



AfRSO
African Road Safety Observatory

Road Safety Performance Indicators (SPIs)

WHAT THEY ARE, WHY THEY MATTER, AND HOW TO MEASURE THEM

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SECTION 1

Introduction

Aims of this session

This session introduces road safety performance indicators (SPIs) and prepares the ground for their use in African countries.

By the end, participants should understand:

- **what an SPI is** and how it differs from other indicators
- **why SPIs add value** for monitoring road safety strategies
- **the four building blocks** of every SPI — topic, metric, target and value
- **the four dimensions** to consider when selecting SPIs
- **what makes an SPI good** : the key quality criteria;
- **how SPIs are measured** in practice, including sampling and weighting.

Expected learning outcomes



By the end of this session, participants should be able to:

- **Explain what an SPI is** and how it differs from input and output indicators
- **Identify suitable SPIs** for their national context, using the four building blocks and four dimensions
- **Describe how SPIs are measured** and the main requirements for reliable, comparable data.

SPIs: a relatively new frontier for Africa

SPIs are well established in Europe and HICs (High Income Countries) but remain a novel instrument across most of the continent. Few African countries currently measure them in a systematic way.

- **Monitoring still relies on output data** (fatalities, injuries) that is itself often incomplete and under-reported.
- **Output figures reveal little** about the contributory factors behind crashes or about emerging risks.
- **The African Road Safety Action Plan 2021–2030** and the 12 global voluntary targets call for performance monitoring, not only outcome counting.
- **This session** builds the shared understanding needed before implementation begins.

SECTION 2

What are SPIs and why use them?



What is an indicator?

- An indicator is a **number** that provides information about a particular process or situation. It condenses a complex reality into a single, comparable figure.
- **In road safety**, SPIs (also called RSPIs or KPIs) refer in general to the contributory factors of road safety.
- **SPIs describe** behaviour and conditions that are known to influence crash risk — for example, average speed or seatbelt-wearing rates.
- **SPIs sit between** the interventions a country puts in place and the road safety outcomes it ultimately achieves.

What's in a name: terminology

The same concept appears under several labels.

They are, for practical purposes, interchangeable.



SPI

Safety Performance Indicator — the most widely used term internationally.

KPI

Key Performance Indicator — the term preferred by the European Commission.

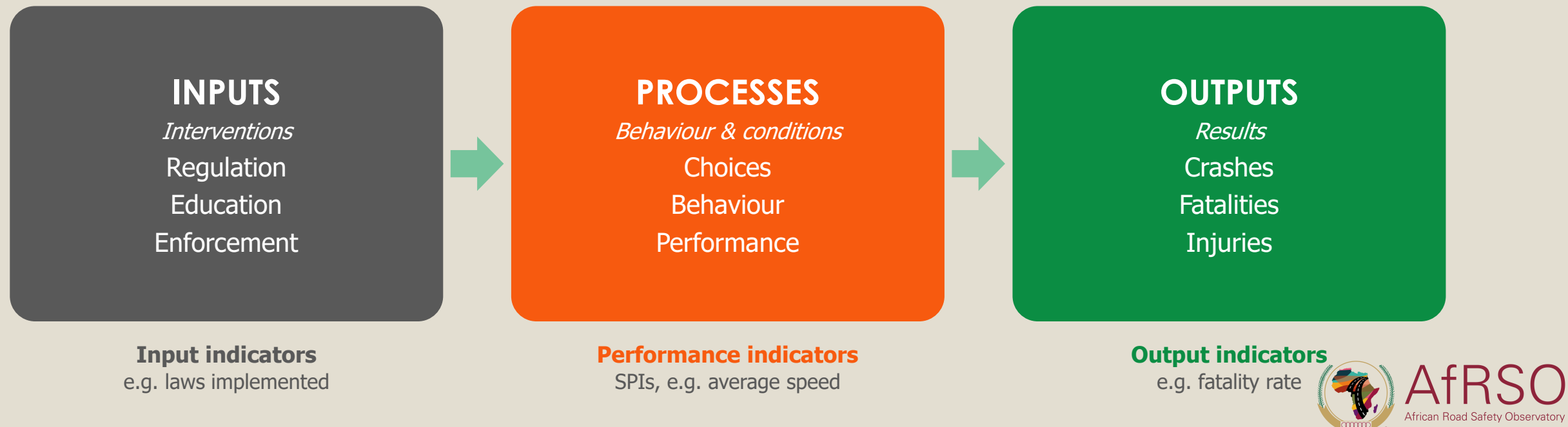
RSPI

Road Safety Performance Indicator — used where the road safety focus must be explicit.

