. The aim of the survey was to collect the perception of the area around the school before and after reconstruction.

¹ Kizito Primary School is located in the northwest of Lusaka, Matero off Mungwi Road (lat. -15.411723, long. 28.1743857), Daina Kaimba is also located the northwest, in Chunga off Barlastone Road near Barlastone barracks (lat. -15.4154677, long. 28.2773267) and Woodlands B Primary school is located in Woodlands off Buluwe Road near Woodland's stadium in the east part of Lusaka (lat. -15.4154677; long. 28.28325).

A before-after study was conducted at two intervention schools and one control school. Vehicle speeds were measured, and surveys with pupils, parents and teachers were used to assess perceived traffic safety before and after the interventions.

2.1.1.3 Infrastructural measures

Along the road near Daina Kaimba School, pedestrians were separated from vehicle traffic by reflective bollards. The pedestrian pathway was constructed from gravel and bricks, providing a clear and designated walking space. A similar arrangement was implemented near Kizito School, where reflective bollards also separated pedestrians from vehicles. However, the pavement was narrower and consisted only of sand, without the gravel and brick surface used at Daina Kaimba School, see Figure 1.



Figure 1. The Daina Kaimba Primary School before and after reconstruction. The school premises are to the left-hand side. On the opposite side of the school, a tree has been removed. Photo: Somela Sinkala.

Figure 2 shows how it looked outside Kizito Primary School both before and after the reconstruction.



Figure 2. The Kizito Primary School before and after reconstruction. New reflected bollards are separating pedestrians from vehicles. The school premises are to the left-hand side Photo: Somela Sinkala.

At Daina Kaimba Primary School new road signs informed that the driver was entering a school zone and that the speed limit was 30 km/h, see Figure 3.



Figure 3. New road signs near the Daina Kaimba Primary School (left) and Kizito Primary School (right). As described above, a zebra crossing and a speed hump were also implemented at Kizito Primary School, Photo: Somela Sinkala.

Figure 4 shows the new zebra crossing at Kizito Primary School.



Figure 4. A new zebra crossing at the entrance of Kizito Primary School. Photo: Somela Sinkala.

Figure 5 shows the speed humps and a sign to warn vehicle drivers for this.



Figure 5. A new speed hump outside Kizito Primary School and a sign to warn vehicle drivers. Photo: Somela Sinkala.

2.1.2 Results

Vehicle speeds decreased at both intervention schools, with the largest reduction (15 km/h) at the school where a zebra crossing and speed hump were installed. Whereas the mean speed increased at the control school, see Table 1.

Table 1. Mean speed of vehicles, before and after the intervention.

School	Mean speed before (km/h)	Mean speed after (km/h)	Speed difference (km/h)	Significant
Daina Kaimba	41	36	-5	No
Kizito	33	18	-15	Yes
Woodlands (control school)	38	47	9	Yes

Pupils who crossed the road were asked how safe it was, how easy and how afraid they would be to cross the road. Figure 6 shows how safe they felt in the before- and after study. Pupils at the intervention schools also felt safer when crossing the road, with the strongest improvements reported at Kizito Primary School.

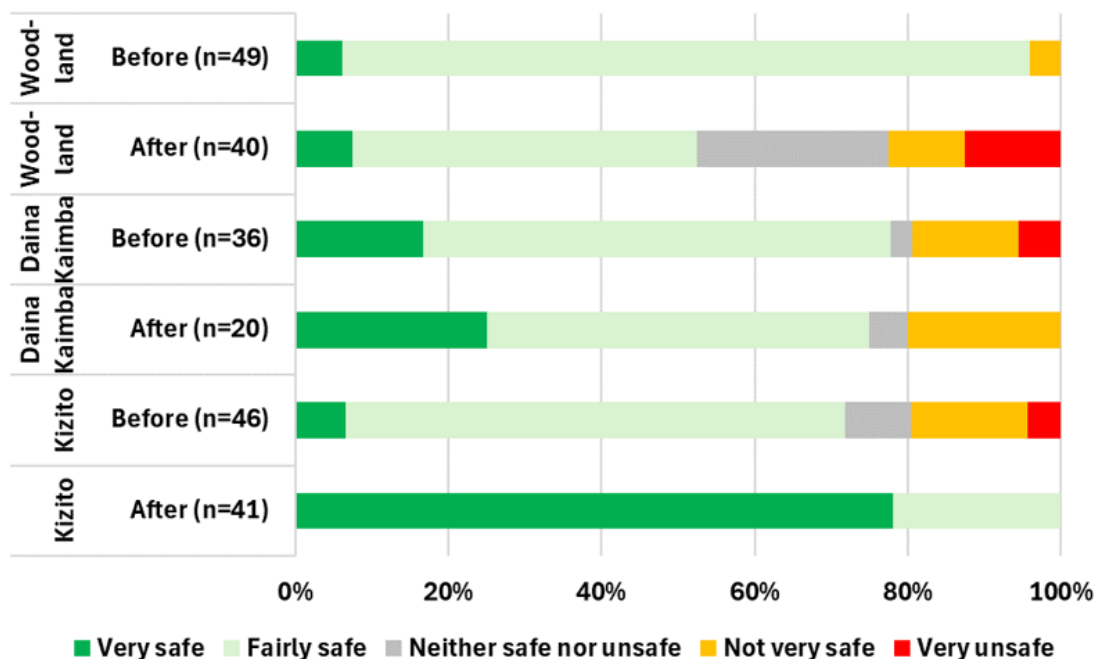


Figure 6. How safe the pupils felt when crossing the road, before and after (pupils).

Similarly, pupils were asked how afraid they would be of the traffic near their schools and pupils reported feeling less afraid of the traffic near the intervention schools in the follow-up period, with again the strongest improvements at Kizito school, see Figure 7.

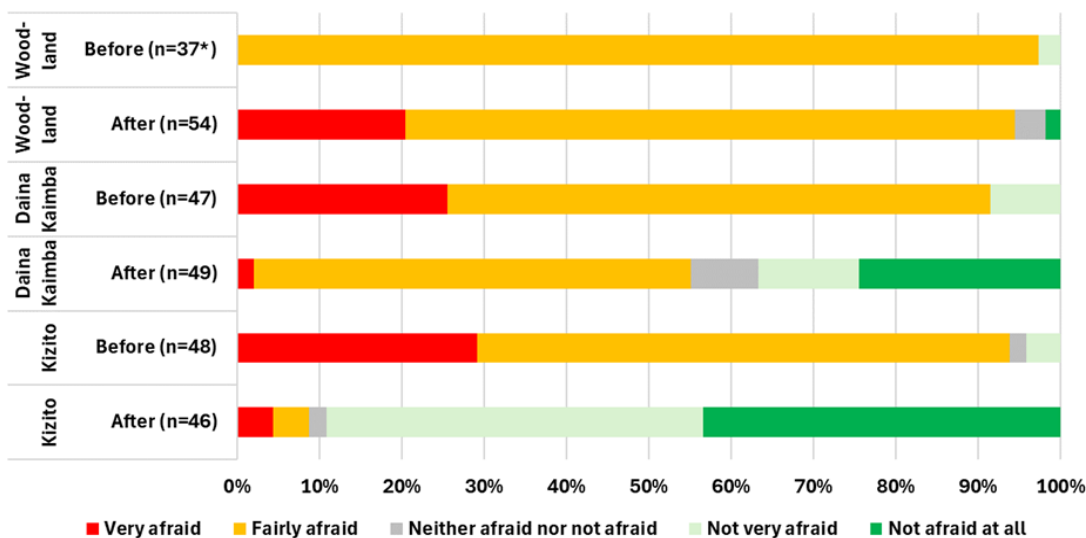


Figure 7. When you are near the school how afraid are you of the traffic? (pupils).

When asked about how afraid they were when crossing the road, the improved safety perception was confirmed by the pupils' response, who felt less afraid when crossing the road in the follow-up period, see Figure 8.

