2025

COMCEC COORDINATION OFFICE

# ENHANCING AND SUSTAINING RURAL ACCESSIBILITY IN THE OIC MEMBER COUNTRIES

COMCEC

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ISBN:

# CONTENT

# LIST OF FIGURES

# LIST OF TABLES

## LIST OF ABBREVIATIONS

| Abbreviations | | Explanations |
|---|---|---|
| 4G | : | Fourth Generation (*Mobile Telecommunications Technology*) |
| 5G | : | Fifth Generation (*Mobile Telecommunications Technology*) |
| ABS | : | Australian Bureau of Statistics |
| ACAP | : | Airports Capital Assistance Program |
| AIIB | : | Asian Infrastructure Investment Bank |
| AIS | : | Automatic Identification System |
| ALBN | : | Cross-Border Transportation |
| ARIA+ | : | The Accessibility/Remoteness Index of Australia |
| ASEAN | : | Association of Southeast Asian Nations |
| ASGS | : | Australian Statistical Geography Standard |
| AUD | : | Australian Dollars (*currency*) |
| AV | : | Autonomous Vehicle |
| BTS | : | Base Transceiver Stations |
| BUMDes | : | Village-Owned Enterprise |
| CAGR | : | Compound Annual Growth Rates |
| CCTV | : | Closed-Circuit Television |
| CIB | : | Canada Infrastructure Bank |
| CN | : | Canadian National |
| COMCEC | : | Commercial Cooperation of the Organization of Islamic Cooperation |
| CP | : | Canadian Pacific |
| CRTC | : | Canadian Radio-television and Telecommunications Commission |
| DRT | : | Demand-Responsive Transport |
| EC | : | European Commission |
| EU | : | European Union |
| EUR | : | Euro (*currency*) |
| EV | : | Electric Vehicle |
| FAO | : | Food and Agriculture Organization |
| FDRZM | : | Fund for the Development of Rural and Mountain Areas Committee |
| FUA | : | Functional Urban Area |
| Gbps | : | Gigabits Per Second |
| GDH | : | General Directorate of Highway |
| GDP | : | Gross Domestic Product |
| GIS | : | Geographic Information System |
| GPS | : | Global Positioning System |
| GRP | : | Growing Regions Program |
| I-MOTION | : | Indonesia Integrated Monitoring System on Navigation |
| ICT | : | Information and Communication Technologies |
| IDR | : | Indonesian Rupiah (*currency*) |
| IFAD | : | International Fund for Agricultural Development |
| IMO | : | International Maritime Organization |
| InaPortNet | : | Indonesia Port Network |
| INDH | : | National Initiative for Human Development |
| IPARD | : | Instrument for Pre-Accession Assistance in Rural Development |
| ISC | : | Indigenous Services Canada |
| ISED | : | Innovation, Science and Economic Development Canada |

| | | |
|---|---|---|
| ISP | : | Internet Service Providers |
| ITS | : | Intelligent Transportation Systems |
| KKYDP | : | Rural Development Investments Support Program |
| KÖYDES | : | Village Infrastructure Support Project |
| KP | : | Ministerial Decree |
| LDCs | : | Least Developed Countries |
| LEADER | : | Links Between Actions for the Development of the Rural Economy |
| LRCI | : | Local Roads and Community Infrastructure |
| LTE | : | Long Term Evolution |
| MAD | : | Moroccan Dirham (*currency*) |
| MAP | : | Malaria Atlas Project |
| Mbps | : | Megabits Per Second |
| MoAF | : | Ministry of Agriculture and Forestry |
| MoTI | : | Ministry of Transport and Infrastructure |
| MT | : | Million Tons |
| NAS | : | National Airports System |
| NGO | : | Non-Governmental Organization |
| NHS | : | National Highway System |
| NRHA | : | National Rural Health Alliance |
| NSRF | : | National Stronger Regions Fund |
| OECD | : | Organisation for Economic Co-operation and Development |
| OIC | : | Organization of Islamic Cooperation |
| ONEE | : | National Office of Electricity and Drinking Water |
| ORKÖY | : | Forest Villages Development Program |
| PM | : | Ministerial Regulation |
| PMV | : | Green Morocco Plan (*Plan Maroc Vert*) |
| PNRR | : | Programme National de Routes Rurales |
| PPPs | : | Public–Private Partnerships |
| PRDTS | : | Program for the Reduction of Territorial and Social Disparities in the Rural World |
| PT ASDP | : | River, Lake, and Ferry Transportation Limited Liability Company |
| PT Pelni | : | Indonesian National Shipping Limited Liability Company |
| PTT | : | Postal and Telegraph Corporation |
| RA | : | Remoteness Area |
| RAI | : | Rural Access Index |
| RAP | : | Regional Airports Program |
| RASP | : | Remote Air Services Program |
| RAUP | : | Remote Airstrip Upgrade Program |
| RDA | : | Regional Development Australia |
| RHOF | : | Rural Health Outreach Fund |
| ROSI | : | Roads of Strategic Importance |
| RPJMN | : | National Medium-Term Development Plan |
| RTSF | : | Rural Transit Solutions Fund |
| SA1 | : | Statistical Area Level 1 |
| SAF | : | Special Allocation Fund |
| SATRIA | : | Satellite of the Republic of Indonesia |
| SDG | : | Sustainable Development Goals |
| SUA | : | Significant Urban Area |
| TEU | : | Twenty-foot Equivalent Unit |

| | | |
|---|---|---|
| TL | : | Turkish Liras (*currency*) |
| TUCSAP | : | Türkiye Climate Smart and Competitive Agricultural Growth Project |
| TULIP | : | Türkiye Resilient Landscape Integration Project |
| UBF | : | Universal Broadband Fund |
| UCL | : | Urban Centres and Locality |
| UN | : | United Nations |
| UK | : | United Kingdom |
| UKKS | : | National Rural Development Strategies |
| USD | : | United States Dollars (*currency*) |
| USA | : | United States of America |
| USO | : | Universal Service Obligation |
| VSAT | : | Very Small Aperture Terminal |

## EXECUTIVE SUMMARY

This report provides a comprehensive assessment of rural accessibility across Member Countries of the Organization of Islamic Cooperation (OIC), focusing on the critical role that connectivity plays in advancing inclusive and sustainable development. Rural accessibility remains one of the most decisive factors shaping social equity, economic opportunity, and regional integration. For many OIC Member Countries, large rural populations continue to face geographic isolation and limited access to essential services such as education, healthcare, markets, and administrative centers. These limitations directly affect livelihoods, productivity, and the overall well-being of communities. The report emphasizes that improving accessibility is not solely a matter of constructing transport infrastructure but rather developing integrated systems that ensure mobility, affordability, and sustainability.

The study was undertaken within the framework of the Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation (COMCEC) Transport and Communications Working Group to support evidence-based policymaking and cooperation among Member Countries. It draws on multiple layers of analysis, including literature review, field-based and desk-based case studies, and a structured survey of national and local stakeholders. The approach combines both qualitative and quantitative dimensions to produce a nuanced understanding of the institutional, spatial, and financial dynamics shaping rural accessibility. Through this methodology, the report captures regional diversity while identifying common trends and systemic challenges that affect rural transport planning and implementation across the OIC Member Countries.

The findings reveal that rural accessibility in OIC Member Countries remains below global averages, reflecting a combination of infrastructural gaps, institutional constraints, and limited maintenance systems. Physical connectivity, particularly in remote and geographically challenging regions, continues to lag behind urban areas. The situation is further compounded by inadequate transport services, fragmented governance structures, and insufficient coordination between national and local authorities. While many Member Countries have made substantial progress in expanding their transport networks and improving policy coherence, the sustainability of these efforts is frequently undermined by maintenance deficits, limited funding, and a lack of local capacity. As a result, the benefits of infrastructure investments are not always fully realized in terms of social inclusion and service delivery.

Beyond infrastructure, the report highlights that true accessibility depends on the integration of transport systems with other sectors, particularly health, education, agriculture, and digital connectivity. Rural communities often face multiple, overlapping deprivations that cannot be addressed through isolated transport initiatives. Therefore, accessibility planning must be embedded within broader rural development frameworks that promote cross-sectoral coordination. Similarly, the adoption of information and communication technologies emerges as a transformative enabler, allowing for more efficient planning, monitoring, and service provision in even the most remote areas. Digital tools can enhance governance transparency, improve the targeting of investments, and facilitate innovative solutions such as community-based or demand-responsive transport systems.

The comparative analysis of selected OIC and non-OIC countries underscores that progress in rural accessibility depends heavily on governance quality, policy coherence, and the ability to engage local communities in planning and implementation. Countries that have institutionalized participatory processes, decentralized planning responsibilities, and established clear

maintenance mechanisms tend to achieve more resilient and inclusive outcomes. Conversely, where responsibilities remain fragmented and financial or technical capacities are weak, accessibility improvements are often short-lived. These insights point to the need for Member Countries to strengthen local institutional capacities and create enabling environments that support long-term, community-oriented solutions.

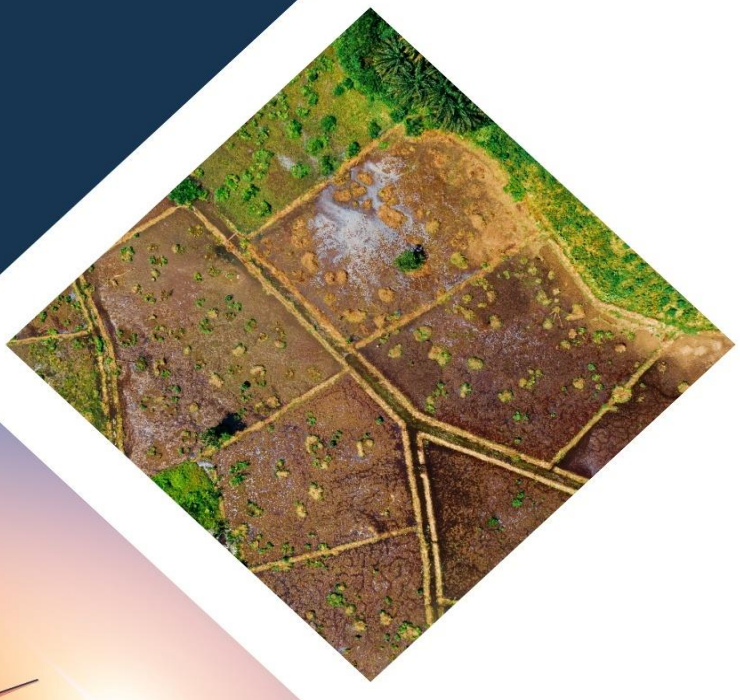
The survey component of the study further reinforces these observations. Respondents across OIC and non-OIC countries highlighted recurring challenges such as deteriorating infrastructure, limited funding for maintenance, and insufficient human resources for technical planning. Many also recognized the potential of emerging technologies and innovative service models to improve efficiency and sustainability. However, adoption rates remain low, primarily due to limited awareness, regulatory barriers, and lack of capacity. Respondents consistently emphasized the need for stronger coordination mechanisms, enhanced capacity building, and greater policy integration to ensure that rural accessibility contributes effectively to national development goals.

In synthesizing these insights, the report identifies a set of guiding principles for enhancing and sustaining rural accessibility in the OIC region. These include the adoption of holistic and context-sensitive planning approaches, integration of accessibility objectives into national development and spatial planning frameworks, and the establishment of reliable financing and maintenance mechanisms. Strengthening institutional coordination between central and local authorities, fostering public–private collaboration, and promoting community participation are also essential for creating inclusive and sustainable transport systems. Furthermore, monitoring and evaluation frameworks should be improved to enable data-driven decision-making and continuous performance assessment.

The study concludes that rural accessibility must be treated as a long-term developmental priority rather than a short-term infrastructure goal. Sustained progress requires embedding accessibility into the broader agenda of social and economic transformation, with attention to equity, resilience, and environmental sustainability. The integration of transport, technology, and governance innovations can significantly enhance the effectiveness of rural accessibility programs, ensuring that they not only connect people to services but also strengthen social cohesion and regional competitiveness.

Ultimately, the report calls for a coordinated and forward-looking policy recommendations under the COMCEC framework that promotes collaboration, knowledge sharing, and capacity building among Member Countries. By aligning national strategies with shared regional objectives, OIC Member Countries can accelerate progress toward inclusive mobility, reduce disparities between rural and urban areas, and support the broader goals of sustainable and resilient development.

# CHAPTER 1: INTRODUCTION



## 1.1. Background

Rural accessibility is a foundational pillar of inclusive development. It refers to the ability of rural populations to reach essential services such as education, healthcare facilities, markets, and administrative centers; through reliable, affordable, and safe transportation networks. For almost 50% of the population of Organization of Islamic Cooperation (OIC) Member Countries living in rural areas across, accessibility is not merely a logistical issue; it is a question of social equity, economic opportunity, and national integration.

In many OIC Member Countries, rural communities face profound isolation. Long distances, poor road quality, lack of all-weather roads, and limited or unaffordable transport services prevent millions from fully participating in their country's economic, social, and political life. This isolation contributes to persistent poverty, health disparities, low educational attainment, and underutilization of agricultural potential. Without accessible transport, farmers have challenges to reach markets, children also face struggles in attending school regularly, and patients have difficulties in seeking timely healthcare.

In global, the significance of rural accessibility has been recognized under the United Nations (UN) Sustainable Development Goals (SDGs). Specifically, SDG Target 9.1.1 measures the "proportion of the rural population who live within 2 km of an all-season road." This indicator, also known as the Rural Access Index (RAI), has become a benchmark for measuring the physical connectivity of rural areas and their inclusion in national development.

Despite improvements in some regions, OIC Member Countries as a group continue to lag behind global averages in rural access. The average RAI in OIC Member Countries is estimated to be 11% lower than the global benchmark, with nearly one-third of the rural population lacking reliable, year-round road access. This access gap severely constrains development outcomes and limits the effectiveness of broader investments in healthcare, education, agriculture and digital infrastructure.

This study, prepared for the Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation (COMCEC) Transport and Communications Working Group, aims to provide a comprehensive assessment of rural accessibility in OIC Member Countries, drawing on a comparative study of practices from both OIC and non-OIC contexts. It identifies challenges, explores effective models, and proposes guiding principles to support inclusive and sustainable rural connectivity. In doing so, it is expected to inform evidence-based policymaking and encourage knowledge-sharing among Member Countries.

## 1.2. Scope of the Study

This study is conducted to support the development of a comprehensive Policy Guide aimed at enhancing and sustaining rural accessibility in the OIC Member Countries. It is designed to address both systemic and operational dimensions of rural transport planning in alignment with the COMCEC Strategy.

The study encompasses a broad and multifaceted scope, integrating several key dimensions essential to understanding and improving rural accessibility in the OIC Member Countries. Firstly, in terms of geographic and thematic coverage, it spans diverse rural geographies, including mountain communities, island settlements, desert regions, and peri-urban areas, while also drawing comparative insights from selected non-OIC countries such as Australia and Canada, thereby providing a global perspective. Secondly, the study adopts a policy and

institutional focus, emphasizing rural transport planning systems, legal and regulatory frameworks, financing mechanisms, decentralization processes, and inter-ministerial coordination, rather than concentrating solely on the delivery of physical infrastructure. Furthermore, it prioritizes practical implementation, aiming to produce actionable outputs in the form of guiding principles, recommended practices, and adaptable planning tools that can inform both national and subnational strategies. In addition, through a cross-sectoral approach, the study explicitly links rural accessibility to broader developmental concerns such as agricultural market access, education, healthcare, climate resilience, and digital inclusion, thereby reinforcing the interconnected nature of rural development. Lastly, the target audience for this Policy Guide includes a wide range of stakeholders, transport policymakers, rural development planners, local governments, donor agencies, researchers, and civil society organizations, ensuring the findings are relevant and applicable across various institutional and disciplinary contexts.

Ultimately, the study aims to provide a technical and policy-oriented resource that enables OIC Member Countries to systematically improve rural connectivity through planning systems that are inclusive, flexible, sustainable, and locally responsive.

## 1.3. Objectives of the Study

The overarching objective of this study is to provide full-fledged guidance to OIC Member Countries on strengthening rural accessibility through improved planning practices, institutional arrangements, and policy tools.

The specific objectives are:

- To provide an overview of the current status in rural accessibility of OIC Member Countries, identifying systemic challenges, institutional gaps, and inequalities in service access across rural territories.
- To explore the effectiveness of planning frameworks, investment approaches, and governance models being used in OIC and comparator countries.
- To document lessons and good practices from selected case studies, highlighting enabling factors, design innovations, and community-centered approaches to rural transport.
- To conduct a dedicated survey with stakeholders from both OIC and non-OIC countries to capture perspectives, experiences, and priority needs related to rural accessibility.
- To formulate guiding principles and policy recommendations supporting inclusive and sustainable rural transport planning, emphasizing adaptability to national and local contexts.
- To produce a user-friendly Policy Guide that can support transport and rural development stakeholders in integrating rural accessibility into policy agendas, budget systems and monitoring frameworks.

This study aims to provide a robust policy framework and practical guidelines for improving rural accessibility in OIC Member Countries. It is also aimed to deliver a comprehensive and impactful Policy Guide that will contribute to sustainable, inclusive, and efficient rural transport systems across the OIC Member Countries through a holistic approach, combining policy analysis, case studies, and stakeholder engagement.

## 1.4. Research Methodology

The study utilizes a mixed-method approach, drawing on both qualitative and quantitative sources to ensure analytical depth, policy relevance, and regional applicability. The methodology includes four key components, which are literature review, field-based and desk-based case studies, survey, and policy recommendations.

The study began with a comprehensive review of relevant academic literature. The analysis focused on key conceptual and empirical frameworks, such as the RAI and functional classifications of rural areas, in order to contextualize the challenges and opportunities associated with rural accessibility. This foundational work provided the theoretical and policy backdrop for subsequent empirical components of the study.