Three types of road safety indicators

SPIs in general occupy the middle of the chain that links what a country does to the results it obtains.

However, in countries who are still in an early stage of road safety policy development and implementation, using input indicators as SPIs also makes sense.



Which topics can SPIs address?

Some topics lend themselves readily to SPIs; others are more demanding but equally important.

Typical topics

- Speeding
- Non-use of seatbelts
- Non-wearing of helmets
- Distraction by mobile phone

Challenging topics

- Driving under the influence of alcohol
- Road infrastructure safety
- Vehicle safety
- Post-crash care

Other possible topics

- Road safety management
- Road safety education
- Compliance at crossings
- Enforcement of traffic rules

Why use SPIs?

Road safety strategies are predominantly preventive — they aim to stop crashes before they happen. The central question is: how do we know these strategies are working?

- **Output indicators alone** (such as numbers killed or injured) say little about the contributory factors of crashes or about emerging trends.
- **Fatality counts react slowly** and are influenced by exposure, reporting quality and chance — a poor guide to whether an intervention is effective.
- **Key added value of SPIs** at national level lies in the monitoring of road safety plans and strategies.

The added value of SPIs

Used to monitor a national strategy, SPIs serve three connected purposes:

Assess

whether policy measures and safety interventions have actually been effective.

Set targets

to be achieved in the medium and long term, expressed in measurable terms.

Monitor progress

year on year, towards those targets — and act when progress stalls.

Other purposes of SPIs

Beyond monitoring strategies, authorities and road safety stakeholders use SPIs:

- **to identify** high-risk and high-priority areas
- **to make authorities** more accountable
- **to monitor** changes in contributing factors over time
- **to detect** emerging trends at an early stage
- **to identify** which policy measures and interventions are needed
- **to compare or benchmark** different road traffic systems
- **to provide focus** for the efforts of the many actors involved.

SECTION 3

The building blocks of an SPI



The four building blocks of an SPI

Every SPI can be decomposed into four elements.
The speed example shows how they fit together.

Topic *What is being measured*

Example: **Speed**

Metric *The unit of measurement*

Example: **km/h**

Target *The value to compare against*

Example: **50**

Value *The figure actually observed*

Example: **66**

The metric



The metric is the physical dimension or unit of the indicator value.

Other terms: measure, yardstick, gauge.

- **Absolute number** — e.g. the number of fatalities, injuries or crashes
- **Fraction** — e.g. the percentage of drivers who were speeding
- **Physical dimension** — e.g. vehicle-kilometres travelled

In general, several metrics are possible for one topic.

The metric: several choices per topic



For speeding, for instance, the topic can be captured by different metrics:

- **Average speed** of the vehicles passing a point
- **Percentage of drivers** exceeding the speed limit
- **Speed dispersion** — the difference between the fastest and the slowest cars.

The target

The target is the value, or range of values, against which the indicator value should be compared.

Other terms: norm, standard, benchmark.

It shares the same dimension as the metric and is often built into the indicator's definition.

Example: “Percentage of drivers exceeding 30 km/h in urban areas”.

- **Topic** = speed in urban areas
- **Metric** = percentage of drivers faster than the norm
- **Target value** = 30 km/h, with the objective that no one exceeds it.



Why set targets?

Without a target, an indicator value cannot be judged.

Is moving from 80% to 85% an average, a good, or an excellent result?

The answer depends entirely on whether the target is set at 84% or at 98%.

- **Setting appropriate targets** is motivational and gives stakeholders a shared ambition.
- **A target obliges** an authority to monitor and to act.
- **Indicators without targets** are difficult to interpret.
- **Indicators without monitoring** serve little purpose.