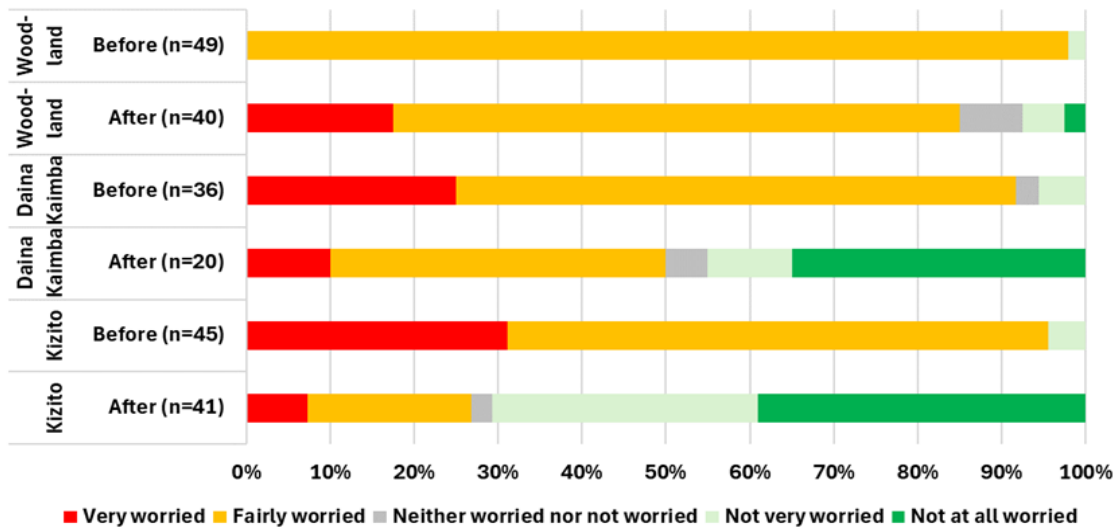


Figure 8. How afraid the pupils were of the traffic when crossing the road, before and after.

Parents and teachers also reported that the perceived traffic safety improved in the follow-up period at the intervention schools. On the school control, parents and teachers reported that pupils' traffic safety perception worsened, feeling less safe when crossing the road, see Figure 9.

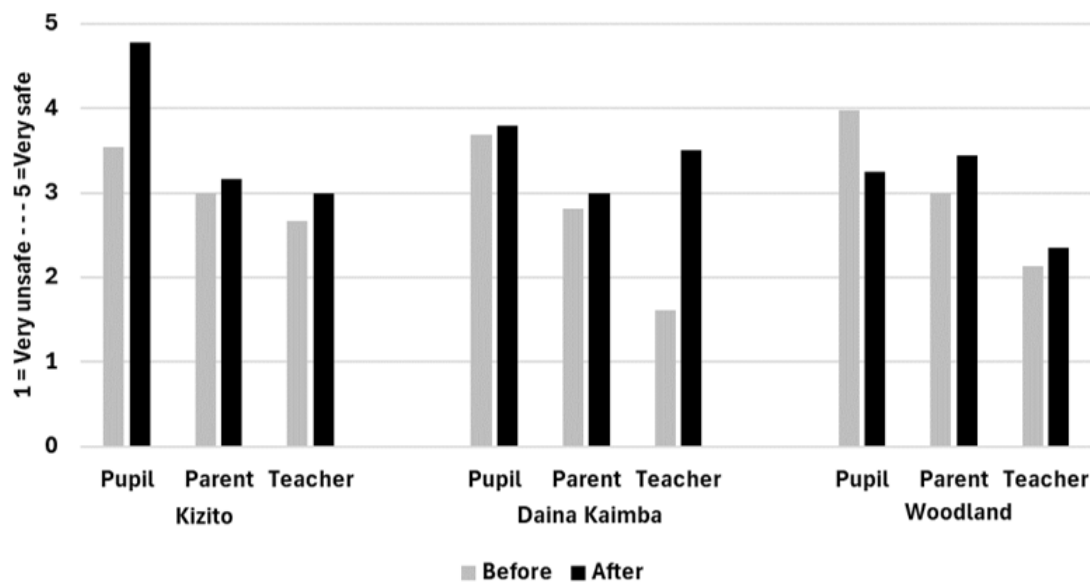


Figure 9. How safe it was for the child to cross the road, opinions of the three target groups, before and after. Mean values on the 5 grade-scale.

Furthermore, parents and teachers responded that pupils felt less afraid of being hit by a vehicle when crossing the road at Kizito school, where the zebra and speed hump were installed, see Figure 10.

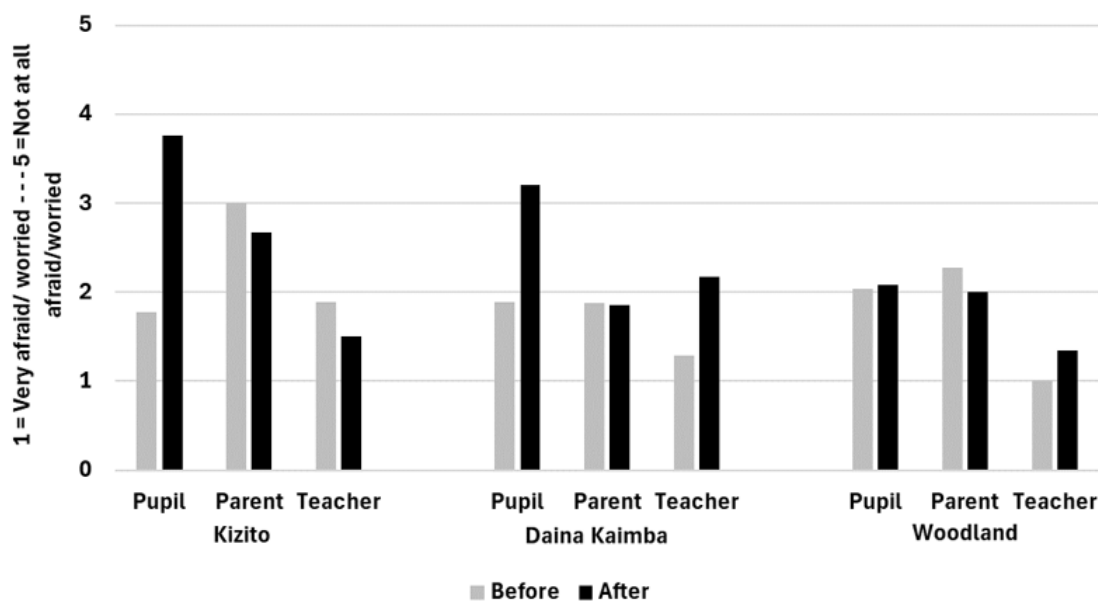


Figure 10. Fear of being hit by a vehicle when crossing the road, opinions of the three target groups. Mean values on the 5 grade-scale.

2.1.3 Summary

In conclusion, the initiatives implemented by AfroSAFE in collaboration with the Zambia Road Safety Trust contributed to improved safety at the two schools included in the study. The relatively simple and inexpensive infrastructure measures increased the perceived safety of children, teachers and parents, demonstrating the potential for such interventions to be adapted and applied in similar contexts to safeguard young lives on a broader scale. The findings also underscore the importance of implementing Safe System principles, such as separating transport modes and reducing vehicle speeds in areas where different road users interact. Consequently, the study is expected to provide valuable insights into the effectiveness of further traffic safety improvements in school zones and to inform future policy decisions and educational initiatives aimed at improving the safety of schoolchildren.

2.1.4 Lesson learned and recommendations

- Relatively simple and inexpensive infrastructure measures can increase the perceived safety of children, teachers and parents.
- The importance of employing data-driven approaches and engaging the community in infrastructure improvements.
- There is a need to strengthen coordination between institutions responsible for road design, construction, enforcement and road safety so that identified risks are followed by clear responsibility and timely action.
- Community engagement should go beyond consultation. Road users, schools and local communities can provide important practical information about hazardous locations that may not be evident from crash data alone.
- Collecting evidence is valuable, but its impact depends on whether findings are translated into concrete interventions and monitored over time.

Deliverable D5.4: Pilot studies in road safety measures directed to road users in selected African countries

- Road safety improvements should prioritise vulnerable road users, particularly pedestrians, cyclists and school-going children, as they are often exposed to high-speed traffic with limited protection.
- Infrastructure interventions should be informed by actual road-user behaviour and movement patterns. For example, pedestrian crossings and walkways should respond to pedestrian desire lines rather than relying only on where infrastructure has traditionally been provided.
- Speed management should be treated as a central component of safe infrastructure, particularly around schools, markets, bus stations and other areas with high pedestrian activity.
- Regular road safety audits and inspections involving relevant government institutions and community stakeholders can help identify relatively low-cost improvements before serious crashes occur.