A structured survey was administered to stakeholders from both OIC and non-OIC countries. The survey sought to capture diverse perspectives on rural accessibility priorities, institutional challenges, investment needs, and policy effectiveness. The responses provided valuable evidence to complement the case studies and ensured that the study's recommendations reflect the practical realities faced by policymakers and practitioners.

As part of the empirical research design, in-depth field-based case studies were carried out in two selected OIC Member Countries. These country visits involved direct engagement with a wide range of stakeholders, including officials from transport ministries, representatives of local governments, non-governmental organizations (NGOs), and community leaders. In addition to stakeholder consultations, site visits were conducted to assess the condition, coverage, and functionality of rural transport infrastructure and services. These qualitative insights added depth to the analysis by highlighting context-specific dynamics and practical implementation challenges.

In parallel, desk-based case studies were conducted in one OIC Member Country and two non-OIC countries using official government documents, program evaluations, and secondary literature. These focused on the analysis of policies and projects, with particular attention to examples of good governance, such as institutional coordination and decentralization; financing mechanisms, including cost-sharing formulas and fiscal transfers; and digital tools used for planning and monitoring rural accessibility. The case study countries were selected for their relevance in terms of geographic diversity and policy innovation. These case studies provided a comparative lens through which rural accessibility frameworks could be examined. The inclusion of non-OIC examples was instrumental in identifying transferable practices and lessons that could inform the design of rural accessibility policies in the OIC context.

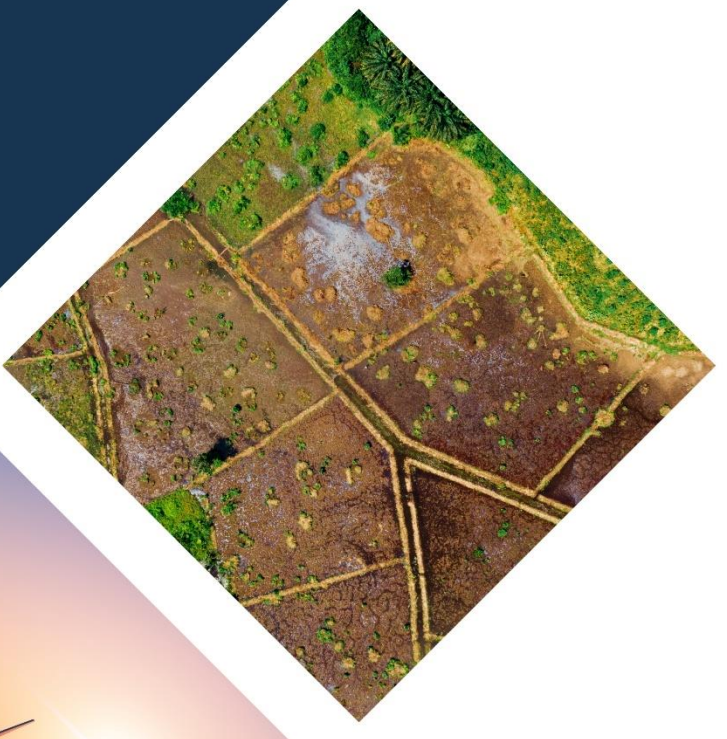
The final phase of the study involved the synthesis of all collected data within a unified analytical framework, structured around institutional, spatial, financial, and service delivery dimensions of rural accessibility. First, findings from the literature review, case studies, and survey were synthesized into a structured set of Guiding Principles and Recommended Practices. These emphasize integration into national development plans, institutional capacity building, participatory approaches, financial sustainability, cross-sectoral coordination, and data-driven monitoring. Each principle was tested against case study evidence to ensure practical applicability. Then the guiding principles were translated into policy recommendations tailored to the OIC context. These recommendations are designed to be adaptable to varying national capacities and priorities, ensuring that they can be realistically applied while promoting inclusive and sustainable outcomes.

This multi-tiered methodology ensures that the study is evidence-based, inclusive of diverse contexts, and aligned with both good practices and the specific needs of OIC Member Countries.

## 1.5. Structure of the Study

This study is structured across five chapters. Chapter 1 introduces the importance of rural accessibility for sustainable development in OIC Member Countries, outlining the study's objectives, scope, methodology, and alignment with the COMCEC Strategy. Chapter 2 presents the conceptual framework, defining rurality, examining key accessibility challenges, and identifying core indicators such as the RAI and access to services. Chapter 3 provides case studies from selected OIC and non-OIC countries highlighting good practices and policy frameworks. Chapter 4 details the survey methodology, questionnaire design, data analysis, and key findings. Finally, Chapter 5 concludes with lessons learned and policy recommendations tailored to improve rural accessibility across OIC Member Countries.

# CHAPTER 2: CONCEPTUAL FRAMEWORK



Understanding and addressing rural accessibility requires not only a solid conceptual foundation but also a broader perspective that highlights its importance for inclusive development. Therefore, this study aims not merely to identify existing conditions but to raise awareness of the issue's importance, showcase good practices, guide countries in their policy design, and contribute to overcoming limitations they may encounter. This chapter lays the groundwork for the study by establishing a comprehensive conceptual framework that defines rural accessibility not merely as physical connectivity but as a multidimensional issue encompassing social inclusion, economic opportunity, and environmental sustainability. The framework aims to capture the complex and interrelated factors influencing how rural populations interact with transportation systems and access to essential services.

By establishing both a conceptual lens and a contextual background, this chapter sets the stage for analyzing current conditions, identifying gaps, and designing informed, sustainable interventions that can enhance and sustain rural accessibility in the OIC Member Countries.

## 2.1. Defining "Rural": Concepts and Classifications

Effectively addressing rural accessibility requires a shared understanding of what constitutes "rural." Definitions of rurality vary considerably across countries, regions, and institutions, impacting data collection, policy formulation, and the targeting of infrastructure investments. In OIC Member Countries, where spatial and demographic diversity is substantial, a nuanced and context-sensitive definition of rural areas is essential for designing effective accessibility interventions.

OECD defines rural areas as those with a population density below 150 inhabitants per square kilometer, and classifies regions into three categories: Predominantly Rural, Intermediate, and Predominantly Urban Regions OECD (2016). This classification has evolved over time into a more nuanced approach. The OECD's "Rural Policy 3.0" framework (OECD, 2018) applies this thinking by categorizing rural regions into: Rural inside functional urban areas, rural close to cities, and remote rural areas. This approach links rurality to functional proximity, not just physical remoteness, offering a more flexible basis for policy design. In (OECD, 2020a, 2024b), rural areas are further categorized based on their proximity to Functional Urban Areas (FUAs), resulting in three distinct types: (1) Rural areas within FUAs – located close to urban centers; (2) Rural areas outside FUAs – situated outside but still near a functional urban area; and (3) Remote rural areas – those located far from any FUA. This evolution reflects a shift from a purely demographic definition to one that also considers spatial relationships and accessibility.

The OECD's Rural Well-being framework (OECD, 2020a) builds on and refines earlier rural development models by moving beyond a simple urban–rural divide. In addition to redefining rural typologies, the framework adopts a multi-dimensional and place-based approach to rural development. It expands the focus from purely economic metrics to also including social and environmental well-being, aiming for a holistic, people-centred strategy. The framework emphasizes coordinated policymaking tailored to local contexts, recognizing the roles of governments, the private sector, and civil society in achieving sustainable rural development.

Eurostat defines rural areas based on both population size and density. According to the 2018 framework, areas located outside urban clusters or centers, typically characterized by a population density of less than 300 inhabitants per $km^2$ and/or a total population below 5,000, are defined as rural grid cells (EUROSTAT, 2018).

While such criteria are widely used in statistical reporting and international comparisons, more recent reports have adopted a broader perspective that incorporates economic conditions, geographic characteristics, and the needs of such as women, young, children or disabled people.

Recognizing the limitations of binary classifications, researchers and policymakers have increasingly turned to functional definitions of rural areas that consider access to services, economic activity, and spatial relationships with urban centers.

As early as 1966, Raymond Edward Pahl introduced the concept of the urban–rural continuum, emphasizing that rural and urban areas are not discrete but exist along a spectrum. This view considers: [1] Economic base (e.g., agriculture vs. industry/services), [2] Commuting patterns, [3] Access to services and infrastructure.

Furthermore, scholars such as Vitale Brovarone and Cotella (2020) advocate for multidimensional and place-based definitions of rurality. They stress the need to talk about various types of rurals rather than a single concept of "rural" by recognizing distinctions such as near-urban hinterlands, agricultural heartlands, mountainous or remote peripheries, coastal fishing settlements. Such typologies acknowledge that each type of rural area presents distinct challenges and opportunities, requiring differentiated policy responses.

The way “rural” is defined has direct consequences for how rural accessibility is measured, funded, and addressed. Population and service-based definitions can underestimate rural accessibility challenges in areas with low density but relatively good infrastructure (or overestimate them in dense but underserved peri-urban areas). Functional definitions are more responsive to spatial and service realities. For monitoring progress under SDG 9.1.1, which relies on the RAI, clarity and consistency in rural classification are critical. If definitions shift over time (where administrative reforms reclassify many rural areas as urban), comparisons and trend analysis may be distorted.

In the context of OIC Member Countries, which exhibit diverse rural characteristics shaped by geography, , or development levels, it is crucial to consider context-sensitive classifications. Rather than prescribing a singular definition, this study reviews the evolution of rurality concepts and current global approaches, such as the OECD’s functional typology, and discusses their relevance for OIC contexts. This enables the formulation of a classification approach that is both analytically sound and operationally practical for rural development analysis.

## 2.2. Accessibility Challenges in Rural Regions

Rural areas face a variety of challenges hindering the establishment of efficient and inclusive transportation systems. These challenges can be broadly categorized into Operational, Specific, and General (Contextual) types. Operational Challenges refer to fundamental limitations in the physical and digital infrastructure of rural areas, including low population density (Nutley, 2003; OECD, 2010), high dependence on private vehicles (Gray et al., 2008), underdeveloped alternative transport modes, inadequate road networks, and limited broadband access (Velaga, Beecroft, et al., 2012), all of which reduce the feasibility of efficient public transport systems. On the other side, Specific Challenges are associated with the mismatch between transportation services and the actual needs of rural residents (Farrington & Farrington, 2005), such as scheduling, accessibility, and flexibility, while also encompassing issues like the negative perception of public transport, fragmented governance structures, limited administrative capacity, and seasonal fluctuations in demand. On a broader level, General Challenges involve systemic and structural factors, including demographic decline (Copus & de Lima, 2014;

McEldowney, 2021), rigid and urban-focused policy frameworks, economic constraints, and both cultural and digital illiteracy, which collectively shape the long-term viability and equity of rural transportation solutions.

One of the primary operational barriers is low population density, which results in scattered settlements that make fixed-route public transportation inefficient and costly to maintain. In addition, rural regions tend to be highly dependent on personal vehicles, creating inequities for people who may not have access to cars. Moreover, viable alternatives such as DRT, ridesharing, or community-based transportation services are either absent or significantly underutilized. Limited transport infrastructure, manifested in poor road conditions, a lack of multimodal hubs, and inadequate intermodal facilities, further hampers mobility. The digital divide, stemming from limited broadband access, restricts the use of e-services and smart mobility solutions, which are increasingly essential for modern transportation systems. These operational barriers are summarized in Table 2.1.

**Table 2.1. Operational challenges**

| Challenge | Description |
|---|---|
| Low population density | Scattered settlements make fixed-route public transport inefficient. |
| High car dependency | Many areas rely almost entirely on personal vehicles; disadvantaged groups suffer most. |
| Lack of viable transport alternatives | A few options, ridesharing, or community transport, exist or are underutilized. |
| Limited transport infrastructure | Poor road quality, lack of multimodal hubs, or intermodal facilities. |
| Digital divide | Weak broadband access restricts e-services and smart mobility solutions. |

There is often a misalignment between available transport services and the actual needs of rural residents, including scheduling, destinations, and flexibility. Public transport is frequently perceived as unreliable, of low quality, or even socially stigmatized, reducing its appeal. Governance fragmentation creates confusion and inefficiencies, as responsibilities may be poorly coordinated among local, regional, and national authorities. Local authorities in rural areas also tend to lack the technical expertise, financial resources, or staffing necessary for effective transport planning. Seasonal changes in transport demand, due to fluctuations related to tourism or agricultural cycles, further complicated year-round service provision. These challenges are multifaceted and interrelated, affecting the effectiveness and sustainability of rural transport systems. A summary of these specific issues is provided in Table 2.2.

**Table 2.2. Specific challenges**

| Challenge | Description |
|---|---|
| Mismatch between services and user needs | Transport does not align with rural residents' actual schedules, destinations, or flexibility needs. |
| Negative perception of public transport | Often viewed as low quality, unreliable, or socially stigmatized. |
| Fragmentation of governance roles | Confusion or lack of coordination between local, regional, and national actors. |
| Limited local capacity | Small rural governments often lack technical knowledge, funding, or staff to plan effectively. |
| Seasonality | Transport needs fluctuate with tourism and agriculture cycles, making year-round service planning harder. |

Broader demographic and socioeconomic trends present significant obstacles to sustainable rural transport. Demographic decline, particularly depopulation and aging populations, diminishes demand and challenges service viability. Rigid policy frameworks at the national level may prevent the development of flexible or innovative solutions suited to rural contexts. National investment strategies often exhibit urban bias, concentrating resources in cities while neglecting rural areas. Additionally, cultural and digital illiteracy can result in resistance to tech-based solutions or difficulty in utilizing digital tools. Finally, economic limitations, such as budget constraints at both local and national levels, hinder infrastructure upgrades and the introduction of new services. These broader contextual barriers are summarized in Table 2.3.

**Table 2.3. General challenges**

| Challenge | Description |
|---|---|
| Demographic decline | Depopulation and aging reduce demand and strain viability. |
| Rigid policy frameworks | National laws or regulations may block flexible or innovative transport solutions. |
| Urban bias in policy priorities | National investment tends to focus on cities, overlooking rural needs. |
| Digital illiteracy | Resistance to tech-based solutions or unfamiliarity with digital tools. |
| Economic limitations | Budget constraints at the local and national levels restrict infrastructure upgrades or new services. |

Addressing these multifaceted challenges requires a nuanced and context-sensitive approach that recognizes the diverse realities of rural territories, facilitates stakeholder coordination, and prioritizes equitable access to mobility for all citizens.

## 2.3. Key Indicators of Rural Accessibility and Development

Effective policymaking for rural accessibility relies heavily on the use of clear and measurable indicators, which play a critical role in assessing baseline conditions, tracking progress over time, and enabling evidence-based comparisons across regions and countries. This chapter outlines the key indicators used globally to evaluate rural accessibility and its developmental implications.

### 2.3.1. Rural Population

The proportion of the rural population in a country has significant implications for infrastructure planning, service delivery, and inclusive development. In the context of OIC Member Countries, the rural-urban demographic balance provide both a challenge and an opportunity: while urbanization is accelerating across much of the Islamic world, a substantial share of the population remains in rural areas, often lacking the services of transport, energy, health, and digital infrastructure.

According to recent data, the total population of OIC Member Countries stands at approximately 2.06 billion, with around 981 million people, nearly half of the total, residing in rural areas. This sizeable rural population underscores the urgent need for targeted investments and policies to ensure equitable access to essential services and infrastructure, making rural development a critical priority for OIC Member Countries.

(World Bank, 2024a) data visualized in Figure 2.1 shows that many OIC Member Countries maintain a predominantly rural demographic. The OIC Member Countries such as Niger, Uganda, Guyana, Comoros, Sudan and Pakistan have rural populations exceeding 60%. For example, in Niger, agriculture accounts for approximately 47.8% of Gross Domestic Product (GDP) and employs around 80% of the labor force (World Bank, 2025). In Uganda, agriculture employed 66.3% of the population as of 2022 (Global Economy, 2022). Similarly, in Pakistan, agriculture contributes around 23% to Gross Domestic Product (GDP) and employs 37.4% of the labor force (FAO, 2025). In these contexts, rural communities form the backbone of national economies, especially in agriculture-based sectors. However, these rural areas often suffer from limited access to paved roads, electricity, healthcare, and education, conditions that perpetuate poverty and constrain mobility.