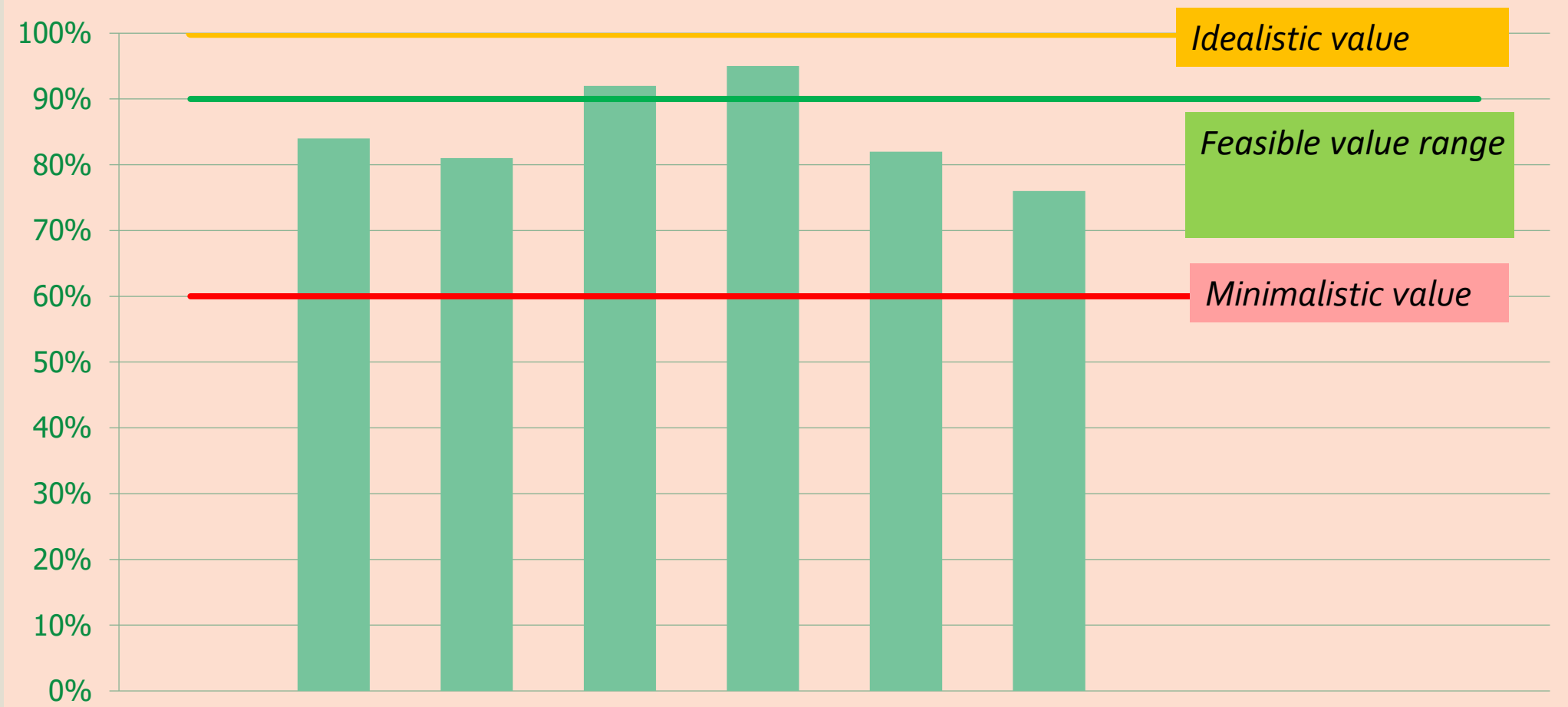
Where to start when setting targets?

A target should be grounded in evidence rather than chosen arbitrarily. Useful reference points include:

- **Average or recent past performance** in the country itself
- **Benchmarking** with similar contexts
- **Best performance** achieved elsewhere
- **Cost considerations** — what is affordable
- **Feasibility considerations** — what is achievable in the period
- **Ethical considerations** — can a non-zero target be justified?



Types of targets



Types of targets: a trade-off

Make clear which type of target is being set. The two extremes both carry risks.

Idealistic value

- Not always credible
- Risks demotivating those responsible
- Best linked to a legal obligation or an ethical imperative

Minimalistic value

- Easy to reach or maintain
- Can suggest everything is already fine
- Only useful when the concern is simply staying above a threshold

Setting realistic targets



A workable target lies between the minimalistic and the idealistic value, and is credible for all key stakeholders. It combines ambition with feasibility.

- **Link the target** to the interventions planned to reach it.
- **Use a time horizon** of at least two to three years, so the impact of measures becomes visible.
 - **A shorter period** tends to produce less ambitious targets.
 - **A longer period** risks a slow start and a loss of momentum.
- **Monitor annually** and adjust as evidence accumulates.