2.2 Pilot 2: Safe transport company and Training of driver education teachers

The aim of this pilot was threefold. First, it sought to provide driver trainers with tools that would enable them to improve the quality of driver training. Second, it aimed to increase professional drivers' awareness of traffic safety. Third, it focused on building local expertise by providing local professionals with the knowledge and attitudes needed to continue training both driver trainers and professional drivers. All pilots focused on the safety of vulnerable road users (VRUs), which is a key priority of AfroSAFE. The pilots were conducted in Lusaka, Ndola, and Winneba.

2.2.1 Method

2.2.1.1 Participants

In Zambia (Lusaka and Ndola), 29 Driver trainers and 43 professional drivers took part in four different focus groups. In Ghana (Winneba) one focus group was conducted, involving 15 professional drivers.

2.2.1.2 Procedure

Participants were recruited by partners within the AfroSAFE project and invited to take part in focus group discussions concerning driver education. Five face-to-face focus groups were conducted, four in Zambia and one in Ghana. Each discussion lasted approximately one hour and was led by two facilitators. Prior to participation, informed consent was obtained from all participants, and the sessions were audio-recorded. After the discussions, participants were provided with a small token of appreciation for their contribution to the project.

Both the training for professional drivers and driver trainers was designed to provide them with tools enabling them to increase their focus on the so-called “higher order skills” in driving (e.g., risk awareness, hazard perception and cognitive skills). The training was varied and highly interactive. Furthermore, since an important focus of AfroSAFE is to increase the safety for VRUs, the training also included the interaction with VRUs. A certificate of completion was provided to participants at the end of the course upon request. The key areas and key take away was carefully targeted. The key areas discussed with *professional drivers* was as follows:

Key areas:

- A review of actual crashes
- Road user behaviour and human factors
- The prediction of traffic violations and how drivers' attitudes, norms and perception of themselves and others influence behaviour.
- A discussion of own experiences, insight-creating exercises
- How to avoid high risk behaviour

For them the key takeaways was a greater understanding of human factors and how crashes can be prevented as well as an increased ability for self-reflection in general.

The key areas and key takeaway targeting *driver trainers* were focusing more on how to teach learner drivers:

Key areas:

- Road user behaviour and human factors
- What predicts traffic violations and how drivers' attitudes, norms and perception of themselves and others influence behaviour
- How to avoid that the training led to undesirable side effects, such as overestimation of skills
- Why self-reflection is important and how to encourage it
- The process of change
- How to change the behaviour of different target groups
- Pedagogical methods
- The teachers as a role model

The general aim of this pilot was to increase driver trainers understanding of the need to focus on attitudes, norms and perception of skills. Be able to use various pedagogical methods which are student centred.

2.2.2 Results

The focus group with driver trainers in Zambia (Lusaka and Ndola) began with a question about how many crashes occur in their respective countries, after which crash statistics were presented. The results did not surprise the participants, as they were already aware that many people are killed in road traffic crashes. Additional statistics were then presented showing the circumstances under which crashes typically occur. The results indicated that crashes usually take place in clear weather and on straight roads. Some participants suggested that drivers may be more relaxed when the weather is clear because visibility is good. However, this may also mean that they are not always paying full attention to the road. This was then followed by discussion about how driver training is conducted in their own country and at their driving school. The participants agreed that the training was relatively short and focused primarily on vehicle handling.

After that a slide was presented which showed the GDE matrix (Goals for Driver Education). None of the participants were familiar with this matrix, which specifies that driver education should address both "lower-order skills", such as vehicle handling, and "higher-order skills", including risk perception and self-assessment. The participants found the concept highly interesting and expressed a willingness to incorporate it into their teaching. However, they were uncertain whether they would have sufficient time to do so.

The focus groups with professional drivers in both Zambia (Lusaka and Ndola) and Ghana began with a discussion of their attitudes towards road safety. To further encourage discussion, several slides were presented that included quotes from drivers who had committed traffic violations. The participants were then invited to discuss whether they could identify with the views and experiences expressed in the quotes.

For instance, they could relate to the quote about speeding and that it was more important to follow the speed of other traffic than the speed limit. In general, they did not perceive speeding as a major problem and added that it was sometimes difficult to avoid. Although some of the participants in Ghana would like to avoid speeding but provided several examples where their employer expected them to speed in order to reach their destination on time. This was something they felt rather frustrated about.

The professional drivers in Lusaka who worked as taxi drivers argued that their income was relatively low, which meant that they needed to attract more customers. This, in turn, required each journey to be completed more quickly to maximize the number of trips they could make. In addition

to pressure from employers or contractors, their attitudes towards other road users could also place vulnerable road users (VRUs) at risk.

Participants commented that pedestrians were "crossing everywhere," making them difficult to avoid. This issue was explored further and, when prompted, it became apparent that the drivers did not stop for pedestrians attempting to cross at zebra crossings. Discussing this appeared to encourage reflection on their own behaviour.

When presented with information about the relationship between vehicle speed and the likelihood of fatal injuries among VRUs during the session, participants expressed considerable surprise.

Driver education in their own country was discussed and the agreement was that it was possible to drive a car without a proper training. One reason for avoiding being trained is that it is very expensive. When trained the focus varied a great deal, some would argue that it focused mainly on traffic rules others on handling the vehicle. How attitudes and norms affect their driving was in some cases touched upon whereas in other not at all.

Feedback regarding the focus group discussions after the sessions was very positive. Participants generally agreed that the sessions had been enlightening, and the driver trainers emphasized that they would seek to incorporate more of these elements into their training programmes.

2.2.3 Summary

It was concluded that driver training and testing could not be considered best practice. One apparent problem is that the training focuses too heavily on what are described as "lower-order skills", namely vehicle handling, rather than "higher-order skills". The latter include aspects such as risk perception and self-assessment, which should also form part of the training curriculum.

The distinction between lower- and higher-order skills can be related to the Goals for Driver Education (GDE) framework (Hatakka et al., 1999). This framework emphasizes that driver training should focus much more than the development of vehicle-handling skills. This view is also supported by Elvik et al. (2009), whose meta-analysis concluded that an excessive focus on vehicle handling (i.e., lower-order skills) may have a detrimental effect on road safety, as it can lead to an overestimation of driving ability and increased risk-taking.

For professional drivers, the conclusion was that a combination of measures is required. First, employers need to adopt a stronger traffic safety culture that also encourages safe behaviour rather than discouraging it. For taxi drivers working under contract arrangements, this is more challenging, as they often do not have a conventional employer who can influence or enforce safety practices.

In addition, professional drivers need to become more aware of the risks that traffic violations pose both to themselves and to other road users. Raising awareness of the consequences of unsafe behaviour, particularly speeding and failure to yield to vulnerable road users, may help promote safer driving practices and reduce crash risk.

2.2.4 Lessons learned and recommendations

- Driver training needs to address both higher-order and lower-order skills. Consequently, both driver education and the training of driver trainers need to be expanded.
- Training should encourage learners to reflect on the consequences of their actions. Positive feedback, combined with constructive criticism, can help achieve this goal.
- Track-based training can be useful, but it should be complemented by driving experience in real traffic environments.

Deliverable D5.4: Pilot studies in road safety measures directed to road users in selected African countries

- Driver training should place greater emphasis on interactions with vulnerable road users, including pedestrians, cyclists, motorcyclists and children, and on recognising situations where lower speeds and greater caution are required.
- Rather than placing excessive emphasis on skill-based courses, which focus on developing the ability to manoeuvre a vehicle in critical situations, greater attention should be given to insight-based training. Such training emphasizes the importance of avoiding hazardous situations and driving with larger safety margins.
- Training should reinforce that obtaining a driving licence is only the beginning of developing safe driving behaviour; continuous learning and refresher training are important, particularly for professional and commercial drivers.
- Professional drivers should receive training that addresses occupational risks such as fatigue, time pressure, speeding and long working hours.
- Employers play a critical role in shaping a strong traffic safety culture. It is therefore essential that they actively promote road safety and ensure that employees are not pressured to disregard traffic rules and regulations.
- Employers and transport operators should complement driver training with organisational policies on speed, fatigue, vehicle maintenance and compliance with traffic regulations.
- Greater consistency is needed in the quality of driving schools, driver instructors and assessment procedures to ensure that learners are not simply prepared to pass a test but are equipped to drive safely in real traffic conditions.
- Driver education should also be supported by effective enforcement.