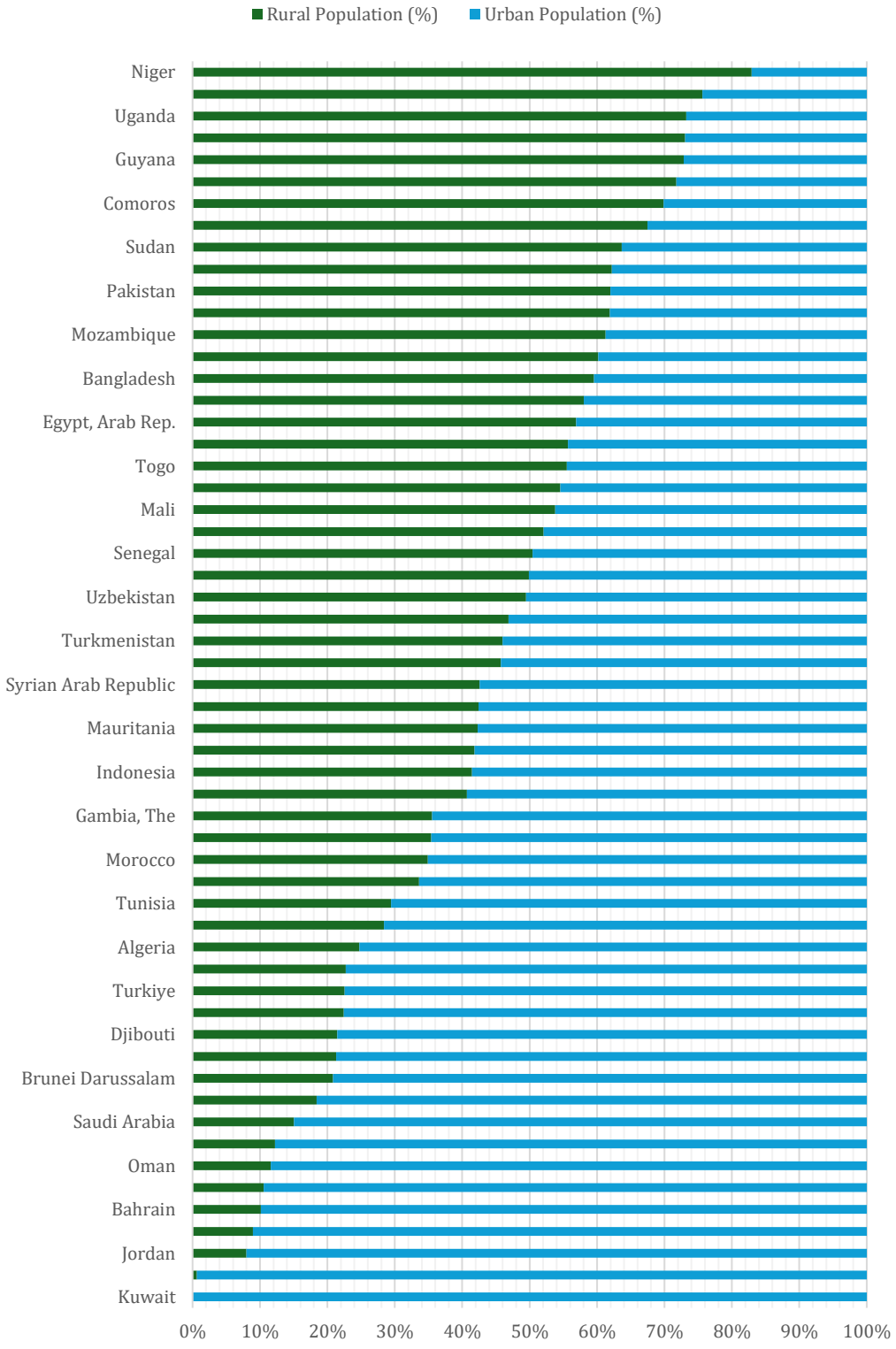



**Figure 2.1. Rural vs. urban population of OIC member countries (%)**

At the same time, many OIC Member Countries, particularly those in the Gulf region such as Kuwait, Jordan, Bahrain, Oman, and Saudi Arabia, are highly urbanized, with rural populations comprising less than 20% of the total. While this demographic structure may ease certain aspects of rural service provision, it can also lead to relatively limited consideration of rural-specific needs in broader development planning.

The diversity in rural population shares across the OIC indicates the need for differentiated infrastructure strategies. In countries with high rural populations, there is a pressing need to significantly scale up investment in all-season roads, rural electrification, and access to healthcare services. These investments are not only necessary to improve living conditions, but are also essential for unlocking economic potential, reducing migration pressures, and closing urban-rural disparities.

### 2.3.2. Road Network

To understand the scope and variability of rural accessibility across OIC and comparable countries, it is crucial to examine the socio-economic context and the state of road infrastructure and analyze how these factors affect rural accessibility outcomes. This involves a detailed interpretation of key indicators, such as road density, road quality, and network connectivity, alongside socio-economic variables like income distribution, population density, and service provision. Evaluating these dimensions together provides a more comprehensive understanding of the structural challenges and disparities in rural access and highlights the critical role in infrastructure shaping development trajectories in rural regions. Table 2.4 (COMCEC, 2024) provides a comparative overview of selected indicators, such as population size, GDP per capita, and the extent and quality of road networks. These indicators are essential for assessing each country's capacity to deliver rural mobility solutions and to identify structural disparities that may influence policy priorities and investment needs.

**Table 2.4. Socio-economic and road network indicators**

| Indicator | Min | Max | Average |
|---|---|---|---|
| Population (m) | 0.449<br>Brunei Darussalam | 275<br>Indonesia | 35 |
| GDP per capita (USD- United States Dollars) | 352.60<br>Afghanistan | 87,480.42<br>Qatar | 8,712.64 |
| Total Roads (km) | 93.00<br>Maldives | 496,607.00<br>Indonesia | 65,316.89 |
| Motorway or Highway Network (km) | 25.00<br>Albania | 34,996.00<br>Pakistan | 4,029.69 |
| Main or National Road Network (km) | 848.00<br>Gambia, The | 47,017.00<br>Indonesia | 15,056.00 |
| Secondary or Regional Road Network (km) | 359.00<br>Gambia, The | 259,892.00<br>Malaysia | 29,762.09 |
| Other Roads - Combined (Urban and Rural) (km) | 2,809.00<br>Lebanon | 445,165.00<br>Indonesia | 82,022.00 |
| Paved roads (%) | 6%<br>Gabon | 100%<br>Jordan | 48% |
| Paved roads (km) | 93.00<br>Maldives | 283,102.00<br>Indonesia | 34,250.33 |
| Unpaved roads (km) | 207.00<br>Comoros | 258,794.00<br>Bangladesh | 39,244.53 |
| Length of roads by GDP per/c (km/USD) | 0.01<br>Maldives | 184.12<br>Pakistan | 31.05 |
| Density of roads (km/km$^2$) | 0.01<br>Mauritania | 5.22<br>Bahrain | 0.35 |

As illustrated in Table 2.4, there is substantial variation in both socio-economic status and transportation infrastructure across countries. Population sizes range from under half a million in Brunei Darussalam to over 275 million in Indonesia, while GDP per capita shows an even wider disparity, from as low as USD 353 in Afghanistan to over USD 87,000 in Qatar. Road network data also reflect deep inequalities; Indonesia has the most extensive road systems in nearly every category, whereas countries like the Maldives, The Gambia, and Comoros report minimal infrastructure. Indonesia, with its vast land area, large population, and archipelagic structure, has a high demand for road infrastructure and the economic capacity to invest accordingly. In contrast, countries such as the Maldives, The Gambia, and Comoros, being small island nations or low-income countries, face challenges in developing road infrastructure due to limited land and budget constraints. Moreover, the proportion of paved roads, a critical indicator of infrastructure quality, ranges from just 6% in Gabon to full coverage in Jordan. Furthermore, road network density and the length of roads relative to GDP per capita highlight significant infrastructural and economic imbalances, especially between urbanized and rural-dominated countries. These disparities underscore the importance of tailoring rural accessibility strategies to each country's unique development level and geographic characteristics.

Figure 2.2 (CIA, 2024; COMCEC, 2024; IRF, 2024) presents the density of road networks across selected OIC Member Countries and several comparison benchmarks. Road network density, measured as the total length of roads per square kilometer of land area, is a crucial indicator for assessing the accessibility, connectivity, and development level of transport infrastructure within a country. Higher values typically reflect more extensive transport systems relative to the country's size, facilitating better mobility and economic integration.

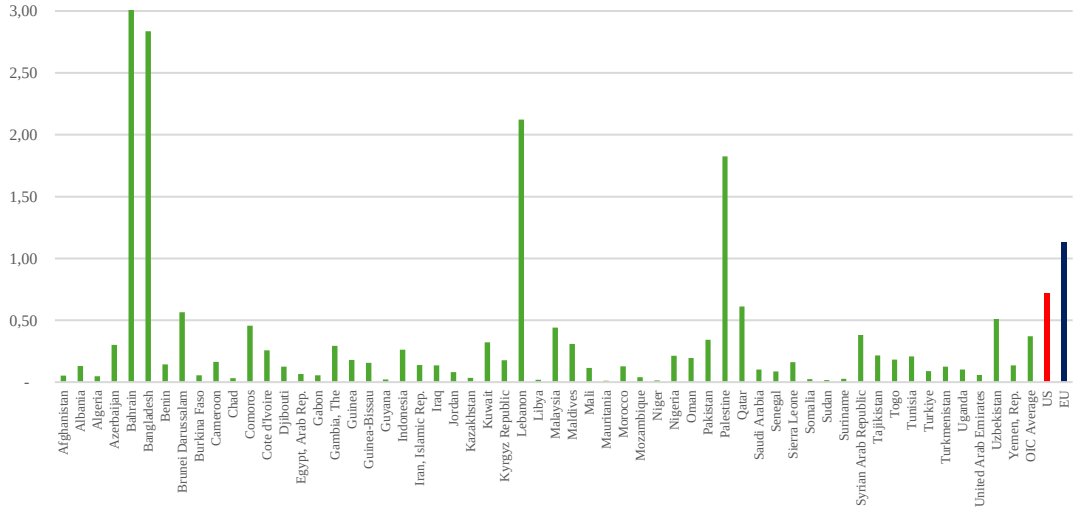



**Figure 2.2. Length of road network (km) / km² area of country**

As depicted in the figure, Bahrain and Bangladesh exhibit the highest road network densities among OIC Member Countries, with over 2.5 km of roads per km² of land area. Lebanon and Pakistan also show relatively high densities, while many countries, especially in Sub-Saharan Africa, have values well below 0.5 km/km². The OIC average remains lower than that of the European Union (EU) and the United States of America (USA), highlighting a disparity in road infrastructure development. These differences can be attributed to factors such as urbanization levels, geographic constraints, and economic investment in transport infrastructure.

Figure 2.3 (CIA, 2024; COMCEC, 2024; IRF, 2024) illustrates the road network availability with population size, specifically measuring the total kilometers of roads available per 1,000 inhabitants in each country. This metric is essential for understanding how well a country's road infrastructure can serve its population. Higher values typically indicate better road access and potentially less congestion, while lower values may reflect inadequate infrastructure relative to population needs.

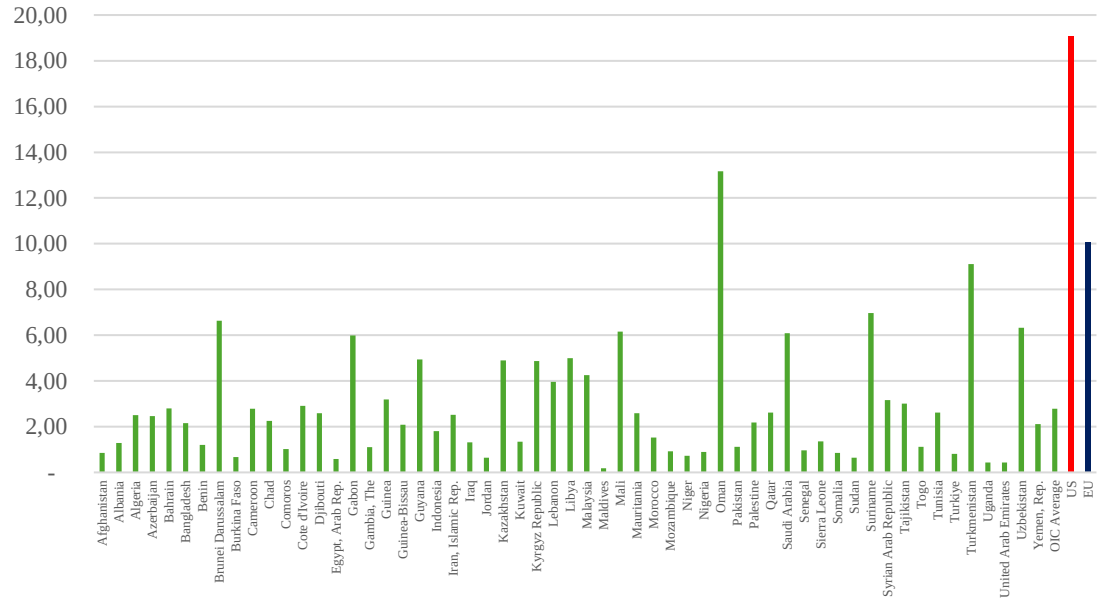



**Figure 2.3. Length of road network (km) / 1,000 population**

The data reveals notable variation among OIC Member Countries. For instance, Pakistan and Turkmenistan show particularly high road network lengths per 1,000 people, exceeding many of their peers. Several African OIC Member Countries, such as Burkina Faso and The Gambia, also report relatively high values. In contrast, more populous nations like Nigeria, Indonesia, and Egypt exhibit lower road lengths per capita. The USA significantly outpaces all others in this metric, while the OIC average remains below that of both the EU and USA benchmarks. This indicates room for improvement in aligning road infrastructure with population growth in many OIC Member Countries.

### 2.3.3. Rural Access Index (RAI)

RAI is one of the most widely recognized indicators of rural connectivity. It measures the percentage of the rural population living within 2 kilometers of an all-season road and is officially adopted as SDG Indicator 9.1.1.

First introduced by the World Bank in 2006 (World Bank et al., 2006), the RAI provides a standardized, outcome-focused measure that reflects not just the presence of roads but their accessibility and utility for rural communities. Notably, RAI also allows disaggregated analysis: countries can identify which provinces or districts have the lowest access, facilitating targeted interventions. Regularly updating RAI data and using it to guide rural infrastructure spending ensures resources are directed to areas with the greatest unmet need.

RAI offers a vital lens through which to evaluate inclusive development. For OIC Member Countries, the implications of this indicator are profound. Reliable rural road access is not merely a matter of infrastructure, it directly influences economic opportunity, access to healthcare and education, social inclusion, and resilience to environmental and economic shocks.

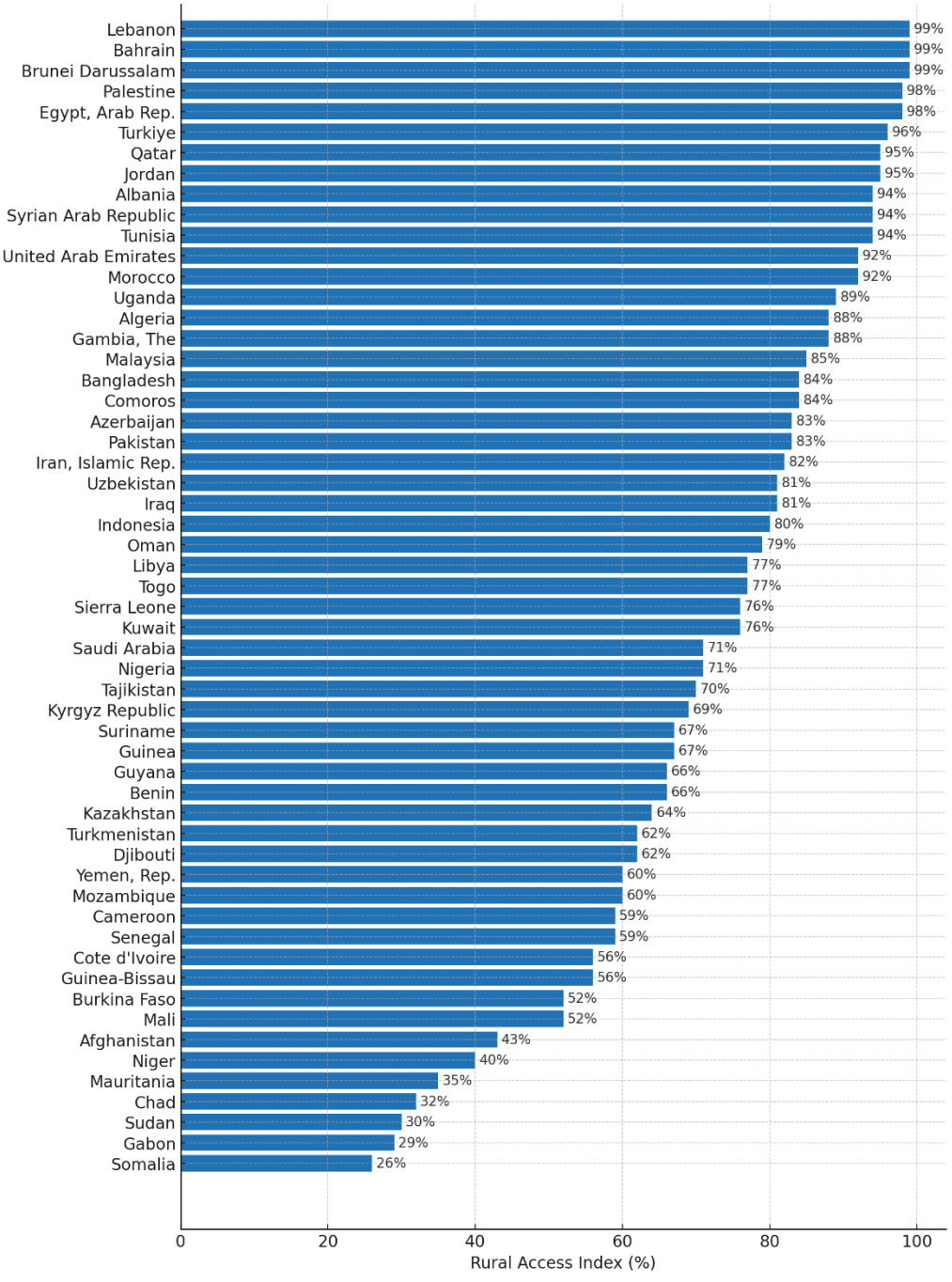



**Figure 2.4. RAI for OIC member countries (2023)**

As seen in Figure 2.4, RAI data reveals significant variation across OIC Member Countries. A select group of Member Countries, such as Lebanon, Bahrain, and Brunei Darussalam, have achieved near-universal rural accessibility, each with an RAI score of 99%. Other countries like Egypt, and Türkiye also perform strongly, scoring between 98% and 96%, respectively. These high figures suggest substantial investments in rural road networks, which enable these countries to ensure that almost all rural residents are within reach of essential services and markets.