The indicator value

The indicator value is the number calculated for the topic — for example, “94% of front-seat passengers wear a seatbelt”.

It has the same dimension as the metric and the target.

- **It is generally** the weighted average of a range of cases or observations.
- **It should be compared** directly with the target.
- **Breakdowns into sub-populations** are often essential to understand the underlying phenomena and to identify appropriate policy measures.

SECTION 4

Scope and dimensions of SPIs

Four dimensions when defining SPIs

An SPI is fully specified only when these four dimensions are defined.

Topic/Risk factor

Geographical area

**Road type / network
coverage**

**Road-user category /
Vehicle type**

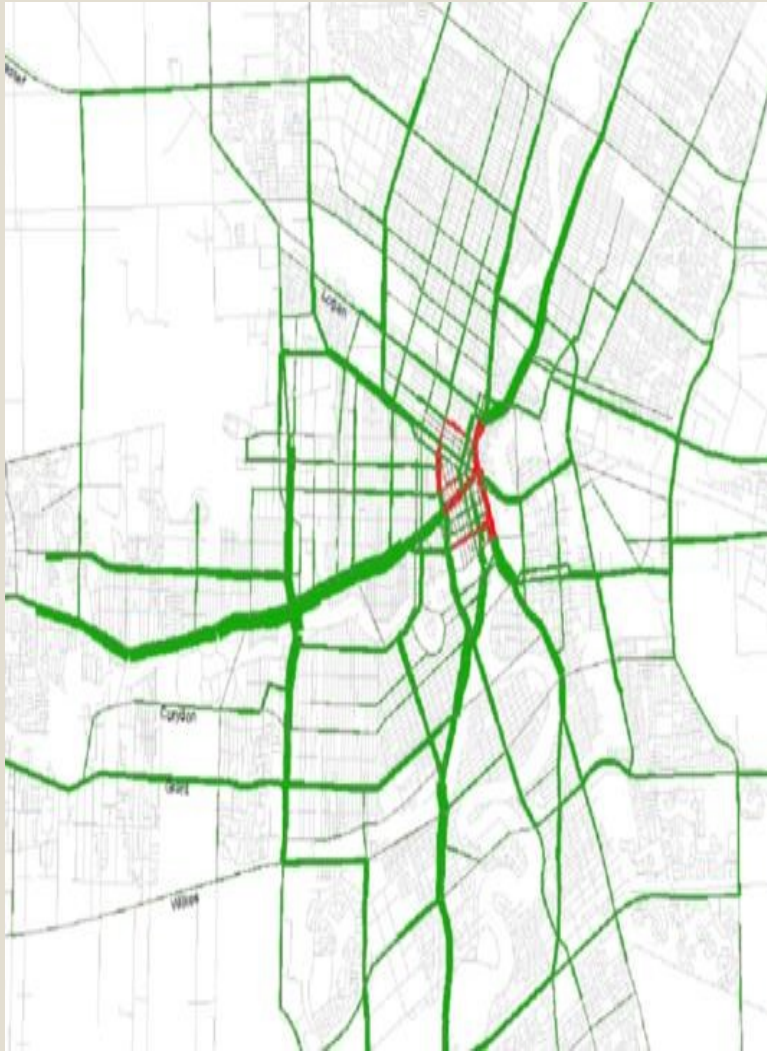
The dimensions explained



Each dimension narrows the scope of the indicator and makes it comparable.

- **Topic** refers to the SPI field — the risk factor or condition being measured.
- **Geographical area** is the territory covered, from local and regional to national.
- **Road-user category** allows a focus on specific groups (newer SPIs increasingly address users beyond car drivers)
- **Road type** matters because values differ between urban roads, rural roads and motorways. Most countries have road classifications that can serve as a basis.

Road type and the road network



The road type is a decisive dimension, particularly for speed. A categorisation by speed limit is usually needed.

- **Common road types:** urban roads, rural roads and motorways.
- **National classifications** (primary, secondary, tertiary) can provide a further basis.
- **The whole network** rarely needs to be covered: typically 10–15% of roads carry over 75% of the traffic. These high-traffic roads are a practical and efficient basis for SPIs.