3 Partially implemented pilot studies

3.1 Pilot 3: Bus Rapid Transit (BRT) corridor infrastructure improvement for Vulnerable Road Users (VRUs) in Dar-es-Salaam Tanzania

The Tanzanian pilot is embedded in an ongoing road infrastructure project on the A7 Morogoro Road, the western trunk approach to Dar es Salaam. The project comprises the widening of the Ubungo–Kimara section, of approximately 5 km. The project began in November 2023 and the works are expected to be completed in November 2026.

The Ubungo–Kimara section combines the functions of an inter-regional trunk road, an urban arterial, a mass transit spine and a local high street with dense residential and commercial frontage on both sides. Crash records for the corridor show an overrepresentation of vulnerable road users, in particular pedestrians and motorcyclists. Crash records for the study corridor obtained from Dar Rapid Transit Agency (DART), show that pedestrians appear in a relatively small number of records but account for a disproportionate share of the fatal outcomes: pedestrian collisions are the only category in which fatal and injury outcomes dominate the record rather than forming a small fraction of it. During the construction period itself, from May 2024 to July 2025, 45 crashes were recorded on the Ubungo–Kimara section, of which five were fatal and two of those five involved pedestrians.

Road widening raises capacity and, unless deliberately countered, raises operating speed. The primary aim of the pilot was therefore to prevent an increase in pedestrian casualties that would otherwise be expected to follow the widening, by establishing the pre-construction conditions at the crossing points and using that evidence to argue for pedestrian provision in the final design.

The pilot was designed as a before–after study. Only the before (baseline) measurement was completed within the AfroSAFE project period. An after measurement could not be carried out, because the works are still in progress and are not due to be completed until November 2026; the completed cross-section has to be open and operating before after-measurements can meaningfully be taken, and that falls beyond the end of the project.

3.1.1 Method

Baseline observations were carried out at four locations on the corridor where pedestrians cross to reach Bus Rapid Transit stations: Kibo, Baruti, Korogwe and Kimara Mwisho. The first three are at-grade crossing points marked as zebra crossings. The fourth, Kimara Mwisho, has a pedestrian foot-bridge, and observations at that location were made at the point beside the bridge where pedestrians were seen crossing the carriageway at grade. Figure 11 shows the four locations.



Figure 11. Locations of the baseline (before) data collection on the Ubungo–Kimara BRT corridor.

Data collection included vehicle and pedestrian counts, vehicle speeds by vehicle type, drivers' yielding behaviour, pedestrian crossing behaviour and pedestrian waiting time. Data were collected on four consecutive days, one location per day: Kibo on Wednesday 11 December 2024, Baruti on Thursday 12 December, Korogwe on Friday 13 December and Kimara Mwisho on Saturday 14 December. At each location, observations were made in two peak periods, morning and afternoon, and in both directions of travel. Each observation session lasted one continuous hour. Morning sessions ran between approximately 07:25 and 08:55 and afternoon sessions between approximately 15:25 and 17:30. The two travel directions were observed simultaneously by two observers, one assigned to each direction, so that the same traffic and pedestrian conditions were captured on both sides.

Six instruments were applied. Pedestrian counts and vehicle counts were full counts of everything passing the observation point during the hour, tallied in five-minute intervals on pre-printed sheets and classified by road-user type. Pedestrian waiting time, pedestrian crossing behaviour and driver yielding behaviour were sampled: 60 observations each per location, per direction and per period, giving 240 observations per instrument per location and 960 in total for each. Vehicle speeds were sampled at 100 free-flow vehicles per vehicle type, per direction and per location, giving 5,600 speed observations. A pedestrian perception survey was administered to 561 respondents.

Observers were briefed before each session on the definitions used, and the same two observers worked throughout the four days so that coding was consistent across locations. Waiting time was measured with a stopwatch from the moment a pedestrian arrived at the kerb to the moment the crossing movement began. Driver yielding was recorded for the first approaching vehicle when a pedestrian was waiting to cross, and the vehicle type was recorded with each observation. Pedestrian crossing behaviour was coded as crossing away from the marked crossing point or crossing at a run. Speeds were measured with a radar speed gun positioned approximately 50 m upstream of the crossing, and only free-flowing vehicles were measured. Completed sheets were collected and checked at the end of each day and entered into a spreadsheet, with entered totals cross-checked against the field tallies.

A face-to-face intercept survey was administered to 561 pedestrians along the corridor between 12 and 14 December 2024, in both the morning and afternoon periods. The instrument was administered in Kiswahili and English and comprised three closed questions on five-point scales — how safe it is to walk along the road, how safe it is to cross the road, and how concerned the respondent is about being involved in a crash — together with the respondent's age band and gender, and the day and period of interview.

Data were analysed descriptively, disaggregated by location, direction of travel and period. Counts are reported as totals per hour. Waiting times are summarised as mean, standard deviation, minimum and maximum, and were examined for skew, since the distributions are strongly right skewed and the mean alone understates the experience of the pedestrians who wait longest. Speeds are summarised as means by vehicle type and location and compared with the 30 km/h reference used in the Safe System approach. Yielding and crossing behaviour are reported as proportions of the sampled observations. Differences by direction, period and gender were examined by comparison of the disaggregated summaries.

The photographs presented in Figure 12-15 were taken during the December 2024 sessions and record the conditions under which the measurements reported in Section 3.1.2 were made. They are included to show the existing conditions observed at the study locations which included the discontinuity of the footway, the high pedestrian volume, the condition of the crossing markings, the volume of two- and three-wheeled traffic, and at-grade crossing beside the footbridge at Kimara Mwisho.



Figure 12. Motorcyclist using pedestrian's walkway unsafely (left). At Kimara Mwisho, viewed from the pedestrian footbridge with pedestrians crossing illegally at grade beneath the bridge (right).



Figure 13. A marked crossing at Korogwe with high pedestrian volume. Pedestrians on a marked crossing with a vehicle passing immediately behind them.



Figure 14. Mixed traffic at pedestrian crossing, with BRT buses, bajaji, motorcycles and pedestrians sharing the same space at the frontage. Pedestrians crossing through a stream of motorcycles and three-wheelers.



Figure 15. Worn crossing markings.

Based on the baseline observations and Safe System principles, several pedestrian safety measures were proposed, by the project team, for the Ubungu-Mbezi corridor. These included raised zebra crossings, supported by vertical signage to alert drivers that they are approaching a pedestrian crossing. Where possible, staggered crossings with a central refuge should be considered to reduce pedestrian exposure and allow the road to be crossed in stages. See Figure 16 for an example of a raised zebra crossing and a staggered pedestrian crossing.



Figure 16. Raised zebra crossing that reduces the speed of vehicles. A staggered pedestrian which allows pedestrians to cross in stages.

The table below sets out for each location, the condition recorded at baseline, the intervention proposed by the project team, and the status of the works.

Table 2. Proposed Interventions and implementation status.

Location	Baseline condition recorded (December 2024)	Intervention proposed by the project team	Status in the works (August 2026)
Corridor-wide	Pedestrian provision discontinuous and in poor condition along the section, pushing pedestrians into the carriage-way between crossing points. 72 % of vehicles exceeded 30 km/h; 85th percentile speed 46 km/h; motorcycles the fastest group at 45 km/h mean.	Continuous pedestrian walkway on both sides with provision for cyclists; signalised raised zebra crossings at all crossing points; speed management through the crossing zones; improved delineation and night-time visibility.	CONSTRUCTED: pedestrian walkways and bicycle pathways along the corridor; raised zebra crossings at all existing pedestrian crossings (already in the original design). IN PROCUREMENT: pole-mounted solar radar speed signs at selected locations, road studs throughout the corridor; additional solar street lighting at the crossings and along the corridor.
Kibo	Faded zebra crossing markings; no kerb ramps; mean driver yielding 46 %; mean pedestrian waiting time 21 s; 85th percentile approach speed 46 km/h.	Raised zebra crossing forming a speed platform; staggered two-stage crossing with a central refuge; advance warning signage; crossing lighting; relocation of the daladala stopping point downstream of the crossing.	IN PLACE: raised zebra crossing. NOT ADOPTED: staggered layout, the permanent works having progressed too far to reconfigure the median and kerb lines. Corridor-wide walkway, bicycle pathway, road stud and solar lighting works also apply.