However, this positive picture does not represent all OIC Member Countries. Many Member Countries are far below this standard. While some, including Algeria, Iran, and Pakistan, have made progress with RAI scores ranging from 80 to 88 percent. The situation is even more acute in several countries within the OIC. Somalia, for instance, has an RAI score of just 26 percent, the lowest among member states. Other countries such as Chad, Sudan, Gabon, and Afghanistan also report RAI scores below 45%, reflecting widespread isolation in rural areas. These low scores reflect long-standing issues such as underinvestment, geographic and logistical barriers, governance limitations, and in some cases, the direct consequences of instability.

The data reveal a concerning disparity in rural accessibility: the average RAI score for OIC Member Countries stands at approximately 72%, which is 11% points below the global average of 83% (NASA, 2023). In practical terms, this suggests that nearly one-third of the rural population across OIC Member Countries lacks reliable, year-round access to all-season roads. These infrastructural deficiencies severely constrain economic productivity, limit access to public services, and perpetuate cycles of poverty and isolation in rural communities.

In OIC Member Countries, where a significant portion of the population still resides in rural areas and depend on agriculture for their livelihood, limited road access restricts market participation, drives up transportation costs, and weakens the entire rural economy. At the same time, the inability to reach health, education or administrative services exacerbates social and health inequalities. For women and children, who are often most affected by rural isolation, poor accessibility can translate into lower school attendance, higher maternal mortality, and restricted economic mobility.

The RAI presents not only a snapshot of where countries stand, but also provides insights for further development for. For OIC Member Countries, closing the 11-point gap with the global average means making real and sustained efforts to improve rural connectivity and inclusion.

### 2.3.4. Access to Electricity

While rural transport infrastructure is a core component of accessibility, electricity access remains a critical enabling factor that underpins the functionality and reach of mobility systems. In the absence of reliable electricity, even well-built transport networks struggle to deliver their full potential, particularly in rural areas where infrastructure gaps tend to be most severe.

According to The World Bank (2024), rural electricity access in OIC Member Countries averages 72.9%, significantly lower than the global average of 84.8%. This 12-percentage-point gap reflects a substantial shortfall in energy provision to rural communities and presents a major barrier to inclusive development. Without consistent access to electricity, rural health clinics cannot refrigerate vaccines or operate diagnostic equipment, schools are unable to utilize educational technology, and businesses face constraints on productivity and growth (Mejdalani et al., 2019; WHO, 2023). These deficiencies directly affect how rural populations access services and participate in economic life, reinforcing cycles of isolation and underdevelopment. As seen

in Figure 2.5, the challenge extends beyond rural areas. Overall, electricity access in OIC Member Countries stands at 81.1%, lagging behind the global average of 91.6%.

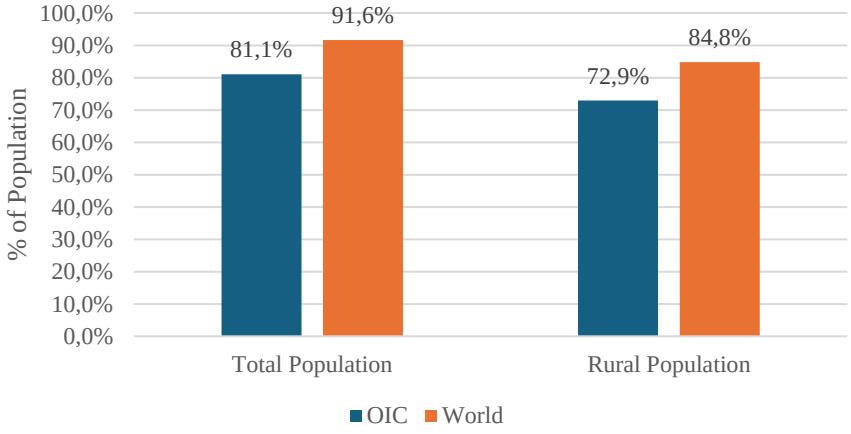



**Figure 2.5. Access to electricity (2023)**

Electricity is also becoming increasingly relevant to the future of transport itself. As electric mobility begins to emerge in various forms, from Electric Vehicles (EV) and motorcycles to renewable-powered public transport, energy access becomes a prerequisite for innovation. Without electricity, rural areas remain excluded not only from digital services but also from the next generation of transport technologies.

For OIC Member Countries, improving rural electrification is, therefore, not a separate development goal, but a necessary condition for realizing meaningful rural accessibility. Closing the rural electrification gap will require targeted policies, cross-sector coordination, and a commitment to equity ensuring rural populations are not left behind in the infrastructure transition.

### 2.3.5. Healthcare Accessibility

The availability and accessibility of healthcare services is a critical determinant of well-being in rural areas, and transport plays a decisive role in determining whether individuals can reach care in a timely and safe manner, an issue of particular importance for many OIC Member Countries, where rural populations often face significant geographic and infrastructural barriers.

World datasets, including the global travel-time to healthcare map developed by the Malaria Atlas Project (MAP) (MAP, 2025), reveal that large segments of the rural population in several OIC Member Countries, especially in Sub-Saharan Africa, Central Asia, and conflict-affected regions, live far away from the nearest healthcare facility. This travel burden is not merely inconvenient; it can be life-threatening in emergencies, especially for maternal and child health, infectious diseases, or injury-related conditions.

This challenge is compounded by the absence of integrated infrastructure planning. Health service catchment areas are rarely aligned with transport investment strategies, meaning that facilities may exist, but remain out of functional reach for much of the rural population. For many

OIC Member Countries seeking to improve basic health indicators and reduce avoidable mortality, this disconnect between transport and health access remains a structural obstacle. As illustrated in Figure 2.6, the global distribution of optimal travel time to healthcare facilities, assuming access to motorized transport, highlights significant disparities in physical access (Weiss et al., 2020).

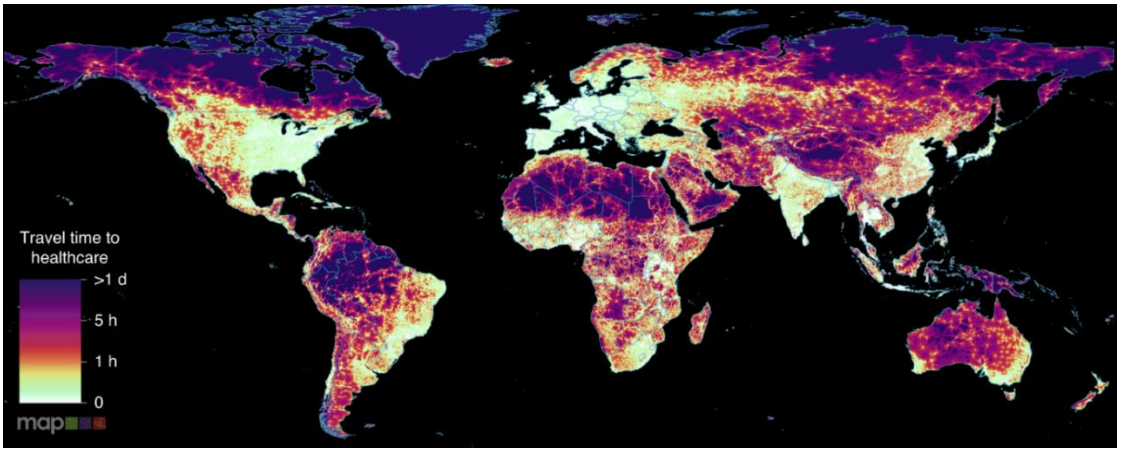
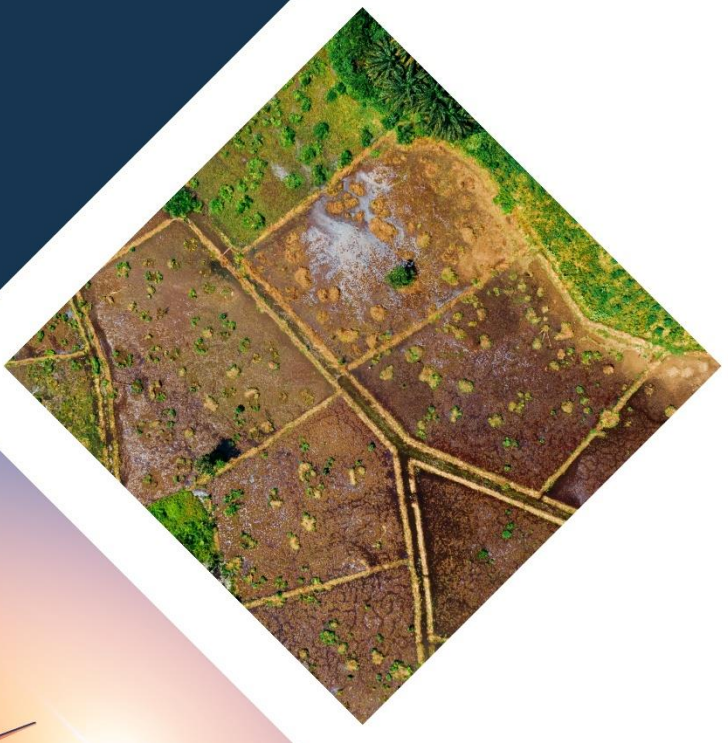



**Figure 2.6. Global map – optimal travel time to healthcare (motorized access)**

# CHAPTER 3: CASE STUDY COUNTRIES



This chapter presents a comparative analysis of case studies from selected OIC Member Countries and non-OIC countries to identify diverse approaches, good practices, and contextual factors influencing the outcomes of rural accessibility across varying geographic, institutional, and socio-economic contexts.

The following table provides an overview of selected case countries, detailing their total population, rural population, and rural access levels. These indicators help assess the extent to which rural areas are integrated into the broader national economy and infrastructure network. RAI quantifies the percentage of the rural population residing within 2 kilometers of an all-weather road. Recognized as indicator 9.1.1 in the SDGs, it serves as a key measure of progress toward Goal 9, specifically Target 9.1, which focuses on developing reliable and sustainable infrastructure.

**Table 3.1. Overview of case study countries**

| Country | Group | Desk-based/ Field Visit | Total Population | Rural Population | Rural Population Rate (%) | RAI Score |
|---|---|---|---|---|---|---|
| **Morocco** | OIC Arab | Field visit | 37,712,505 | 13,153,745 | 35% | 91.92 |
| **Indonesia** | OIC Asia | Field visit | 281,190,067 | 116,491,421 | 41% | 80.33 |
| **Türkiye** | OIC Asia | Desk-based | 85,325,965 | 19,229,913 | 23% | 95.79 |
| **Australia** | Non-OIC | Desk-based | 26,658,948 | 3,567,767 | 13% | 95.35 |
| **Canada** | Non-OIC | Desk-based | 40,097,761 | 7,272,932 | 18% | 93.40 |

## Field Visit Countries

Field visits were undertaken to provide an in-depth understanding of the contextual realities of rural accessibility in selected OIC Member Countries. This approach allowed the research team to go beyond desk-based analysis by capturing first-hand observations, stakeholder perspectives, and localized data. Fieldwork included direct engagement with government officials, local authorities, community representatives, and relevant partners.

The countries selected for field visits, the Kingdom of Morocco (OIC Arab) and the Republic of Indonesia (OIC Asia), represent diverse socio-economic, geographical, and institutional contexts. Morocco illustrates the rural accessibility challenges of North African and Arab OIC member countries, characterized by semi-arid climatic conditions, mountainous terrain, and strong national development programs. Indonesia, on the other hand, presents the distinct features of a large archipelagic OIC Asia, where rural accessibility is not only constrained by land-based infrastructure but also by inter-island connectivity, requiring multimodal and innovative transport solutions.

The case studies drawn from these countries provide valuable comparative insights, highlighting both context-specific constraints and transferable practices that can inform broader policy recommendations for the OIC Member Countries.

### Desk-Based Countries

In addition to the field visits, desk-based country analyses were conducted to broaden the comparative scope of the study and to capture lessons from both OIC and non-OIC contexts. The desk-based review primarily relied on secondary sources, including government reports, academic literature, international development agency documents, and statistical databases.

Three countries were included in the desk-based sample: Türkiye (OIC Asia), Australia (Non-OIC), and Canada (Non-OIC). Türkiye provides an important OIC example of a country that has undergone significant transport infrastructure expansion and rural accessibility improvements in recent decades, particularly through road upgrading and regional development programs. Australia and Canada, while not OIC members, were included as advanced economies with vast rural and remote territories. Both countries offer globally recognized practices in ensuring sustainable accessibility in sparsely populated areas, including the use of integrated rural transport policies, innovative financing mechanisms, and the application of digital technologies for service delivery.

The desk-based case studies serve as complementary references to the field visit findings. They enable the report to draw comparative insights across different income levels, governance systems, and geographic conditions, thereby enriching the recommendations for enhancing and sustaining rural accessibility in OIC member countries.

## 3.1. Kingdom of Morocco

The Kingdom of Morocco, located in North Africa and strategically positioned between the Atlantic Ocean and the Mediterranean Sea, represents one of the most dynamic economies in the OIC Arab Group. With a population of nearly 37.7 million, of which 35% reside in rural areas, the country faces significant challenges stemming from mountainous terrain, dispersed settlements, and socio-economic disparities (World Bank, 2023c). Nevertheless, Morocco has made notable progress in improving rural transport infrastructure and accessibility, as reflected in its RAI score of 91.92 (NASA, 2023), supported by targeted national programs and reforms.

From a socio-economic perspective, Morocco has demonstrated consistent growth. Morocco's Compound Annual Growth Rates (CAGR) over the last 10, 5 and 3 years were 2.7%, 4.2% and 3.2% respectively (World Economics, 2025). Agriculture continues to play a central role in the economy, employing a substantial share of the rural population and contributing to both food security and export revenues. The rural population, however, still (World Bank, 2023c), faces challenges such as regional disparities, limited access to markets.

In terms of governance, Morocco has introduced gradual decentralization reforms aimed at strengthening local governance structures. The 2011 Constitution marked an important step in this process by providing greater autonomy to regional and municipal authorities. This shift has had direct implications for rural development and accessibility, enabling subnational entities to play a more active role in planning and implementing infrastructure and service delivery initiatives.

Infrastructure-wise, Morocco has invested heavily in transportation and connectivity over the last two decades. The expansion of highways, the modernization of ports, and the development of Africa's first high-speed rail (Al Boraq) highlight the government's ambition to position the country as a regional logistics hub. Nonetheless, while urban areas, particularly Casablanca, Rabat, and Tangier, benefit from modern infrastructure, rural regions still face limited accessibility due to topographical constraints, underdeveloped secondary road networks, and insufficient integration with national transportation planning.

For rural accessibility, Morocco has implemented targeted programs such as the National Initiative for Human Development (INDH) (INDH, 2006), the *Programme National de Routes Rurales* (PNRR) (PNNR2, 2005; PNRR, 2012), and the *Program for the Reduction of Territorial and Social Disparities in the Rural World* (PRDTS) (El-Badmoussi, 2021), which aim to reduce geographic disparities by enhancing basic services and improving rural mobility. Despite these efforts, issues such as uneven service quality, limited public transport availability, and the sustainability of rural infrastructure remain critical.

### 3.1.1. Overview of Morocco

Since the early 2000s, Morocco has implemented a series of structural reforms to modernize and liberalize its transport and logistics sector, recognizing its strategic importance for economic growth and social development. Key reforms include the liberalization of road freight transport (2003), air transport (2004), and maritime freight transport (2006), along with port reform and the signing of the Open Sky Agreement with the EU in 2006. These were followed by the launch of the National Strategy for the Development of Logistics Competitiveness (2010), the establishment of the Moroccan Agency for the Development of Logistics (2011), the adoption of new governance frameworks through the Organic Laws on Municipalities and Regions (2015),

the introduction of a new Civil Aviation Code (2016), and the creation of the National Road Safety Agency (2020) (see Figure 3.1).

In parallel, Morocco has pursued infrastructure development strategies, including the Rail Plan 2040, motorway and expressway modernization programs, the Rural Roads Program, and the Port Strategy 2030. These initiatives were complemented by the Logistics Competitiveness Development Strategy 2030, positioning Morocco as a regional hub for trade and connectivity. Over the last two decades, the country has invested approximately Moroccan Dirham (MAD) 400 billion in the sector, resulting in one of the most advanced transport and logistics infrastructure networks in Africa.

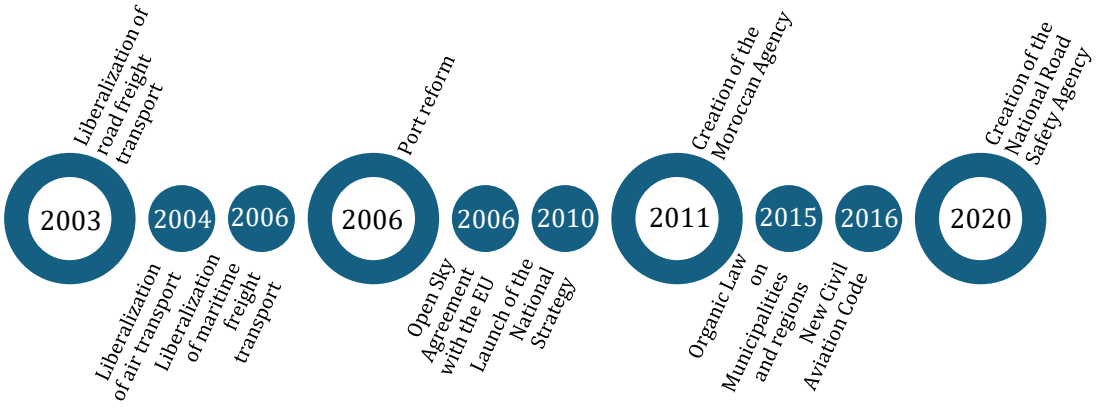



**Figure 3.1: Morocco's government reforms timeline**

Over the past two decades, Morocco has allocated significant financial resources to the development of its transport and logistics sector. Approximately 400 billion dirhams have been invested under various national strategies and programs, resulting in one of the most advanced infrastructure networks on the African continent.