Breakdowns and segmentation

For analysis and interpretation, it is useful to break SPI values down into segments. Typical breakdowns include:

- **Region** within a country
- **Vehicle category** (passenger car, light goods vehicle, truck, bus)
- **Road-user group** and function (driver, passenger)
- **Gender and age group** (child, adolescent, adult, senior)
- **Time** — time of day, part of the week, month or season.

However, such segmentation requires a considerably larger and more complex data-collection process.

SECTION 5

What makes a good SPI?



Criteria for identifying good SPIs

A well-designed SPI satisfies, as far as possible, the following criteria:

- **Causal link** with crashes and injuries, based on prior research, with limited confounding
- **Quantifiability** of the phenomenon, sensitive enough that real changes are observable
- **Relevance for policymaking:** the phenomenon is influenceable by interventions;
- **Representativeness** for the area and period, attained through sampling and weighting
- **Reliability** of the values, through accurate registration and sufficient sample sizes
- **Comparability** over time, across areas, and with other indicators
- **Feasibility:** no legal obstacles, willing data providers, and resources to repeat.

The four qualities that matter most

Of all the criteria, four are most often decisive in practice.

Representative

Of the geographical area, through representative locations and appropriate weighting.

Reliable

Based on a scientific, reproducible approach, with errors kept under control.

Accurate

Sufficiently large samples, small uncertainty, still valid for useful breakdowns.

Comparable

Over time, with other geographical areas, and with other indicators.

An indicator is never perfect



It is worth keeping the limits of any indicator in view:

- **By definition**, an indicator is a reduction of reality and conceals internal variation in the data.
 - **A complex issue** can never be fully captured by a single value.
 - **Anyone who opposes an indicator** can always find an argument against it.
- **But that is not a reason** not to use them — imperfect measurement is far better than none.

SECTION 6

Measuring SPIs: data and methods

Methods for collecting SPI data

SPI data can be gathered in four broad ways, each with its own strengths.

Road-side observations

Visual inspection
Cameras, radars

Self-reported behaviour

Online surveys
Questionnaires

Existing databases

Police records
Hospital data
Administrative data

Other sources

In-vehicle sensors
Police checks
New technologies



Road-side observation studies

For behavioural SPIs (helmet, seatbelt, phone use), observation by trained observers is often the method of choice.

Advantages

- Often the easiest method to implement
- One approach fits many risky behaviours
- Extensive documented expertise available
- Relatively cheap — no costly equipment
- Can achieve high reliability and comparability
- Flexible in the field

Disadvantages

- Site selection is crucial
- Subjectivity and risk of cheating
- Samples may be too small
- Results require weighting

The need for sampling and weighting

SPIs require an estimate of average behaviour (e.g., the percentage of drivers wearing a seatbelt).

It is not feasible to observe all road users, everywhere, at all times.

- **SPI values are estimates** based on a representative sample of vehicles or road users.
- **The sample size, the locations and the periods** must be chosen carefully to be representative and reliable.
- **Using a sample of sites** also requires weighting the results of the different sites.
- **Tested methodologies** exist (like those developed in the European SafetyNet, Baseline and Trendline projects).

What is the minimum sample size?



Two minimum quantities matter: the number of observation locations and the number of observations. There is no universal statistical formula — it depends on the variance between locations.

- **The EU Baseline and Trendline minimums** were deliberately modest:
 - **at least 2,000 observations** overall
 - **at least 500 observations** for each road category (urban, rural, motorway)
 - **at least 10 observation sites** per road category.
- **For some users** (motorcyclists, cyclists, children in restraints) even these minimums can be costly to meet.

Sampling approach: strata

Sampling is done at two levels: a random selection of observation locations for each road type, and a (nested) random selection of vehicles or road users within each session.

- **Stratification by time period** is usually useful — typically weekday versus weekend.
- **For drink-driving**, four periods are advisable (weekday and weekend, daytime and night-time).
- **Each combination** of road type and time period forms a separate sampling stratum. For example, 2 road types \times 4 time periods \times 2 vehicle types gives 16 strata.