Location	Baseline condition recorded (December 2024)	Intervention proposed by the project team	Status in the works (August 2026)
Baruti	Faded zebra crossing markings; highest vehicle flow on the section (3,568 veh/h inbound) and the highest volume of motorcycles crossing on the zebra (89 per hour); mean yielding 51 %; uneven surface and exposed concrete at the refuge.	Raised zebra crossing; staggered two-stage crossing with central refuge; separated channel for two-wheelers crossing at the same point; parking prohibition and a formal lay-by 30 m downstream.	IN PLACE: raised zebra crossing. NOT ADOPTED: staggered layout and separated two-wheeler channel, for the same programme reason. Corridor-wide walkway, bicycle pathway, road stud and solar lighting works also apply.
Korogwe	Highest pedestrian flow on the section, 871 pedestrians per hour in one direction; feeder road immediately upstream obstructing the driver's view of waiting pedestrians; mean yielding 46 %; identified as a crash cluster in the DART record.	Raised zebra crossing; widened two-stage refuge clear of the BRT platform; signal control at the crossing; clearance of the sight triangle at the feeder road; a second crossing point to divide the very high demand.	IN PLACE: raised zebra crossing. IN PROCUREMENT: pedestrian signal to be installed at Korogwe. NOT ADOPTED: staggered layout. Corridor-wide walkway, bicycle pathway, road stud and solar lighting works also apply.
Kimara Mwisho	A pedestrian footbridge is the only sanctioned facility. 205 pedestrians per hour crossing at grade beside the bridge; 50 % of observed pedestrians running.	Physical restriction of at-grade crossing along the bridge frontage; upgrading of the footbridge; and a new at-grade crossing further east near Stopover to serve the demand the bridge catchment does not reach.	IN PROCUREMENT: an additional at-grade pedestrian crossing towards Stopover, east of the footbridge; and a pole-mounted solar radar speed sign. Corridor-wide walkway, bicycle pathway, road stud and solar lighting works also apply.

3.1.2 Results

Baseline results showed a substantial interaction between pedestrians and mixed motorized traffic. Motorcyclists were generally the fastest group, while motorcyclists and Bajajis together represented a large share of the traffic.

Driver yielding behaviour varied considerably between locations, with particularly low rate at Kimara Mwisho, reaching only 18% in one observation period. The impact of travel direction is highest at Korogwe with travel direction Mbezi to Ubungu showing lower yielding rate, compared to the opposite travel direction, see Table 3.

Table 3. Driver yielding behavior (number of observations 60 per location, direction and period).

Travel direction		Ubungo to Mbezi		Mbezi to Ubungo	
Location	Driver action	AM	PM	AM	PM
Kibo	Yield	25	33	29	23
	(%)	42	55	48	38
Baruti	Yield	27	26	31	39
	(%)	45	43	52	65
Korogwe	Yield	38	33	22	17
	(%)	63	55	37	28
Kimara Mwisho	Yield	21	22	21	11
	(%)	35	37	35	18

Pedestrian waiting times also varied considerably, with an average of up to 47 seconds at Kimara Mwisho. The results also show that travel direction impact the waiting time of pedestrians at Kimara Mwisho, with direction Mbezi to Ubungo being the longest in the AM period, but the opposite direction in the PM period. Travel direction also impacts the waiting time of pedestrians at Korogwe, showing longer waiting times in the direction Mbezi to Ubungo and no difference by gender is observed. Period (AM or PM) impacts the waiting time of pedestrians at Kimara Mwisho, see Table 4.

Table 4. Pedestrian waiting times per locations, in seconds (60 observations per location and period).

KIBO				BARUTI				KOROGWE				KIMARA MWISHO			
Period	AM		PM		AM		PM		AM		PM	AM		PM	
	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi
Total	avg	18 27	22 20	18 30	21 22	17 33	18 38	22 47	43 28						
	stdv	15 18	18 17	15 22	14 16	11 20	12 19	13 35	22 22						
	min	2 4	2 3	2 3	2 4	5 5	4 6	3 7	8 4						
	max	76 80	63 78	67 98	60 82	64 79	54 82	67 172	140 90						
Male	avg	19 28	12 18	19 28	20 23	18 32	18 36	24 46	43 29						
	min	3 4	2 4	3 3	3 4	5 10	7 6	5 10	8 6						
	max	76 61	46 51	67 91	53 69	42 73	42 82	67 172	78 90						
Female	avg	16 25	28 22	18 33	22 22	17 35	18 40	19 49	44 27						
	min	2 5	3 3	2 5	2 6	6 5	4 7	3 7	8 4						
	max	46 80	63 78	64 98	60 82	64 79	54 81	47 136	140 80						

The observations also noted that half of the observed pedestrians were running while crossing the road. Table 5 shows the results of the baseline pedestrian behaviour. At Kimara Mwisho, about 50 % of the pedestrians is running.

Table 5. Pedestrian behaviour (jaywalking or running) while crossing the BRT corridor and locations (60 observations per location and period)

		KIBO				BARUTI				KOROGWE				KIMARA MWISHO			
Period		AM		PM		AM		PM		AM		PM		AM		PM	
Gender	Code	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.	U. to Mbezi	Mbezi to U.
Male	1	26	32	29	36	28	23	24	29	21	39	29	29	17	16	21	13
	2	9	2	1	4	3	2	7	0	5	3	4	4	23	16	12	19
Female	1	24	21	30	15	23	31	22	27	31	17	26	26	13	11	12	16
	2	1	5	0	5	6	4	7	4	3	1	1	1	7	17	15	12
Total	1	50	53	59	51	51	54	46	56	52	56	55	55	30	27	33	29
Total	2	10	7	1	9	9	6	14	4	8	4	5	5	30	33	27	31

*Code 1: jaywalking; Code 2: running

The vehicle counts in Table 6 shows that the traffic volume is about double of the volume of traffic in the evenings, except for location Kimara Mwisho, with the evening period showing a higher volume compared to the morning period. Light vehicles are the most predominant type of vehicle, followed by motorcycles in second place and Bajaji (tricycles that can carry passengers). The sum of motorcycles and Bajaji is in the same proportion as the light vehicle group. A large proportion of motorcyclists do not wear a helmet, up to 47 %, according to the results. The traffic volume of the lorry group is the highest in the evenings for all locations.

Table 6. Vehicle counts per type, location and period (1 hour observation per period).

Sum of every vehicle type	Kibo		Baruti		Korogwe		Kimara Mwisho	
	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
Light Vehicles	1567	475	1392	683	1216	556	1072	1115
Buses	19	9	20	18	25	23	14	13
Micro Buses	141	47	102	109	123	141	119	129
Lorries	46	62	41	169	50	146	157	199
Bajaji	461	125	544	420	639	464	511	521
Mc	781	305	887	458	812	414	731	489
Mc + Bajaji	1242	430	1431	878	1451	878	1242	1010
Total	3015	1023	2986	1857	2865	1744	2604	2466
Mc with no helmet	531	280	582	362	521	344	610	412
Avg. % mc with no helmet	41	47	40	44	39	46	45	46

The pedestrian count is shown in Table 7. The results show that the location Kimara Mwisho has the lowest pedestrian count per direction and per period. The highest pedestrian count is at Korogwe in the Ubungo to Mbezi direction. It was also observed a continuous flow of motorcyclists crossing the motorway at zebra crossings, with the highest count at Baruti.

Table 7. Pedestrian count per direction and location (1 hour observation per period).