The road network has expanded to around 58,000 km, including 1,800 km of highways and 1,670 km of expressways, significantly improving national and regional connectivity. The railway system now covers 2,300 km, with 200 km of high-speed lines, positioning Morocco as a pioneer in high-speed rail in Africa. Maritime infrastructure includes 43 ports, of which 13 are dedicated to foreign trade, providing strong linkages with international markets. Air transport capacity has also been strengthened, with 26 airports, including 19 international airports serving more than 150 destinations worldwide (National Report, 2020).

These investments reflect Morocco's long-term vision of positioning transport and logistics as key enablers of economic growth, regional integration, and social inclusion. Importantly, rural accessibility programs such as the PNRR have ensured that a share of these investments directly

support improved connectivity for rural populations, thereby contributing to balanced territorial development.


**Figure 3.2: Overview of Morocco's transport infrastructure network**

Transport activity in Morocco has demonstrated steady growth across most modes, reflecting both rising demand and the impact of infrastructure investments. In rail transport, passenger volumes are projected to increase from 38 million in 2019 to 55 million in 2024, supported by the expansion of conventional and high-speed lines. Rail freight, however, shows a slight decline from 25 million tons (MT) in 2019 to an expected 20.8 MT in 2024.

Maritime transport remains the dominant mode for freight, increasing from 154 MT in 2019 to 241 MT in 2024, consolidating Morocco's role as a regional logistics hub. Passenger traffic in maritime transport remains stable at around 5.3 million passengers over the same period.

Air transport has also expanded, with passenger traffic growing from 25 million in 2019 to 32.7 million in 2024, reflecting Morocco's stronger integration into global air networks. Air freight volumes remain modest, moving from 0.1 MT in 2019 to 0.09 MT in 2024, highlighting the continued predominance of maritime freight for international goods movement.

Road transport continues to dominate domestic mobility and logistics. Daily traffic is estimated at 110 million vehicle-kilometers, underlining the central role of the road network in supporting both passenger and freight flows, especially in linking rural and urban areas.

**Table 3.2: Passenger and freight transport volumes in Morocco**

| | Passengers | | Goods | |
|---|---|---|---|---|
| | **2019** | **2024** | **2019** | **2024** |
| **Rail transport** | 38 million | 55 million | 25 MT | 20.8 MT |
| **Maritime transport** | 5.3 million | 5.3 million | 154 MT | 241 MT |
| **Air transport** | 25 million | 32.7 million | 0.1 MT | 0.09 MT |
| **Road transport** | 110 million vehicle km/day | | | |

The vision of the Ministry of Transport and Logistics is guided by royal directives, the government program, and the new development model, while also addressing sectoral challenges and the needs of the national economy. At its core, the Ministry's strategic objective is to promote the development of efficient logistics chains in order to enhance the competitiveness of the national economy.

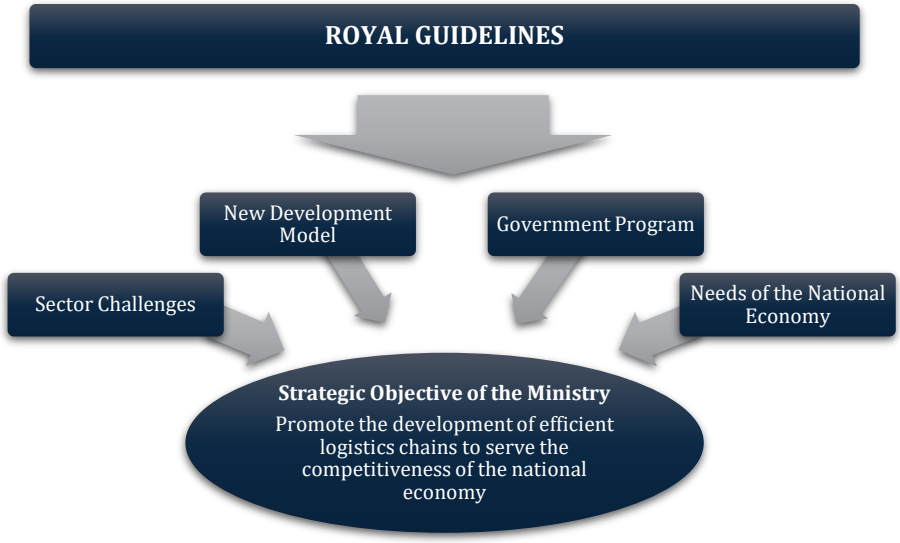



**Figure 3.3: Royal guidelines of Morocco**

Within the framework of Morocco's transport and logistics vision, the Ministry of Transport and Logistics has identified four major challenges that align with the country's development objectives. The first challenge, sustainable mobility, focuses on enhancing the attractiveness of public road transport, expanding high-speed rail and regional services, improving airport infrastructure with Casablanca as a regional hub, and restructuring maritime passenger transport across the Strait of Gibraltar. The second challenge, competitive logistics, emphasizes the development of regional logistics zones, strengthening multimodal freight transport, enhancing the competitiveness of the national maritime fleet, and modernizing road freight and logistics companies. The third challenge, governance, underlines the importance of a national mobility charter, improved stakeholder collaboration, reinforced road safety governance, effective implementation of logistics strategies, as well as modernizing the legislative framework to ensure transparency, efficiency, and user protection. The fourth challenge, efficient, innovative, and agile administration, highlights the need for digital transformation in administrative processes, investment in staff development, stronger coordination across central and territorial services, and enhanced cooperation with national and international stakeholders.


**Figure 3.4: Vision and strategic challenges of the Ministry**

Accessibility remains one of the most pressing challenges of Morocco's transport sector, as it is closely linked to equity, inclusiveness, and socio-economic development. Ensuring that all citizens, particularly those in rural and remote areas, have adequate access to reliable transport services is a national priority.

In the rural context, Morocco has made significant progress through successive programs aimed at improving road infrastructure and connectivity. The rural accessibility rate increased from 54% in 2005 to 78% in 2021, reflecting the expansion of paved and properly developed roads across different regions. This improvement has contributed to enhanced mobility, better access to markets, education, and health services, and has played a vital role in reducing rural isolation.

Despite these advancements, regional disparities remain, and ensuring equitable access for the entire rural population continues to be a key challenge. Strengthening rural accessibility therefore requires sustained investments in infrastructure, integration of multimodal solutions, and improved governance mechanisms to ensure that transport services are inclusive, affordable, and aligned with Morocco's broader sustainable development objectives.

As part of its continuous sectoral dialogue with professional stakeholders in the road transport sector, and in line with the methodology adopted since December 2021 (Anouar, 2022b), the Ministry of Transport and Logistics has identified key priorities for improving transport services in rural and mountainous areas. These priorities, developed in consultation with rural transport professionals, aim to strengthen accessibility, enhance service quality, and ensure better integration of remote regions into national development dynamics.

The joint work program focuses on improving road infrastructure, rehabilitating deteriorated networks, and upgrading transport services to meet the needs of rural populations. Special emphasis is placed on addressing the unique challenges of mountainous regions, where geographical and climatic conditions often hinder connectivity. By prioritizing inclusiveness, safety, and sustainability, the Ministry of Transport and Logistics seeks to provide equitable mobility solutions that foster social cohesion, reduce rural isolation, and contribute to balanced territorial development.

### Dual-purpose transport

The Ministry of Transport and Logistics has prioritized the review and processing of dual-purpose transport applications in 2024. The Transport Committee examined 595 files, resulting in the issuance of 96 new licenses and the renewal of 415 licenses in 2024 (Rhamir, 2025). Furthermore, the Ministry requested provincial authorities to thoroughly assess proposed license routes to ensure they meet the socio-economic needs of rural populations. It also emphasized the importance of increasing the frequency of regional committee meetings, as well as broadening participation to include representatives of all public transport modes, thereby strengthening inclusiveness in the decision-making process.

**Figure 3.5: Dual-purpose transport vehicles in Morocco**

To improve the quality and safety standards of vehicles used for dual-purpose transport in rural areas, the Ministry of Transport and Logistics has launched a new fleet renewal program for the period 2024–2026 (Morocco24, 2022). Within this framework, the value of grants allocated for replacing vehicles older than 15 years has been substantially increased. The program now provides 290,000 dirhams for the purchase of a new vehicle, compared to 160,000–180,000 dirhams under the previous scheme. In addition, operators can receive 170,000 dirhams for replacing vehicles older than 15 years with vehicles less than seven years old, representing a significant improvement over the previous crushing grant of 80,000 dirhams.

In response to the demands of rural transport operators, the Ministry of Transport and Logistics has authorized the allocation of exceptional permits for dual-purpose transport vehicles to organize additional trips during peak demand periods. These permits aim to ensure that the needs of rural populations are met during seasonal events, such as festivals, local gatherings, and special occasions.

### Implementing the advanced regionalization project

To advance the regionalization agenda, the Ministry of Transport and Logistics continues to work in close coordination with the Ministry of Interior. This collaboration seeks to support regional councils in exercising their competencies in the transport sector. The approach aims to provide context-specific transport solutions tailored to regional and local characteristics, while ensuring compliance with legal standards and safeguarding citizen safety.

Regionalization workshops are being implemented to strengthen institutional capacity at the regional level and to better integrate transport planning into broader territorial development strategies. This framework provides a platform for addressing the mobility challenges of rural areas through participatory and decentralized governance.

In parallel, the Ministry of Transport and Logistics has launched a strategic study to establish a national charter for inclusive and sustainable mobility. The charter is designed to reduce social and territorial disparities, promote sustainable transport systems, and improve the governance and quality of mobility services. Developed in partnership with the Ministry of Interior and other relevant stakeholders, the charter aims to create an integrated and participatory vision for Morocco's transport sector. It will build on previous initiatives while ensuring a comprehensive approach that covers all territories and addresses both current and future mobility needs.

### 3.1.2. National Policies and Projects

The Government of Morocco has placed rural accessibility and transportation infrastructure at the core of its national development agenda. Recognizing the geographical challenges of mountainous and remote rural areas, several policies and programs have been launched to reduce isolation, improve social inclusion, and facilitate economic integration.

Morocco has progressively advanced its transport and logistics sector through a series of liberalization reforms, institutional developments, and governance improvements. As seen in Table 3.3, with the liberalization of road, air, and maritime freight in the early 2000s, Morocco focused on market opening and modernization. Subsequent strategies, such as the 2010 National Logistics Competitiveness Strategy and the 2011 creation of the Moroccan Logistics Agency**,** highlighted the country's commitment to strengthening logistics performance and global integration. In later years, governance reforms, updated legal codes, and safety-focused institutions (e.g., 2020 National Road Safety Agency) (Anouar, 2022a) further consolidated the framework, ensuring both efficiency and sustainability in the sector (Anouar, 2022a; Morocco Transport, 2013, 2015).

**Table 3.3: Morocco's national policies**

| Year | Policy / Legislation | Focus |
|---|---|---|
| 2003 | Liberalization of road freight transport | Market liberalization and modernization of domestic freight |
| 2004 | Liberalization of air transport | Market opening and improved connectivity |
| 2006 | Liberalization of maritime freight transport + Port reform | Increased competitiveness and efficiency in maritime logistics |
| 2006 | Open Sky Agreement with the EU | Liberalization of air services and expanded international routes |
| 2010 | National Strategy for the Development of Logistics Competitiveness | Enhancing logistics performance and integration into global supply chains |
| 2011 | Establishment of the Moroccan Agency for the Development of Logistics | Institutional strengthening for logistics governance |
| 2015 | Organic Laws on Municipalities and Regions | Decentralization and improved governance frameworks |
| 2016 | Civil Aviation Code | Updated legal and regulatory framework for the aviation sector |
| 2020 | National Road Safety Agency | Strengthening institutional governance for road safety |

One of the cornerstone initiatives has been the PNRR1 and PNRR2 (PNNR2, 2005; PNRR, 2012), implemented in successive phases since the late 1990s. These programs have significantly improved rural accessibility rates, with PNRR2 (2005–2021) achieving considerable progress in connecting villages to main transport networks. The program aimed not only to build and rehabilitate rural roads but also to ensure better access to schools, healthcare facilities, and local markets, thereby fostering rural development and poverty reduction.

In addition, Morocco's government has aligned rural transportation projects with broader national strategies such as the national strategy for sustainable development and the Green Morocco Plan (Plan Maroc Vert — PMV) (Green Morocco Plan, 2016), which emphasize agricultural productivity, resilience, and sustainable resource management. By improving road connectivity, these policies have supported the integration of rural communities into agricultural value chains and facilitated market access for smallholder farmers.

Furthermore, partnerships with international organizations such as the World Bank and the African Development Bank have provided both financial and technical support for rural transport projects. These collaborations have enabled the adoption of international best practices in road safety, maintenance, and rural mobility planning.

Overall, Morocco's government policies and projects reflect a strong commitment to improving rural accessibility through a combination of infrastructure investment, institutional reforms, and sustainable development strategies. While significant progress has been achieved, challenges remain in terms of financing long-term maintenance, addressing climate-related problems, and ensuring equitable access for the most remote communities.

Morocco has undertaken significant reforms in rural development and territorial equity over the last two decades. Despite consistent progress in national infrastructure and social policy, geographical disparities persisted, particularly in remote, mountainous, and arid zones. Responding to these challenges, the Royal Speech of 30 July 2015 (MapNews, 2015) emphasized the urgent need for an integrated and coordinated program targeting rural and mountainous areas.

In this context, the National Strategy for the Development of Rural Areas and Mountain Zones was formulated and validated in July 2015 by the Permanent Interministerial Commission for the Development of Rural Areas and Mountain Zones. The strategy introduced a multi-level governance system, combining strategic orientation at the national level, planning and financing at the regional level, and implementation through technical services of ministerial departments and public institutions.

The resulting flagship initiative – the PRDTS – launched in 2017 (El-Badmoussi, 2021), provided an institutional and financial framework for addressing connectivity, service delivery, and socio-economic integration in rural territories. With a budget envelope of approximately MAD 50 billion (2017–2023) (Boutakrint, 2025), the program became one of the most important rural development schemes in Morocco's history.

**Table 3.4: Projects related to rural accessibility in Morocco**

| Project Name | Focus | Budget |
|---|---|---|
| PNRR (part of infrastructure investments) | Expansion of rural road networks to reduce isolation | ~MAD 400 billion (overall sector investment) |
| PNRR1 and PNRR2 | Construction and rehabilitation of rural roads; improved access to schools, health, and markets | PNRR1: ~ MAD 1.75 billion (1995-2005)<br>PNRR2: ~MAD 14.4 billion (2005-2017) |
| PRDTS | Connectivity, service delivery (roads, health, education, water, electrification) | MAD 50 billion (2017–2023) |
| National Strategy for the Development of Rural Areas and Mountain Zones | Integrated governance, regional planning, socio-economic development | Not specified (2015) |
| PMV | Modernizing agriculture via high-value crops, inclusive rural development, irrigation, value chains | Pillar I: ~ MAD 150 billion (2008–2020)<br>Pillar II:~ MAD 15 billion (2008–2020) |
| Génération Green 2020–2030 | Human-centered rural development and sustainable agriculture; employment, digitalization, rural entrepreneurship | Increasing annual agricultural exports to MAD 60 billion; agricultural GDP reaching MAD 250 billion by 2030 |

As shown in Table 3.4, Morocco has undertaken several large-scale initiatives to enhance rural accessibility and reduce regional disparities. Key programs include the PNRR1 and PNRR2 (PNNR2, 2005; PNRR, 2012), which focuses on building and rehabilitating rural roads to improve access to essential services, and the PRDTS (El-Badmoussi, 2021), a major investment plan (MAD 50 billion) (Boutakrint, 2025) addressing connectivity, health, education, water, and electrification. Complementary strategies, such as the 2015 National Strategy for Rural and Mountain Areas, emphasized integrated governance and socio-economic development, while broader infrastructure investments further expanded the rural road network to reduce isolation.

### The PRDTS framework

The PRDTS was structured around three complementary pillars that collectively sought to address rural development in an integrated and multidimensional manner. The first pillar, Social Safety Net and Emergency Measures, introduced a solidarity income scheme, universal minimum services, and social upgrading initiatives targeting 200–300 communes, with a budget ranging between MAD 10 and 20 billion. These measures were primarily designed to strengthen social resilience and provide immediate relief in disadvantaged areas. The second pillar, Integrated and Targeted Projects, was formulated as a strongly regionalized portfolio encompassing Integrated Economic and Social Development, Environmental Preservation, and Cultural Projects. Altogether, these initiatives covered 400–500 projects, with a total investment of MAD 20–25 billion, thereby ensuring that development interventions were not only broad in scope but also context-specific. Finally, the third pillar, Ambitious Connectivity Policy, prioritized large-scale structuring projects in road connectivity, urban attractiveness, and the development of tourist and energy stations, with investments amounting to MAD 50–60 billion. Thus, through these three pillars, the PRDTS (Boutakrint, 2025) simultaneously addressed immediate social needs, medium-term developmental priorities, and long-term connectivity and competitiveness.

The governance framework of the PRDTS was designed as a multi-level structure ensuring both strategic orientation and operational efficiency. At the strategic level, the Interministerial Commission for the Development of Rural and Mountainous Areas and the National Commission for the Development of Rural Areas and Mountain Zones were entrusted with orientation, validation, and evaluation responsibilities. Complementarily, at the regional level, 12 Regional Commissions prepared Provincial Action Plans and Regional Programs, thereby ensuring that national strategies were translated into regionally tailored interventions. At the operational level, the technical services of ministries and public institutions were responsible for implementing, monitoring, and evaluating the interventions. Consequently, this hierarchical governance structure enabled the alignment of national strategies with regional priorities and localized implementation capacities.