Selecting observation locations



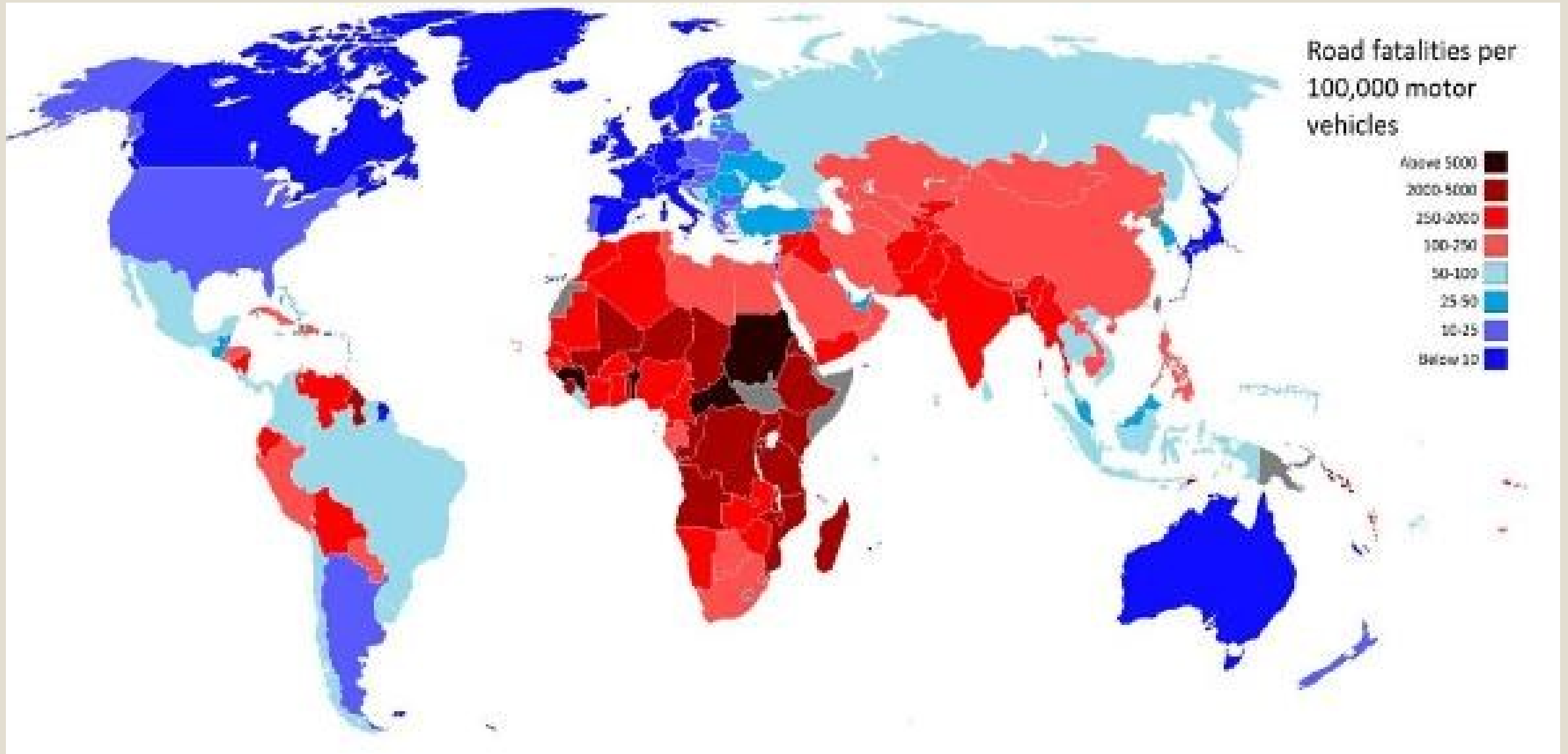
Ideally locations are randomly selected within each road type, but full randomisation raises practical problems. Sound practice considers:

- **Traffic volume** — avoid sites with fewer than about 20 relevant vehicles per hour.
- **A good spread** across administrative units and geographical features.
- **Feasibility of measurement** — space, visibility, and parking for drink-driving checks.
- **Safety of the observers**, especially on rural roads and motorways.
- **Travel time and cost** to reach each location. Locations may need replacing for weather, road works or events.

SECTION 7

SPIs in the African context





Why SPIs matter for Africa now

Africa is the only world region where road deaths rose during the first Decade of Action.

Decision-making is still constrained by weak outcome data.

SPIs offer a complementary, forward-looking instrument:

- **They make progress visible** between fatality counts, which react slowly and are under-reported.
- **They strengthen accountability** of lead agencies and support evidence-based budgeting.
- **They detect emerging risks early** (for example, the rapid growth of powered two-wheelers).
- **They are explicitly called for** by the African Road Safety Action Plan 2021–2030.