Direction	Ubungo to Mbezi								Mbezi to Ubungo							
Location	Kibo		Baruti		Korogwe		Kimara Mwisho		Kibo		Baruti		Korogwe		Kimara Mwisho	
Period	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Adult (male)	188	93	193	117	473	328	92	31	137	77	71	82	82	191	37	42
Adult (female)	91	56	161	100	366	305	38	28	70	63	61	119	38	146	29	41

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Children	25	28	26	24	31	24	3	2	12	13	18	21	5	27	6	5
Mc crossing on zebra	42	29	89	59	10	17	0	0	5	4	47	42	4	10	0	0
Disabled	0	0	1	0	1	2	0	0	0	0	0	0	0	1	0	0
Bicycle	3	1	2	0	0	0	0	0	0	1	2	1	0	0	0	0

The speed of vehicles per type is presented in Figure 17. The results show that the fastest group is the motorcycle group with an average speed around 44 km/h, followed by the light vehicle group in second place. The slowest group is the group of lorries with an average speed around 26 km/h. The lorry fleet was composed of old and overloaded heavy vehicles. Many risky situations were observed when motorcycles were overtaking lorries and busses as the speed difference was evident.

In general, the observed speeds are not high for a road classified as motorway (speed limit 50 km/h). By function definition and based on Safe System principles of speed separation, VRUs are prohibited to travel on motorways, which allows setting a high posted speed limit. Introducing the BRT corridor in the middle section of the motorway might have created a mix travel purpose and a mixed travel mode environment, where BRT users (pedestrians) attempt to cross the motorway at every station. It might be the case the motorway definition should be changed; thus, the speed limit can be lowered to 40 km/h and allowing the introduction of at-grade pedestrian crossing facilities.

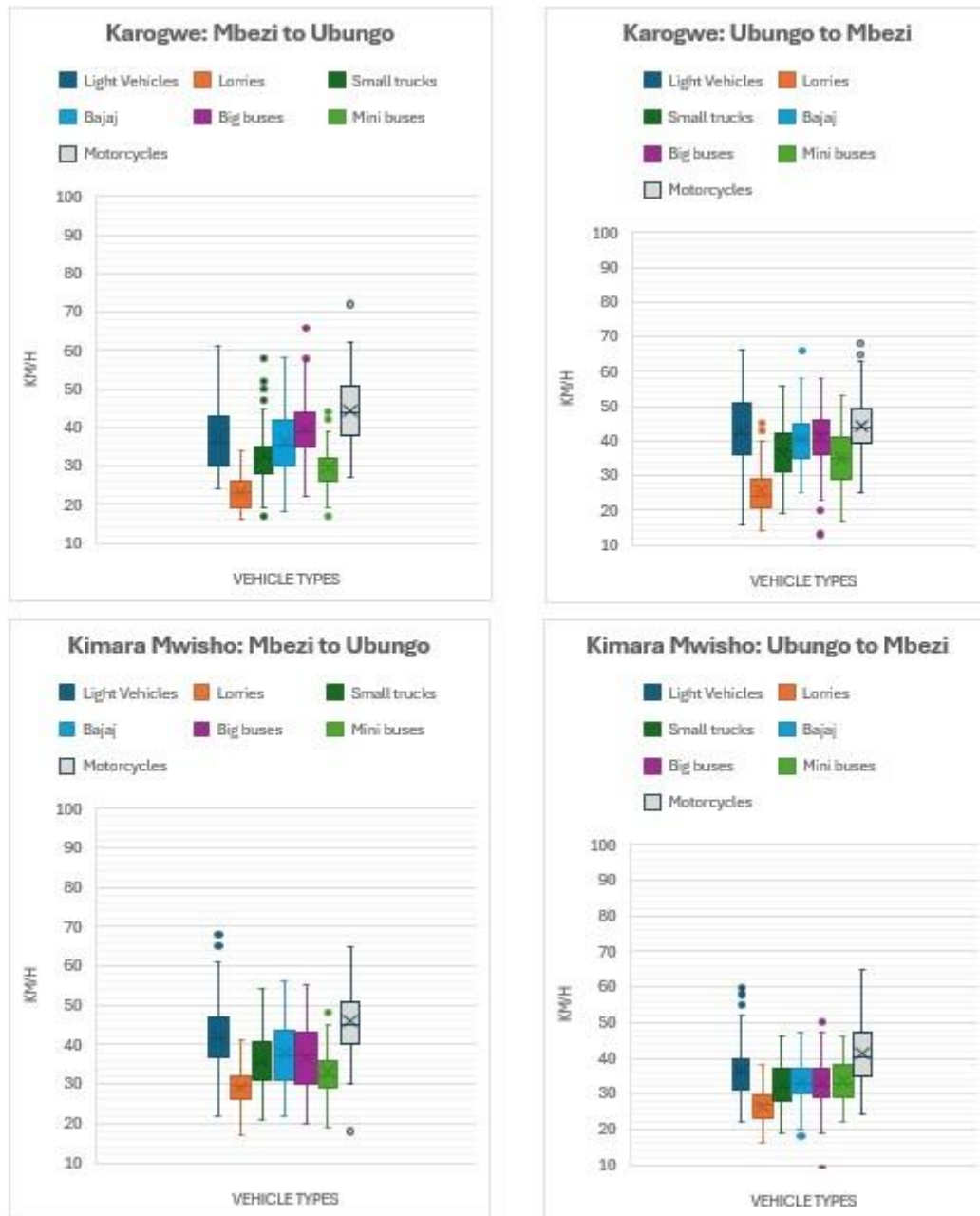


Figure 17. Speed observation of vehicle types per location

The perception survey shows that pedestrians themselves distinguish sharply between walking along the corridor and crossing it. Almost half of the 561 respondents, 49.0 %, reported that crossing the road is unsafe, against 31.3 % for walking along it, and only 36.5 % reported that crossing is safe. Concern about crash involvement was near universal: 81.3 % of respondents were concerned about being involved in a crash and 53.1 % were very concerned. The subjective results align closely with the observed behaviour, which strengthens both: the locations where waiting times were longest and yielding lowest are on the same corridor where pedestrians report that crossing feels dangerous, see Figure 18.

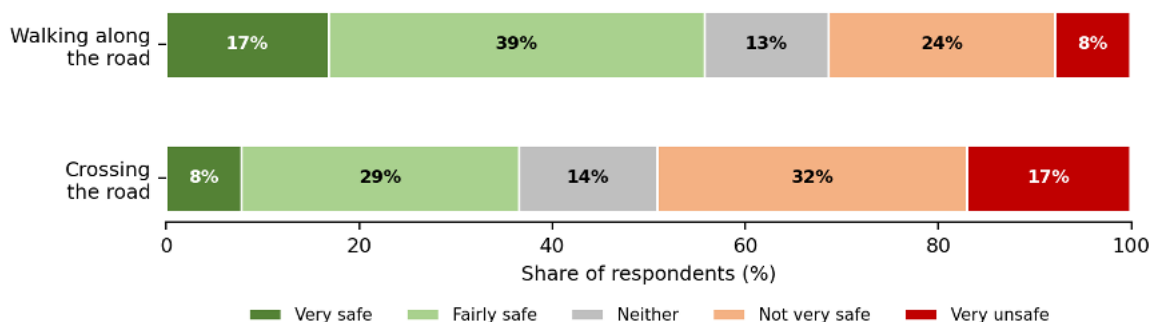


Figure 18. Pedestrian perception of safety when walking along and when crossing the corridor ($n = 561$, December 2024).

3.1.3 Summary

The widening of the motorway may improve traffic flow in the short term, but additional road capacity can also make car travel more attractive and therefore increase traffic volume. Based on experiences from elsewhere, it is important to encourage the use of the BRT system, but this will also increase the number of pedestrians accessing and crossing the corridor. If pedestrian infrastructure is not improved at the same time, the expected benefits of the BRT system may be reduced, and the risk of pedestrian accidents may increase. Poor pedestrian conditions may also discourage people from using public transport and increase reliance on private cars, contributing further to congestion, pollution and road safety problems.

These concerns are reflected in the pilot along the Ubungu-Mbezi BRT corridor, where pedestrians interact with high volume of mixed traffic. The baseline observations identified important safety concerns, particularly at Kimara Mwisho, including low driver yielding, long pedestrian waiting times and frequently running while crossing. Based on the observations, pedestrian safety infrastructure improvements were proposed following the road widening. As the intervention and follow-up study were not completed within the project period, no conclusions on intervention effects can be drawn.