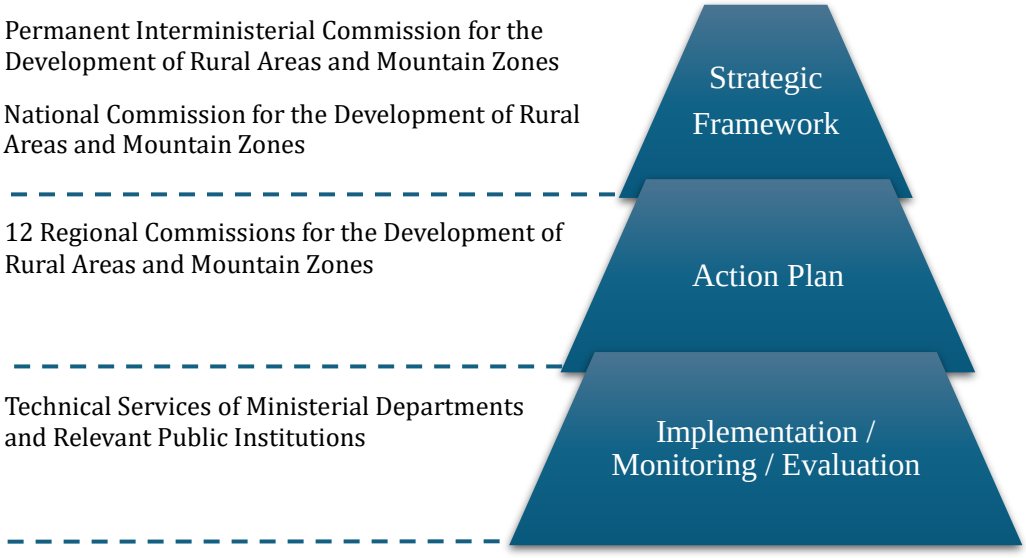



**Figure 3.6: Governance framework for rural and mountain area development in Morocco**

### Financial framework

The financial framework of the PRDTS for the period 2017–2023 was established with a total allocation of MAD 50 billion, reflecting the scale and ambition of the program. Funding sources were diversified, with 47% coming from the Fund for the Development of Rural and Mountain Areas Committee (FDRZM) (MAD 23.3 billion), 40% from Regional Councils (MAD 20 billion), 8% from the INDH (MAD 4 billion), and 5% from National Office of Electricity and Drinking Water (ONEE) (MAD 2.56 billion). In terms of sectoral allocation, the distribution strongly emphasized infrastructure, as 71% of the total budget (MAD 35.4 billion) was dedicated to rural roads. The remaining funds were allocated to essential services, with 12% for drinking water (MAD 6 billion), 10% for education (MAD 5.1 billion), 4% for electrification (MAD 2 billion), and 3% for health (MAD 1.4 billion). This distribution reveals that while the program sought to enhance basic services, its main priority was to reduce rural isolation through road infrastructure (APA News, 2025; Boutakrint, 2025).

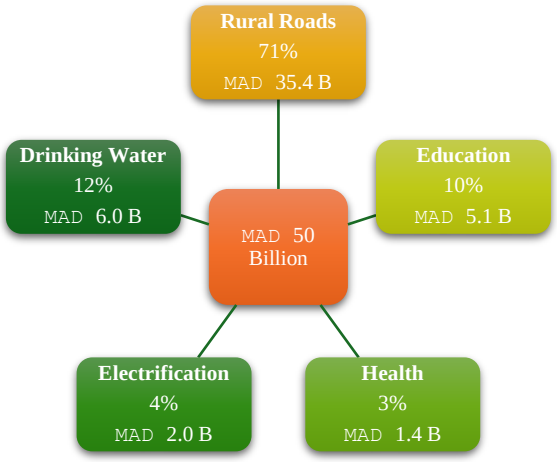



**Figure 3.7: Budget allocation by sector**

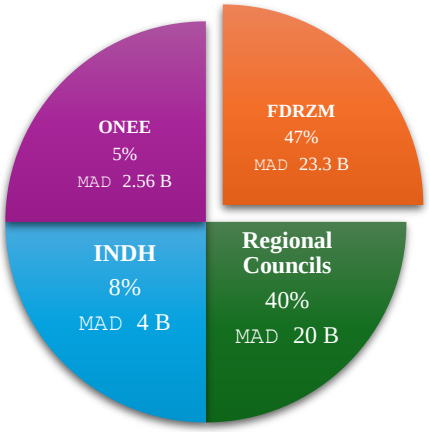



**Figure 3.8: Financial structure of the rural and mountain development program**

### Governance bodies: across all decision levels and global financial indicators

Governance arrangements for rural and mountainous area development in Morocco are anchored in multi-level institutional mechanisms. Coordination is ensured through regular meetings of national and regional governance bodies, including the Permanent Interministerial Committee for the Development of Rural Areas and Mountain Zones, National Council for the Development of Rural Areas and Mountain Zones, Central Technical Committee, Ministerial Committee for Monitoring and Steering Reforms, the FDRZM, and Regional Committees for the Development of Rural and Mountain Areas. These forums serve as decision-making platforms where minutes and resolutions constitute the official record, thereby reinforcing transparency and institutional accountability.

Financial performance indicators further highlight the robustness of the program. The total credit setup amounted to MAD 46.13 billion, corresponding to between 92% and 97% of the projected investment, with benchmarks ranging from MAD 47.58 to 49.92 billion. Of this, MAD 44.74 billion was formally committed, representing 90–94% of the target. Payments reached MAD 36.48 billion, equal to approximately 80% of the committed credits, indicating a high level of financial execution.

The mobilization of funds across diverse sources underscores the program's multi-stakeholder nature. Regional budgets contributed MAD 19.68 billion (98% of projections), the FDRZM provided MAD 19.25 billion (82%), while ONEE exceeded expectations with MAD 3.23 billion (125%). The INDH complemented these resources with MAD 4.02 billion**,** fully aligned with its planned allocation. Collectively, these figures illustrate a well-coordinated governance structure and a solid financial mobilization effort, which together constitute a cornerstone of Morocco's rural accessibility strategy.

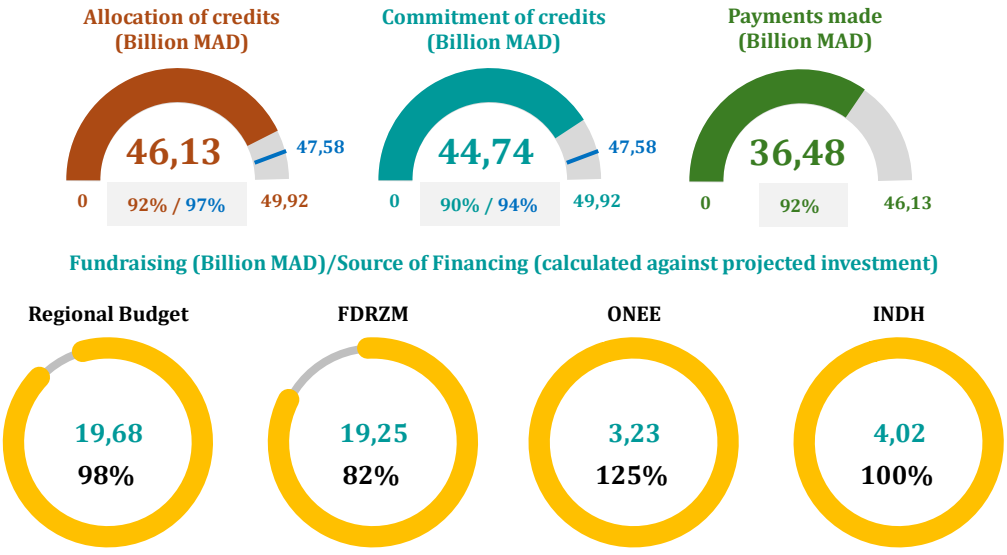



**Figure 3.9: Credit implementation and funding sources**

## Physical achievements

The implementation of the PRDTS between 2017 and 2023 resulted in significant physical achievements across multiple sectors. In terms of roads and tracks, 22,109 kilometers were built alongside 223 engineering structures, which substantially improved regional accessibility. In the health sector, 987 infrastructure projects were realized, complemented by the provision of 832 ambulances and 884 equipment upgrades, thereby enhancing both preventive and emergency health services. Similarly, the education sector witnessed 4,142 projects, supported by 1,454 school buses and 139 equipment operations, which directly improved access to schooling in rural and remote areas. With respect to drinking water, the program delivered 31,226 new connections, installed 725 systems, and extended the network by 1,096 kilometers, thus contributing to public health and quality of life. Finally, in terms of electrification, 1,135 villages were electrified, supported by 1,137 kilometers of new lines and 351 transformers, which significantly reduced rural energy poverty. Collectively, these achievements underscore the multidimensional impact of the PRDTS in addressing infrastructure gaps and improving living standards.

To ensure the long-term sustainability of these achievements, the PRDTS incorporated several complementary measures. For roads and tracks, routine maintenance responsibilities were delegated to regions and provinces, with financial contributions divided among stakeholders, 60% provided by regions, 30% by the state, and 10% by provinces. This arrangement aimed to secure both financial sustainability and local ownership. Regarding the ambulance fleet, a province-led management system was proposed, which includes the establishment of call centers and partnerships, such as the one with the Red Crescent in Ouarzazate. This approach not only addressed logistical challenges but also sought to overcome human resource and organizational constraints. Therefore, sustainability was embedded into the program's design through institutional, financial, and operational mechanisms, ensuring that short-term investments translated into long-lasting benefits for rural and mountain communities.

### Accessibility index

In Morocco, the Accessibility Index was created as part of the national rural development strategy to measure and monitor the level of access in rural communes. It serves as a diagnostic instrument for policymakers to identify priority areas for investment and to evaluate the impact of public programs aimed at reducing territorial disparities.

The index is built on a set of factors that reflect both physical connectivity and basic service provision. Key dimensions include access to transport infrastructure (particularly paved and all-weather rural roads), social facilities such as schools and health centers, and essential services like electricity, drinking water, and sanitation. By combining these indicators, the index goes beyond simple distance measurements and instead captures the effective ability of rural populations to reach vital services.

For planning purposes, the index categorizes communes into six levels, from P1 (very weak accessibility) to P6 (very strong accessibility). The lower categories identify highly isolated areas with limited or irregular access to services, while the higher categories correspond to communes that are well integrated into regional and national networks. This classification allows the Moroccan government to target resources where they are most needed, particularly in disadvantaged and remote regions, while also tracking progress toward greater equity in rural accessibility.

### PRDTS key insights

The Moroccan experience with the PRDTS (El-Badmoussi, 2021) highlights several key lessons for integrated rural development and territorial cohesion. At the institutional level, the establishment of an integrated governance model based on a tripartite structure (national–regional–operational) ensured both coherence and effective monitoring, while regional commissions played a pivotal role in tailoring interventions to local priorities. In parallel, strong financial mobilization and efficient resource allocation were observed, as evidenced by the fact that by mid-term, 92–97% of projected credits had already been committed and 80% of payments executed, thereby reflecting both the credibility of the program and the improved targeting of investments. As a direct outcome of these policies, accessibility and service indicators improved substantially: road accessibility advanced dramatically, with certain regions such as Tangier–Tétouan–Al Hoceima achieving universal paved road access by 2023; education access expanded in rural and peri-urban communes, as indicated by rising school enrollment, particularly among girls, whose participation increased by 15% since 2017; and health infrastructure quality rose markedly, with 84% of communes in Drâa–Tafilalet improving their classification between 2016 and 2023. Likewise, electrification reached high penetration levels, with Béni Mellal–Khénifra recording a 69% improvement, although drinking water access, while moderately improved, continued to display significant disparities, particularly in the southern and central provinces of the Oriental region. These infrastructural and social improvements translated into significant socio-economic effects, since approximately 14 million rural residents benefitted from the program, covering more than 1,245 communes, equivalent to 83% of the national total, and creating over 120 million workdays and 343,000 jobs, both direct and indirect. Furthermore, road and track investments facilitated structural economic transformation, enabling 27% of beneficiaries to diversify into non-agricultural activities, thus reducing rural dependence on subsistence farming. Nevertheless, while Morocco has initiated mechanisms to sustain infrastructure, such as the maintenance of unclassified roads and the management of ambulance fleets, the long-term success of the program will largely depend on

securing stable financing, strengthening institutional coordination, and building local and regional capacities.

The evaluation of accessibility to education infrastructure in the Rabat–Salé–Kénitra region highlights significant progress between 2016 and 2023. In 2016, a considerable number of communes were classified within the lower priority categories (P1–P3), represented in red, orange, and yellow, which reflected limited access to education facilities. By 2023, however, the majority of communes had shifted to higher priority categories (P5–P6), shown in green, signaling a strong improvement in the availability and quality of educational infrastructure across the region Figure 3.10.

The transformation is further confirmed by the evolution in priority levels. While two communes were classified as P1 and seven as P2 in 2016, these categories were eliminated by 2023. Similarly, the number of communes in P3 decreased from 14 to 7, and in P4 from 42 to 26. At the same time, higher categories expanded considerably, as P5 communes increased from 20 to 44 and P6 from 6 to 11. In total, 91 communes were evaluated, and the results show that 60% improved their education accessibility indicator, with 31 communes advancing to the upper categories.

These results emphasize the effectiveness of targeted infrastructure investments in enhancing access to education in rural areas. The eradication of the lowest accessibility levels and the expansion of communes within higher categories reflect not only improved service delivery but also a reduction in regional disparities, contributing to the broader goals of social inclusion and human capital development.

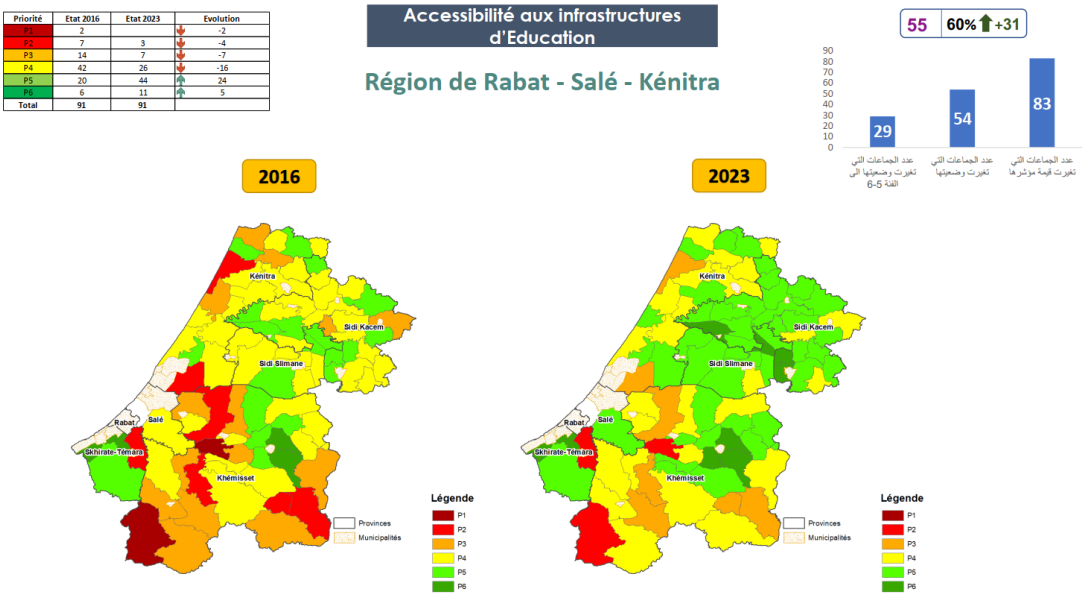



**Figure 3.10: Evolution of accessibility to education infrastructure in Rabat–Salé–Kénitra**

### Rural transport and agricultural value chains

Rural transport infrastructure constitutes a cornerstone for the efficiency of agricultural value chains in Morocco, particularly within the framework of the "Generation Green 2020–2030" strategy (World Bank, 2020). Building on the achievements of the PMV, the new strategy emphasizes human capital, sustainability, and inclusiveness, with a particular focus on youth and women in rural areas. Reliable transport systems are critical to achieving these goals, as they enhance market access and reduce post-harvest losses by facilitating the timely delivery of perishable products and essential inputs. Moreover, well-developed road networks ensure a steady flow of raw materials to agro-processing units such as olive oil mills, dairy plants, and fruit processing facilities, thereby contributing to increased value addition in agriculture. Improved connectivity also strengthens the prospects for small and medium-sized farms, promotes youth entrepreneurship and women's cooperatives, and generates direct and indirect employment opportunities. In addition, reliable infrastructure enhances resilience by enabling rapid responses to climate-related risks and reducing resource waste. The Moroccan government, through the PNRR, continues to prioritize investments in rural transport infrastructure, integrating rural networks with logistics hubs, industrial zones, and ports such as Tanger Med, while gradually adopting digital logistics solutions to reinforce the "Generation Green" strategy.

### Feeder roads as drivers of rural transformation

The Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests of Morocco adopts an integrated approach to feeder road development, positioning it as a central enabler of rural transformation under the "Generation Green" framework. This approach acknowledges the multi-sectoral impact of feeder roads, which not only connect farmers to markets but also improve access to schools, healthcare facilities, and administrative services, thereby contributing to balanced territorial development. By reducing transportation costs and improving the flow of agricultural products and inputs, feeder roads strengthen value chains and enhance opportunities for agro-processing within rural areas. Improved connectivity also facilitates job creation for rural youth and broadens women's participation in cooperatives, while local labor involvement in construction and maintenance contributes to community capacity building. Strategic planning ensures that investments are prioritized according to agricultural potential, population density, and access gaps, particularly in mountainous and remote areas, and projects are designed to integrate effectively with national logistics networks. Furthermore, feeder road development is aligned with complementary rural initiatives such as the INDH and regional development plans, ensuring synergies between infrastructure investment and broader social and economic policies.