Aligning with continental frameworks

SPIs should not be designed in isolation. They connect directly to the instruments African countries have already committed to.

- **The 12 UN global voluntary targets** are largely expressed as performance indicators (e.g. speed, helmets, seatbelts, alcohol).
- **AfRSO** can coordinate definitions, support data collection, and enable cross-country comparison.
- **Harmonisation** is what turns isolated national figures into continental knowledge.



Practical challenges to anticipate



Introducing SPIs in African countries raises real constraints that should be acknowledged from the outset.

- **Data systems** are fragmented, with limited integration between police, health and insurance sources.
- **Capacity** for sampling, observation and analysis must be built and retained.
- **Funding** is rarely earmarked, so methods must be affordable and repeatable.
- **Comparability** depends on shared definitions, which require coordination.
- **Language**: materials and tools are needed for in different languages.

SECTION 7

Case study: SPIs in Ethiopia

An African example: Ethiopia (1)

Ethiopia has begun integrating SPIs into its national road safety policy. The Road Safety and Insurance Fund Service (RSIFS), established by Council of Ministers Regulation 493/2022, acts as the national lead agency.

- **SPIs are embedded** in the National Road Safety Strategy 2021–2030 and its five pillars.
- **The framework aligns** with the Safe System approach, the African Action Plan and AfRSO.
- **The strategy aims** to halve road traffic deaths by 2030, supported by data-driven monitoring.
- **A mid-term evaluation** of the strategy is being conducted with the World Resources Institute (WRI).

An African example: Ethiopia (2) — SPIs by pillar

RSIFS tracks concrete indicators against each of the five pillars:

Management

Budget allocated; strategy implementation; stakeholder meetings held.

Safer roads

Roads audited (iRAP); black spots improved; pedestrian and cyclist infrastructure.

Safer vehicles

Insured-vehicle compliance; fraudulent insurance cases detected.

Safer road users

Seatbelt and helmet use; traffic-offence rates; people reached by awareness.

Post-crash response

Average emergency response time; victims cared for within the first hour; claims processed.

An African example: Ethiopia (3) — digital and legal reforms

Ethiopia's progress rests heavily on digitalisation and a strengthened legal base.

- **Digitised third-party insurance** enables real-time data collection and detection of fraudulent stickers.
- **RADMS** : a Road Accident Data Management System (World Bank-supported) is being piloted in five regions.
- **Regulations 557/2024 and 554/2024** modernise enforcement, update penalties and add data-collection provisions.
- **Enforcement equipment** (speed radars, breathalysers) was distributed to 14 regional authorities.
- **National standards** for seatbelts, child restraints and motorcycle helmets are being developed.

An African example: Ethiopia (4) — challenges and lessons



Ethiopia's experience also points to common challenges and transferable lessons.

- **Challenges:** no behavioural baseline data; need for disaggregation by age, sex and vehicle type; weak police–hospital–insurance linkage.
- **Institutional coordination:** RSIFS's multi-body coordination model is a valuable example.
- **Digital transformation:** the insurance system and RADMS strengthen compliance and data quality.
- **SPI localisation:** adapting global SPIs into a national strategy offers practical insight for other African countries.

In conclusion

Getting started: a phased approach



Experience elsewhere suggests starting small and building credibility, rather than attempting a comprehensive system at once.

- **Begin with a few high-value SPIs** where data is feasible (typically speed, helmet and seatbelt use)
- **Adopt modest minimum samples**, then refine over time.
- **Invest in observer training** and in simple, well-documented forms or apps.
- **Publish and repeat** annually, so trends drive decisions.
- **Share methods and results** to build a continental evidence base.

Key takeaways

- **SPIs measure the contributory factors** of road safety — the middle of the chain between interventions and outcomes.
- **Every SPI has four building blocks** (topic, metric, target, value) and four dimensions to specify.
- **A good SPI** is representative, reliable, accurate and comparable (but no indicator is ever perfect).
- **Measurement rests on sound sampling and weighting**, for which tested, affordable methods exist.
- **For Africa**, SPIs are a novel but timely instrument, best introduced in phases and aligned with the African Road Safety Action Plan.



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Thank you for your attention

Questions and discussion are welcome.

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