From a Safe System perspective, when motorized traffic interact with VRUs, speeds should be lowered to reduce the risk and severity of crashes. Where necessary, infrastructure interventions should be in place to lower the speeds and create safer conditions for pedestrians.

3.1.4 Lessons learned and recommendations

- Baseline study needs to be programmed into the project inception phase, so that pedestrian provisions are fully considered before the detailed design is approved.
- Where a pilot must be run during construction, as in this study, it is important to consider that the measured speeds are suppressed by the works and will rise on completion.
- It is important to measure the specific site rather than citing general statistics. A national casualty figure invites the response that this corridor is different; a count taken at the crossing in question does not. Reporting the results using measures that decision-makers already recognise as operational problems such as pedestrian volume, waiting time, yielding rate and vehicle speed are readily understood as evidence that a facility is not working, and they do not require the audience to accept a safety argument first.
- Consider securing a formal position within the supervision or contract management structure, or a standing invitation to site meetings, so that findings enter the decision process rather than arriving alongside it.
- Conducting an after study once the project is complete is important, to determine the impact of the measures introduced.

3.2 Pilot 4: Street market infrastructure improvements in Accra-Ghana

The pedestrianization and decongestion of Derby Avenue in Accra's Central Business District (CBD) are part of the Accra Metropolitan Assembly's (AMA) ongoing efforts to reclaim walkways from street hawkers and improve pedestrian mobility. Derby Avenue frequently experiences heavy pedestrian foot traffic alongside informal trading.

Although the AMA periodically removes illegal structures and street vendors along Derby Avenue, traders often return due to economic pressures and a lack of permanent alternative market spaces. Derby Avenue has also been designated within broader urban management frameworks, including on-street parking design initiatives and periodic clean-up campaigns.

A baseline study was conducted in May-June 2025, comprising pedestrian and vehicle counts at selected locations and times of day, observations of pedestrian-vehicle interactions, and a short survey of pedestrians on perceived safety, traffic conditions and satisfaction with the urban environment.

However, the planned follow-up evaluation could not be undertaken within the project period because the proposed pedestrianization of Derby Avenue had not yet been implemented. Implementation depended on funding from the Government of Switzerland, which had not been released within the project timeframe. Consequently, the Ghana pilot provides a baseline assessment and a preparatory evaluation framework, rather than an assessment of the effects of an implemented pedestrianization intervention.

3.2.1 Method

The baseline study was conducted in the Rawlings Park-Derby Avenue market area during May-June 2025. It followed the same methodology as described in the Tanzanian pilot study. Pedestrian and vehicle counts were carried out at two key junctions: Derby Avenue/Kwame Nkrumah Avenue and Derby Avenue/Kojo Thompson Road. Counts were conducted during the morning (08:00-09:00), midday (11:00-12:00) and evening (17:00-18:00) periods.

Pedestrians were categorised as adults or children up to 12 years of age, while vehicles were classified by type. Observations also covered pedestrian-vehicle interactions and the use of available street space. In addition, a short questionnaire was administered to pedestrians to assess their satisfaction with safety, traffic volume, cleanliness, public spaces, resting places, traffic noise and the likelihood of being involved in a road traffic accident.

Figure 19 shows the pilot study area and the mixed pedestrian and vehicle activities in the market area.

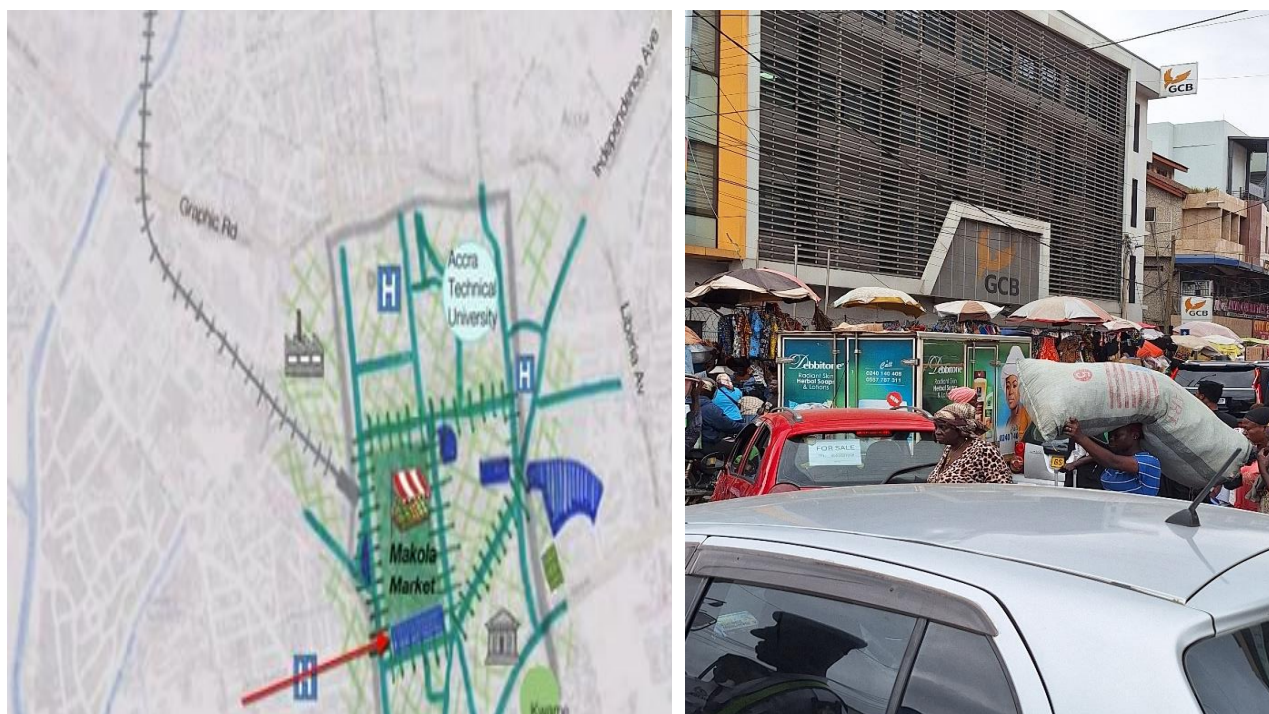


Figure 19. Makola market pilot area to be transformed into a pedestrianized zone in Accra. Makola market area.

3.2.2 Results

The baseline documented a high level of pedestrian activity alongside motorized traffic in the market area. Previous assessments of the site had identified competition for limited street space, with market activities occupying sidewalks and pedestrians consequently using the roadway. The baseline measurements provide a reference for assessing changes in pedestrian movement, vehicle activity and perceived safety. The junction Derby Ave. / Kwame Nkrumah Ave. shows its highest pedestrian traffic in the morning period, while the junction Derby Ave. /Kojo Thompson Road has its highest pedestrian traffic in the noon period, see Table 8.

Table 8. Pedestrian volume in the market per junction, baseline.

Time	Derby / Kwame Nkrumah		Time	Derby / Kojo Thompson	
	Adults	Children up to age 12 ¹		Adults	Children up to age 12
08:00 - 09:00	3253	109	08:00 - 09:00	1758	59
11:00 - 12:00	2640	86	11:00 - 12:00	1989	26
17:00 - 18:00	2005	80	17:00 - 18:00	1429	34
total 3 hrs	7898	275	total 3 hrs	5176	119
Total	8173		Total	5295	

The traffic volume has a different dynamic with its highest volume in the evening period for both junctions in the market area for light vehicles, while lorries have their highest volume in the morning period, see Table 9 and Table 10.