### Climate change, land degradation, and infrastructure resilience

At the same time, climate change and land degradation present significant challenges to rural mobility in Morocco, with direct implications for infrastructure resilience and agricultural productivity. The increasing frequency of floods, landslides, droughts, and desertification accelerates road degradation, isolates rural communities, and disrupts supply chains, thereby raising transport costs and reducing agricultural incomes. These disruptions not only hinder access to essential services such as healthcare and education but also undermine food security by restricting the flow of agricultural goods. In response, the Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests integrates adaptive measures into

the "Generation Green 2020–2030" strategy (World Bank, 2020), focusing on climate-resilient infrastructure planning. This includes reinforcing road structures, improving drainage systems, adopting erosion-control techniques, and aligning rural transport development with national climate action plans. Through these interventions, Morocco seeks to ensure that rural transport networks remain functional, efficient, and resilient under changing climatic conditions, thereby safeguarding the sustainability of rural economies.

### Adaptive measures implemented by the Ministry of Agriculture

The Moroccan government has undertaken a series of integrated policies and projects aimed at strengthening rural accessibility and enhancing the resilience of agricultural and transport infrastructure. These initiatives are closely linked to the "Generation Green 2020–2030" strategy (World Bank, 2020), which emphasizes sustainable agricultural transformation, the empowerment of rural communities, and the creation of a rural middle class. Within this framework, the Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests in collaboration with the Ministry of Equipment and Transport and other stakeholders, has adopted adaptive measures to ensure that infrastructure and agricultural development are aligned with national objectives.

**First**, climate-resilient infrastructure design and construction has been prioritized, with the adoption of improved engineering standards for rural roads and bridges. These include elevating roads in flood-prone areas, reinforcing slopes to prevent landslides, and integrating advanced drainage systems. Complementary measures such as erosion control, terracing, reforestation, and slope stabilization have been implemented in mountainous and watershed areas to protect critical road sections. Regular maintenance programs and monitoring systems have also been institutionalized to ensure the durability and functionality of rural transport networks.

**Second**, sustainable land management practices have been integrated into agricultural and infrastructure projects. The Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests has promoted soil conservation techniques, including conservation agriculture, contour plowing, and agroforestry, with a target of expanding conservation agriculture to one million hectares by 2030. Large-scale reforestation and afforestation programs, led by the Ministry of Water and Forests, further contribute to soil stabilization and the protection of rural infrastructure. Integrated watershed management approaches are also being implemented to balance water use, control erosion, and safeguard downstream transport assets.

**Third**, the government has advanced water management and irrigation initiatives to support rural livelihoods and ensure the sustainability of agricultural production. Investments in modern irrigation systems, including large-scale deployment of drip irrigation, have enhanced water efficiency. Additionally, projects such as desalination plants and wastewater reuse for agriculture (e.g., the Chtouka Ait Baha desalination project (GreenTimes, 2025)) have strengthened water security in arid regions. Small-scale water harvesting techniques and the construction of hill dams have further improved local water availability for both communities and agriculture.

**Fourth**, early warning systems and disaster preparedness measures have been strengthened. The use of meteorological data and forecasts enables better planning and response to extreme weather events, while community engagement ensures local populations are involved in preparedness activities, such as identifying alternative routes and emergency procedures for road clearance.

**Fifth**, the government promotes the diversification of rural livelihoods beyond traditional agriculture. Initiatives in rural tourism, handicrafts, and agro-processing have been encouraged, alongside training programs that equip rural youth with skills in infrastructure maintenance and new agricultural technologies. These measures not only improve income generation but also contribute to the sustainability of rural development.

**Finally**, a multi-stakeholder and coordinated governance approach underpins all these initiatives. The Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests collaborates with the Ministry of Equipment and Transport, local authorities, and international partners such as the World Bank and French Development Agency to ensure coherence between rural road development and agricultural investment. This integrated framework facilitates resource mobilization, technical expertise sharing, and effective implementation of projects on the ground.

The coordination between agricultural investments and infrastructure development is particularly noteworthy. Rural road programs, such as PNRR1 and PNRR2, have been implemented in close alignment with agricultural strategies, ensuring that infrastructure investments support agricultural value chains by improving access to markets, processing units, and irrigation systems. Inter-ministerial committees, regional directorates, and provincial authorities play a central role in aligning agricultural and infrastructure priorities, while instruments such as the Agricultural Investment Fund provide targeted subsidies that link agricultural production with feeder road development.

Moreover, the agricultural aggregation model promoted under "Generation Green" exemplifies the integration of infrastructure and agricultural development. By organizing smallholder farmers around larger aggregators, the model requires effective road connectivity for the transport of inputs and outputs, thereby fostering efficiency and competitiveness. Public–Private Partnerships (PPPs) are also increasingly mobilized to co-finance agricultural and infrastructure projects, ensuring sustainable investment and operational capacity.

Through international cooperation with development partners such as the World Bank, African Development Bank, International Fund for Agricultural Development (IFAD), and bilateral donors, Morocco has been able to leverage financial and technical support for integrated rural development projects. These partnerships have emphasized the need for infrastructure to function as a catalyst for agricultural transformation and rural inclusion.

In summary, Morocco's approach to government policies and projects in rural transport and agriculture reflects a strategic, multi-layered, and integrated framework. Infrastructure is not pursued in isolation but as an enabling factor for agricultural productivity, market integration, and social development. By aligning the "Generation Green" strategy (World Bank, 2020) with transport and water policies, Morocco has established a model of coordinated rural development that supports long-term resilience, economic growth, and social inclusion.

### Assessing and prioritizing rural transport needs in agricultural zones

The Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests employs a comprehensive and multi-layered approach to assess and prioritize rural transport requirements in agricultural zones, fully aligned with the objectives of the Generation Green 2020–2030 strategy (World Bank, 2020). Recognizing that effective connectivity is a prerequisite for agricultural transformation, the ministry combines strategic national guidance, localized needs identification, and evidence-based evaluation criteria. At the national level, rural

transport investments are framed within key policy instruments, notably the Generation Green strategy, which emphasizes youth and women's empowerment, the emergence of a rural middle class through improved agricultural incomes, and the promotion of sustainable agriculture. Complementary to this, the PNRR1 and PNRR2 (PNNR2, 2005; PNRR, 2012) and their successors have sought to expand all-weather accessibility to more than 80% of the rural population, particularly targeting high-potential agricultural zones.

In order to achieve these goals, the Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests applies a data-driven methodology supported by advanced mapping and socio-economic analysis. Agricultural potential mapping identifies high-value production basins for citrus, olives, vegetables, and livestock, alongside irrigation perimeters where connectivity is essential for maximizing returns on water investments. Socio-economic data are also central, encompassing indicators such as population density, isolation, poverty incidence, and disparities in access to education, healthcare, and administrative services. In addition, value chain and market connectivity analyses are conducted to identify logistics bottlenecks that cause spoilage and increase transaction costs, with particular attention to perishable products. This analytical process helps to prioritize projects that can significantly reduce costs, improve competitiveness, and enhance farmers' market participation.

The prioritization of feeder roads is not only technical but also institutional and participatory. Coordination occurs across central, regional, and provincial levels, with central departments setting strategic orientations and regional and provincial directorates conducting field assessments and identifying feeder road priorities. Stakeholder engagement is a central feature of this process, as input is systematically gathered from farmer cooperatives, professional associations, and aggregators, whose operations are directly affected by feeder road connectivity. Public consultations further ensure that community perspectives are incorporated into planning. Once identified, projects are evaluated against clear socio-economic and technical criteria, including potential contributions to agricultural GDP, reductions in post-harvest losses, competitiveness gains, and social impacts such as improved access to education and healthcare, with special emphasis on benefits for youth and women. Environmental and climate resilience are also embedded into the criteria, as are engineering feasibility and cost-effectiveness.

Transport and logistics are conceptualized not simply as physical connectors but as transformative enablers of the Generation Green strategy (World Bank, 2020). Efficient feeder roads and logistics systems reduce post-harvest losses, improve market access, and supply raw materials to agro-processing facilities, while simultaneously fostering rural development by empowering youth and women and supporting the rise of a rural middle class. These investments also contribute to sustainability, as roads are increasingly designed to withstand climate-related shocks, while innovations in green logistics help reduce the carbon footprint of agricultural supply chains. Morocco's geostrategic location further enhances the importance of such investments, as integration with ports and multimodal logistics hubs such as Tanger Med strengthens the global competitiveness of Moroccan agricultural products.

Nevertheless, several regions continue to face acute mobility constraints that hinder agricultural development. Mountainous areas such as the High Atlas, Middle Atlas, Anti-Atlas, and Rif face isolation due to challenging topography, snowfall, and landslides, which raise transport costs and delay the marketing of perishable products. Semi-arid and pre-Saharan zones, including Drâa-Tafilalet and Oriental, are characterized by dispersed populations, desertification, and long distances, all of which undermine transport viability. Rainfed agricultural areas also suffer from

historical underinvestment, low productivity, and fluctuating yields, further limiting modernization and integration into value chains.

To overcome these challenges, Morocco has institutionalized strong inter-ministerial coordination mechanisms. High-level committees and ministerial councils validate national rural road programs, while framework agreements between the Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests, the Ministry of Equipment and Water, and the Ministry of Interior align infrastructure with agricultural priorities. At the decentralized level, regional and provincial commissions ensure integration of agricultural, social, and infrastructure planning, supported by joint technical groups that use agricultural mapping, socio-economic data, and monitoring systems. Financing mechanisms combine national budget allocations, international donor support from institutions such as the World Bank, African Development Bank, and French Development Agency, as well as climate finance facilities, thereby ensuring sustainability and continuity.

Finally, Morocco has embedded climate resilience into rural infrastructure development, guided by strategic policy frameworks such as the National Climate Plan, the Nationally Determined Contribution, and the Sustainable Development Strategy. Engineering standards now include reinforced drainage systems, slope stabilization, and reforestation measures to mitigate flood and erosion risks. Capacity building initiatives train engineers and local authorities in climate-resilient practices, while research and innovation focus on new construction materials and early warning systems. International climate finance, including the Green Climate Fund, the Adaptation Fund, and the International Monetary Fund Resilience and Sustainability Facility, supports the co-financing of climate-resilient rural infrastructure. Through this integrated and multi-sectoral approach, Morocco has positioned rural transport not only as a means of connectivity but also as a catalyst for agricultural productivity, inclusiveness, and sustainable rural development.

## 3.2. Republic of Indonesia

The Republic of Indonesia represents a critical example from the OIC Asian group, where geography and demography combine to create unique rural accessibility challenges. Out of a population of about 281 million, 41% reside in rural areas spread across more than 17,000 islands (World Bank, 2023c). With an RAI score of 80.33 (NASA, 2023), Indonesia continues to face obstacles in ensuring equitable access, particularly in its eastern and more remote provinces. Nevertheless, substantial investments in maritime connectivity and road programs underscore the country's efforts to bridge gaps and integrate rural populations into national development. As a founding member of the Association of Southeast Asian Nations (ASEAN) and one of the largest economies among OIC Member Countries, Indonesia plays a pivotal role in regional and global economic dynamics. The country is classified as an upper-middle-income economy, with consistent GDP growth averaging between 4–5% (World Bank, 2023a) in the last decade, although temporarily affected by the COVID-19 pandemic.

Indonesia's geography presents unique challenges for accessibility. While the major islands of Java and Sumatra host the majority of the population and economic activity, smaller and more remote islands face significant isolation. Approximately 41% of the population still resides in rural areas, many of whom depend on agriculture, fisheries, and small-scale trade for their livelihoods. Ensuring reliable rural accessibility is therefore critical for poverty reduction, equitable development, and integration of remote communities into national markets and services.

Governance in Indonesia is characterized by a decentralized system, following major reforms in the early 2000s. Local governments play a key role in planning and implementing infrastructure and rural development initiatives, supported by central government financing and policy frameworks. This decentralization has enabled more context-specific solutions, but has also revealed challenges related to coordination, capacity, and resource allocation.

Infrastructure development has been a central pillar of Indonesia's national strategies. Programs such as the National Medium-Term Development Plan (RPJMN) emphasize connectivity through roads, bridges, ports, and airstrips, particularly targeting rural and remote areas. Major national initiatives, including the Village Fund Program (Dana Desa), have allocated substantial resources to local infrastructure, improving basic access to education, healthcare, and markets. However, disparities persist, particularly in eastern Indonesia, where rugged terrain, sparse populations, and limited fiscal capacity constrain progress.

Indonesia's case provides critical lessons for the OIC context in addressing rural accessibility within complex geographic settings. The combination of strong economic growth, ambitious infrastructure policies, and the challenges of archipelagic geography makes Indonesia an essential reference point for innovative, multi-modal approaches to enhancing and sustaining rural accessibility.

### 3.2.1. Overview of Indonesia

#### Rural development

Rural development in Indonesia is characterized by both remarkable opportunities and persistent challenges. The country hosts 75,265 villages, which account for 90% of the government's direct interaction with citizens. This institutional proximity renders villages strategically important, particularly as 202 million residents, equivalent to 73% of the national population, are registered as village inhabitants. Despite this demographic significance, structural deficiencies remain. As of recent assessments, 2,919 villages are still without electricity, while approximately 1.9 million households lack access to reliable power. Even in electrified rural areas, the supply is often limited to less than twenty-four hours per day. Parallel to this challenge, digital connectivity also lags, with 22,544 villages suffering from poor internet access, thus constraining socioeconomic participation in the digital economy. In addition, poverty remains entrenched, with 13.58 million individuals, or 11.79% of the rural population, living below the poverty line, and 10,463 villages classified as underdeveloped or highly underdeveloped.

Figure 3.11 indicates several categories of priority areas: very underdeveloped regions (green), underdeveloped regions (pink), underdeveloped regions that are also border areas (purple), border areas (yellow), and metropolitan areas (red). As reflected in the map, the largest concentration of very underdeveloped and underdeveloped areas lies in eastern Indonesia, while metropolitan centers across the country are also identified as important hubs for integration. This mapping provides the basis for the construction and development of supporting infrastructure, ensuring that disadvantaged and rural regions are prioritized alongside metropolitan areas that act as national transport anchors.

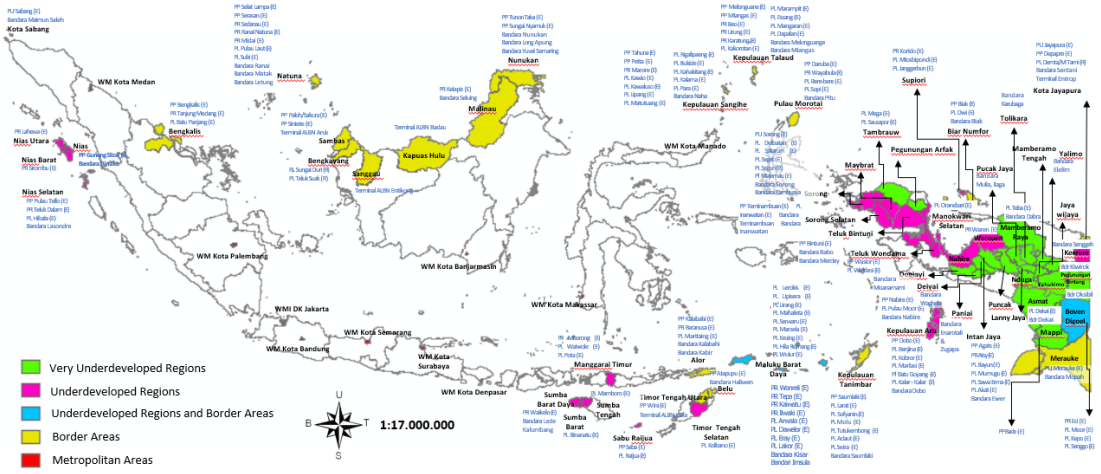



**Figure 3.11: Level of development map (Bappenas 2024)**

## Village connectivity infrastructure conditions

The analysis of Village Development Index survey for 2024 (Bappenas, 2024) reveals that significant disparities persist in the quality and type of rural road infrastructure across villages. A large proportion of rural roads are already paved with asphalt or concrete, accounting for more than 52,000 villages, which reflects substantial investment in improving accessibility. Nevertheless, approximately 14,982 villages still rely primarily on less durable paved surfaces, and as many as 6,521 villages continue to depend on dirt roads (see Figure 3.12). The reliance on these less durable road types indicates a considerable gap in infrastructure quality, particularly in regions where seasonal weather conditions can severely affect mobility and hinder access to essential services. Consequently, while notable progress has been achieved, the persistence of such disparities highlights the continuing need for targeted infrastructure upgrading, particularly in villages where economic and social activities are constrained by inadequate road surfaces.

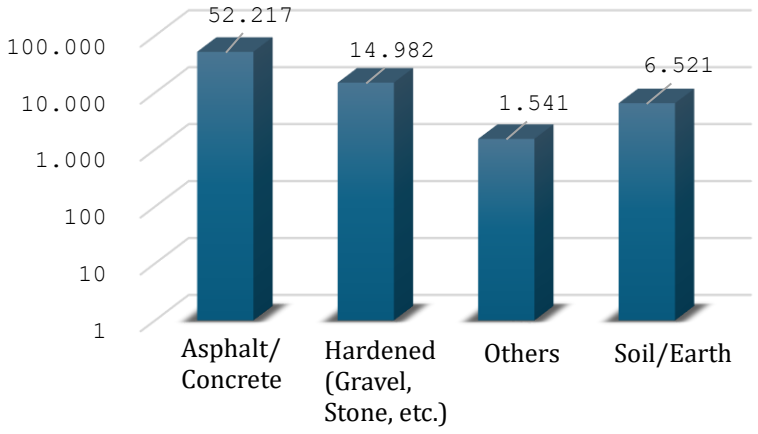



**Figure 3.12: Types of village road surface in Indonesia**

In terms of road quality, the data suggests that more than half of the villages (56.7%) benefit from roads classified as being in good condition, which underscores the positive outcomes of sustained road maintenance and rehabilitation programs. However, 35% of villages report roads in moderate condition, and nearly 8% face poor road conditions (see Figure 3.13). These figures indicate that although the majority of rural populations have access to adequate infrastructure, a considerable segment remains at risk of isolation and reduced economic opportunities due to substandard road networks. Therefore, without consistent investments in maintenance and rehabilitation, the sustainability of rural accessibility may be compromised in the long term, especially in regions where agricultural productivity and access to markets depend heavily on reliable transportation.