¹ Estimated age

Table 9. Traffic volume in the market area, baseline (Derby Ave. / Kwame Nkrumah Ave)

Time	Derby Ave. / Kwame Nkrumah Ave.						
	Light vehicle	Buses	Micro buses	Lorries	Pragia (tricycle)	Bicycle	Other
08:00 - 09:00	193	1	0	84	0	5	5
11:00 - 12:00	177	0	0	69	0	6	5
17:00 - 18:00	422	1	0	75	0	13	4
Total	792	2	0	228	0	24	14
Grand total	1060						

Table 10. Traffic volume in the market area, baseline (Derby Ave. / Kojo Thompson Road)

Time	Derby Ave. / Thompson Road								
	Light vehicle	Buses	Micro buses	Lorries	Pragia	Bicycle	2-wheeler	3-wheeler	Other
08:00 - 09:00	226	0	0	50	0	5	123	5	0
11:00 - 12:00	203	0	0	45	0	4	136	2	2
17:00 - 18:00	374	0	1	0	28	20	150	3	5
Total	803	0	1	95	28	29	409	10	7
Grand total	1382								

The results from the survey measuring respondents' satisfaction with the area are presented in Table 11. The results show that both females and males were less satisfied with the level of traffic noise and volume of traffic in the market area. The highest levels of satisfaction were reported for overall satisfaction and the range of shops. This may reflect the function of the market area, as people may value high having access to a wide range of products in one location (travel purpose), while being less satisfied with the surrounding environment because of the noise and traffic in the area.

Table 11. Respondents perceived satisfaction with the market area (baseline)

Questions	Male		Female		Total	
	mean	sd	mean	sd	mean	sd
In general, how pleased are you with the area?	4,1	1,8	4,1	1,4	4,1	1,7
How satisfied are you with: Safety	3,3	1,9	3,1	1,9	3,2	1,9
How satisfied are you with: Volume of traffic	2,3	1,8	1,9	1,7	2,1	1,7
How satisfied are you with: Cleanliness	3,3	2,0	2,9	1,7	3,1	1,9
How satisfied are you with: Range of shops	4,0	1,6	4,0	1,3	4,0	1,5
How satisfied are you with: public places like squares and parks	3,2	2,0	2,6	1,7	2,9	1,9
How satisfied are you with: resting places	2,8	2,0	2,3	1,7	2,6	1,8
How satisfied are you with: Level of noise from traffic	1,7	1,5	1,6	1,7	1,7	1,6
How worried: being involved in an accident with a motor vehicle?	3,5	2,1	3,7	1,7	3,6	1,9

3.2.3 Summary

The Ghana pilot focuses on improving pedestrian conditions in the Rawlings Park-Derby Avenue market area by restricting daytime motorized traffic and shifting freight deliveries to nighttime hours. The intervention is intended to provide more space for pedestrians and reduce conflicts between pedestrians and vehicles. Finally, the baseline study establishes the conditions against which the intervention can be evaluated.

3.2.4 Lessons learnt and recommendations

- Baseline data remain valuable even when implementation is delayed. Despite the delayed intervention, the baseline provided useful evidence on pedestrian and vehicle activity and on users' perceptions of the market environment.
- Market streets require an integrated approach to pedestrianization. The findings show that the challenge is not simply the presence of moving vehicles. Pedestrian space is also affected by trading activities, loading and unloading, parked vehicles, and other competing uses of the street. Pedestrianization should be approached as an integrated street-management intervention, rather than as a simple vehicle restriction.
- Freight management is critical to the success of pedestrianization. Market areas rely on regular goods deliveries, and poorly planned restrictions could provoke resistance from traders and suppliers. Future interventions should therefore involve freight operators and market stakeholders in the planning process from the outset.
- Pedestrian volumes and respondents' satisfaction with the area provide complementary evidence. Pedestrian counts show the intensity and temporal distribution of pedestrian activity, while the survey reveals how users experience the environment. The particularly low satisfaction with traffic noise and traffic volume and concerns about accidents illustrates why both forms of evidence are necessary when assessing quality of a pedestrian environment.
- Future evaluations should not assume the pedestrianization will automatically yield positive outcomes. Beyond safety, pedestrian movement and environmental quality, evaluations should consider market accessibility, trader activity, freight operations, traffic displacement to surrounding streets and the experiences of different user groups. This will provide a more balanced assessment of the intervention.
- Introduce appropriate enforcement and access management. The intervention's success will depend on effectively enforcing vehicle restrictions. AMA needs to clearly communicate access arrangements, supported by appropriate signage and complemented by practical enforcement measures
- The pilot provides a transferrable model for Accra. The methodology developed through the Derby Avenue pilot can be applied to other market environments in Accra.

4 Discussion

The pilot studies demonstrated different ways of applying Safe System principles to local road safety challenges in Africa, with focus on VRUs. The pilot activities ranged from infrastructure measures around schools, highways and marketplaces to training activities targeting professional drivers and driver trainers.

The level of implementation varied between pilots. Some pilots were fully implemented and evaluated using before-after measurements, while others were only partially implemented within the project period. Therefore, the available evidence differs between pilots.

The fully implemented school pilot in Zambia showed that relatively small infrastructure changes can produce measurable improvements in road safety. The largest effects were observed where several small measures were combined, including pedestrian separation, a zebra crossing and a speed hump. Vehicle speeds decreased and pupils, teachers and parents reported improved perceived safety.

Focus groups with driver trainers and professional drivers highlighted some important issues. Driver education needs to place greater emphasis on so-called “higher-order skills”, which focus on risk perception, decision-making, and the influence of peer and group pressure, rather than concentrating primarily on “lower-order skills” such as vehicle handling. Employers of professional drivers can also make an important contribution to road safety by ensuring compliance with traffic rules and regulations. In doing so, they can help foster a positive Road Safety Culture, which in turn can influence attitudes, norms, and behaviours related to road safety.

The partially implemented pilots in Tanzania and Ghana nevertheless provided important baseline information and demonstrated how systematic data collection can be used to identify local safety problems and support the selection of appropriate countermeasures. In Tanzania, observations identified challenges related to pedestrian interaction with mixed traffic, driver yielding behaviour and pedestrian crossing conditions. In Ghana, the baseline documented the interaction between high pedestrian movement, high street market activity and motorized traffic in a constrained street environment.

Across the pilots, the work also provided practical experience for local partners in site assessment, data collection, analysis and the identification of possible Safe System measures. This experience is an important result of the pilot activities, since one of the objectives was to strengthen local capacity to apply and replicate Safe System principles in other contexts.

Regarding the pedestrianization of Derby Avenue (Market Avenue) in Accra, Ghana, the Government of Ghana has constituted a technical committee to inspect the physical spaces and submit an implementation advisory document (i.e., physical layout and construction), which will be part of the Rawlings Park Area renewal activity.

4.1 Conclusion

The pilot activities provided a practical way of applying and adapting the Safe System principles to different African road safety contexts. The pilots addressed different environments and problems, including school zones, a major BRT corridor and a dense market area, but they shared the same approach: identifying local safety problems, involving local partners in the process and considering measures that could reduce the risk of death and serious injury. In this way, the pilots contributed to translating Safe System knowledge and methods into practical activities adjusted to local African conditions.

An important part of the work was the involvement of local practitioners and decision makers. Rather than only presenting Safe System principles theoretically, the pilots gave local partners practical experience in site inspections, data collection, analysis, identification of safety problems and discussion of possible countermeasures. This was important for showing how Safe System thinking can be used as a working method in road safety practice and not only as a general policy concept.

The pilots also aimed to contribute to a stronger Road Safety Culture by showing that relatively small and feasible changes can lead to meaningful safety improvements. The Zambia pilot provided the clearest example, where relatively simple measures around schools resulted in lower vehicle speeds and improved perceived safety among pupils. This supports the idea that road safety improvements do not always require large-scale interventions and that smaller actions can help build confidence in systematic road safety work.

The experience from the pilots also contributed to the development of a more standardized procedure for conducting similar activities. Across the pilots, the same main steps were used: identifying the problem, inspecting the site, collecting baseline data, analysing the findings, proposing countermeasures and, when possible, carrying out follow-up measurements. This provides a practical structure that can be adapted and replicated by local partners in other settings.

A limitation of the pilot activities is that not all planned interventions and follow-up studies could be completed within the project period. Therefore, the effects of the proposed measures could not be evaluated for all pilot sites. However, the partially implemented pilots still contributed to the overall objectives by identifying safety problems, establishing baseline conditions and giving local partners practical experience in applying Safe System methods. In addition to this it also provides important information about the planning process. For instance, the intervention should involve the local authorities, such as AMA, relevant transport and road agencies, enforcement agencies and other affected stakeholders. Finally, early engagement is important to agree on procedures, alternatives and modalities.

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