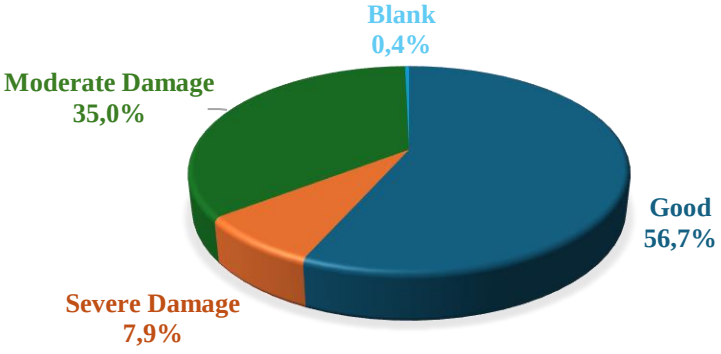



**Figure 3.13: Village road condition in Indonesia**

The availability of public transport constitutes another crucial dimension of village connectivity. According to the data, only around 30.6% of villages are served by public transport with fixed routes, while a similar share (30.9%) benefit from services without fixed routes (see Figure 3.14). Importantly, 38.5% of villages still lack any form of public transportation, which exacerbates accessibility challenges, particularly for vulnerable groups such as women, children, and the elderly. This limited availability not only restricts mobility but also hampers equitable access to education, healthcare, and labor markets. Consequently, while road infrastructure improvements are necessary, they are insufficient in themselves to guarantee inclusive rural connectivity. Ensuring reliable and affordable public transport services is equally critical for fostering social cohesion, enhancing rural–urban linkages, and promoting territorial integration.

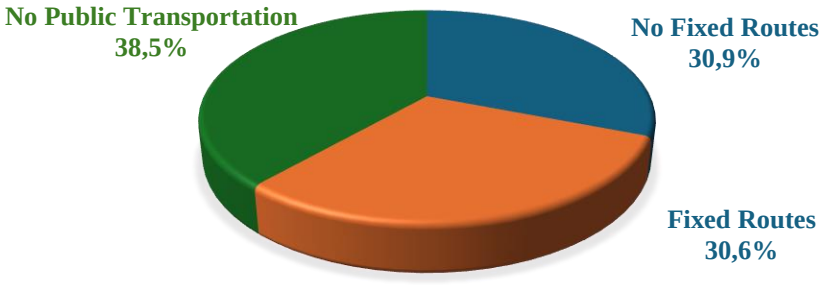



**Figure 3.14: Availability of village public transport in Indonesia**

Overall, the evidence suggests that rural connectivity in villages is characterized by a dual reality. On the one hand, significant strides have been made in expanding paved road networks and ensuring that a majority of roads are in good condition. On the other hand, persistent gaps remain in both infrastructure quality and public transport provision, which continue to constrain rural development outcomes. Addressing these challenges requires a holistic approach that simultaneously prioritizes road upgrading, regular maintenance, and the systematic integration of public transport services into rural connectivity strategies. Such an integrated perspective would not only enhance physical accessibility but also contribute to reducing spatial inequalities and strengthening the resilience of rural communities.

## Rural accessibility in the land transport sector

### *Pioneer and rural transport*

The regulatory basis for rural and pioneer transport services in Indonesia is established through a combination of laws, government regulations, and ministerial decrees. The principal legislation is Law No. 22 of 2009 on Road Traffic and Road Transport, which provides the overarching framework for land transport systems. This is supported by Government Regulation No. 74 of 2014 on Road Transport, which operationalizes provisions concerning passenger and goods services.

More specific rules govern the organization of scheduled and non-scheduled transport services. Ministerial Regulation (PM) No. 15 of 2019 regulates the scheduled public transport of passengers by motor vehicles, while PM No. 117 of 2018 sets the framework for non-scheduled public transport. Of particular relevance for rural accessibility is PM No. 73 of 2019 on Subsidies for Pioneer Road Transport, which replaced Ministerial Decree (KP) No. 60 of 2007. This regulation provides the legal framework for financing transport routes that are uneconomical but socially essential, especially in rural, remote, and border regions.

Pioneer Road Transport (*Angkutan Jalan Perintis*) is a government-subsidized program designed to provide mobility for communities in areas where commercial public transport is not viable. Its objectives are to connect isolated, underdeveloped, border, and transmigration areas with urban centers, ensuring that people in disadvantaged regions can access education, health services, markets, and administrative facilities. Beyond connectivity, the program seeks to reduce economic disparities, stabilize fares for vulnerable groups such as students, and provide affordable transport to low-income households.

The framework for Pioneer Road Transport, guided by PM No. 73 of 2019, specifies clear requirements. Vehicles must meet roadworthiness and safety standards and operate on fixed, reliable schedules without interruption. Routes must be distinct from existing commercial services and linked to terminals or intermodal hubs. Connectivity criteria prioritize areas that are remote, disaster-affected, or with weak interregional ties, particularly those lacking provincial or district-level transport links. These requirements underscore the program's role in addressing accessibility gaps in rural Indonesia.

The subsidy mechanism follows a structured process. Regional governments propose routes and schedules, which are then evaluated by the Directorate General of Land Transportation within 14 days. Once approved, routes are tendered through provincial offices, with implementation contracted to licensed transport operators. Evaluation occurs annually and covers load factors, road infrastructure conditions, trip frequency, socioeconomic impacts, and safety standards. Routes that fail to achieve a 70% load factor or do not show community benefits within five years are subject to termination.

The program is flexible in its allocation of providers. While auctions are the primary selection mechanism for transport operators, direct appointments can be made for state-owned or regionally owned enterprises, especially where private participation is limited. This allows continuity of service in challenging environments.

In 2025, the network will comprise 309 schedules across 32 provinces, supported by over 300 vehicles (see Figure 3.15). The heaviest allocation is in Papua, with 47 schedules and 47 vehicles, reflecting the province's high dependence on subsidized services due to its dispersed geography

and limited alternatives. Other major allocations are in Nusa Tenggara Timur (36 schedules, 36 vehicles) and Maluku (11 schedules, 15 vehicles). In western Indonesia, coverage is lighter but still significant in provinces such as Aceh, Sumatra Utara, and Kalimantan. This geographic spread demonstrates the government's effort to balance accessibility across diverse terrains.

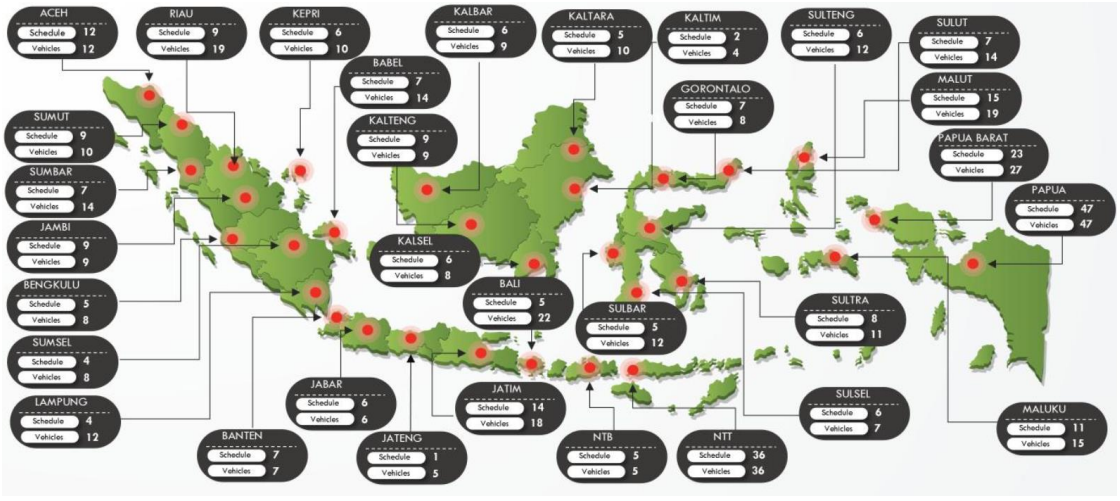



**Figure 3.15: Map of the distribution of the pioneer road transport schedule**

Between 2019 and 2022, the number of schedules increased from 307 to 338, an average annual growth of 4.34% (see Table 3.5). However, more recent years show a contraction, with schedules declining to 330 in 2023, 318 in 2024, and projected 309 in 2025. This decline reflects a shift toward efficiency, as routes with persistently low utilization are phased out. The adjustment suggests that while the program remains essential for connectivity, there is an increasing emphasis on impact evaluation and cost-effectiveness.

**Table 3.5: Growth of pioneer road transport**

| No | Year | Province | Donor Bus | Schedule | Percentage Increase In Schedule |
|---|---|---|---|---|---|
| **1** | 2019 | 32 | - | 307 | 3,5% |
| **2** | 2020 | 32 | - | 322 | 5,1% |
| **3** | 2021 | 32 | - | 324 | 0,6% |
| **4** | 2022 | 32 | - | 338 | 4,14% |
| **5** | 2023 | 32 | - | 330 | -2,4% |
| **6** | 2024 | 32 | - | 318 | -2,4% |
| **7** | 2025 | 32 | - | 309 | -2,83% |

For rural and remote Indonesia, the Pioneer Road Transport program serves as a critical enabler of mobility. It ensures that communities in border regions, disaster-prone areas, and isolated islands are not excluded from national development. By linking peripheral settlements with urban centers and intermodal hubs, the program helps bridge accessibility divides that otherwise restrict economic participation and social inclusion.

At the same time, the program highlights the structural challenges of serving rural areas: difficult geographies, limited demand, and weak fiscal incentives for private operators. Subsidized pioneer services fill this gap, ensuring that transport is recognized as a public good rather than solely a commercial activity.

### *Cross-border transportation*

A significant dimension of pioneer transport in Indonesia is Cross-Border Transportation (ALBN). These routes not only connect domestic rural areas to neighboring countries but also support economic and social integration in frontier zones:

- Indonesia–Timor Leste (*Kupang–Dili*): Operating since March 30, 2023, this service has delivered clear benefits to border communities, providing a reliable transport option for people and goods.
- Indonesia–Malaysia–Brunei Darussalam (*Pontianak–Kuching–Bandar Seri Begawan*): This service is operated on a commercial basis, without subsidies. It reflects the strong demand along this corridor and the role of intercity buses in facilitating regional integration.
- Indonesia–Papua New Guinea (*Jayapura–Vanimo*): Following the Memorandum of Understanding signed on July 15, 2024, between the Indonesian Minister of Transportation and the Minister of Transportation and Civil Aviation of Papua New Guinea, plans are underway to establish regular cross-border bus and goods services. This initiative is aimed at strengthening bilateral cooperation and promoting socio-economic development in the border region.

For many rural communities near borders, such services provide essential mobility where national road infrastructure remains limited.

### *Informal transport in rural areas*

Online transportation services have yet to expand widely into Indonesia's rural areas. Major providers such as Grab and Gojek remain concentrated in urban centers, leaving villages and remote regions reliant on informal solutions like motorbike taxis or chartered vehicles arranged through local networks (e.g., WhatsApp, Facebook). The main constraints are narrow and damaged roads, weak internet coverage, seasonal mobility patterns, and low digital literacy. These factors reduce demand and contribute to unstable driver incomes.

Despite these limitations, opportunities exist to gradually integrate online transport into rural accessibility strategies. Village digitalization programs, partnerships with cooperatives such as Village-Owned Enterprise (BUMDes), and flexible motorbike or pickup-based services could better match rural needs. Government support is essential: the Ministry of Transportation can promote integration into the broader system, while local governments regulate and facilitate training, and the Ministry of Communication works to enhance digital literacy.

Policy direction emphasizes the need for inclusive and simple business models, supported by incentives or initial subsidies. Inter-village connectivity and micro-logistics are identified as priority areas, as they can reduce isolation and improve access to markets, schools, and health services.

The regulatory framework distinguishes between two categories. Online taxis are legally recognized under PM 118/2018 as special rental services, with tariffs regulated nationally and locally. Online motorcycle taxis, though not formally considered public transport under Law No. 22/2009, have gained regulatory protection through PM 12/2019 and KP 667/2022, which set safety standards and tariff guidelines. The detailed regulation timeline for online motorcycle taxis & special rental transportation can be seen in Figure 3.16. While their formal status is limited, motorcycles remain indispensable in rural mobility, often bridging first- and last-mile gaps.

Taken together, these developments show that while online transport is not yet a mainstream solution in rural Indonesia, it holds significant potential if properly supported by digital infrastructure, local partnerships, and regulatory clarity.

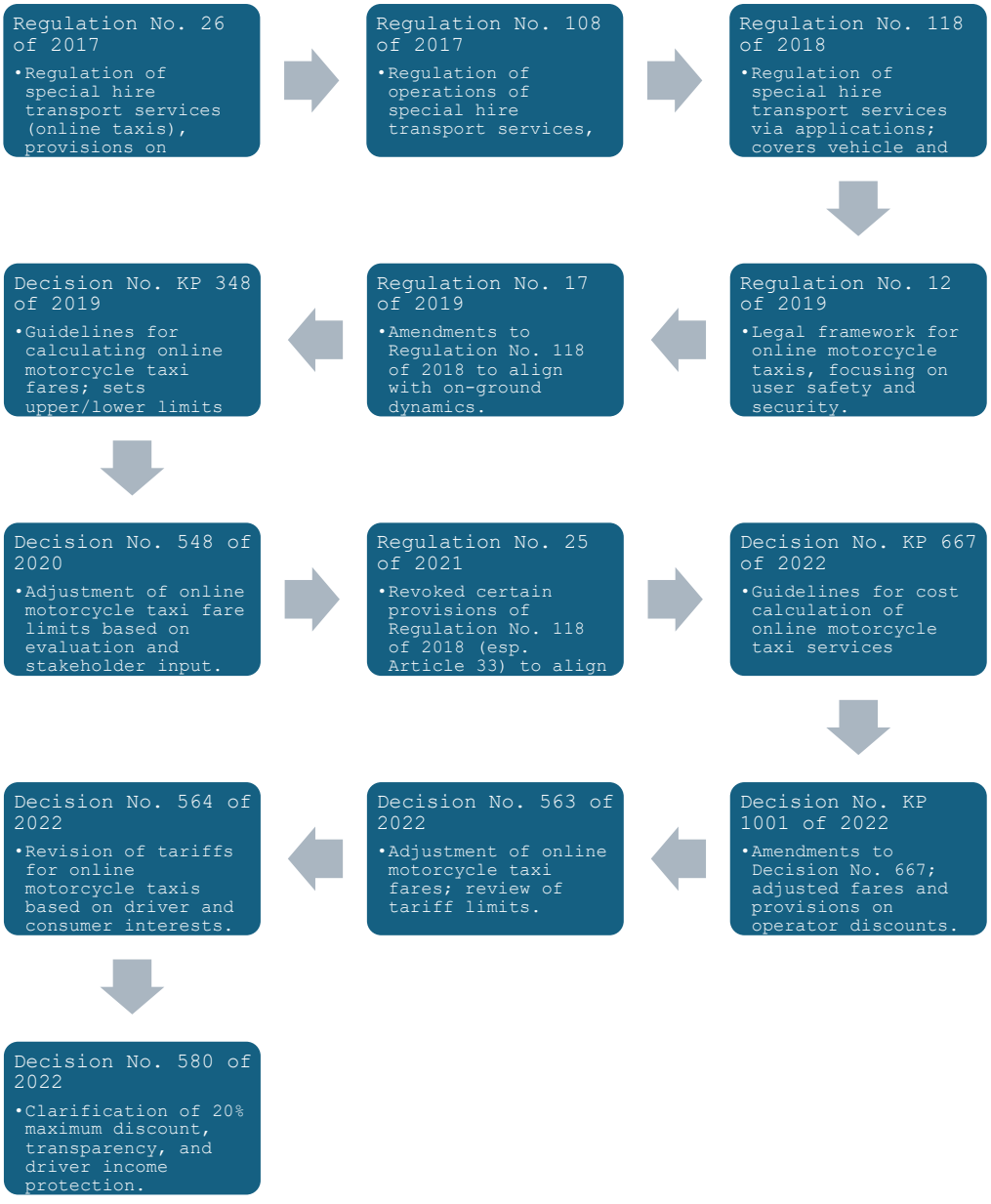



**Figure 3.16: Regulation timeline online motorcycle taxis & special rental transportation**

## Digital infrastructure development

By June 2025, considerable progress had been made in expanding access to digital connectivity across the country, with clear emphasis on rural areas. Deployment has been organized into three packages: the Western Package, serving five cities and regencies; the Central Package, covering 17; and the Eastern Package, serving 35. The greater concentration of projects in the eastern region reflects the government's strategy to prioritize rural and hard-to-reach areas that face the greatest connectivity challenges.

Nationwide, a total of 27,858 internet access points have been deployed. Additionally, 7,196 Base Transceiver Stations (BTS) are operational, many of which directly extend services into rural districts. Connectivity has been further strengthened by the Palapa Ring system, with 133 operational locations providing backbone capacity. The network currently supports 830 Gigabits per second (Gbps) through fiber optics and 5.05 Gbps through microwave connections.

Satellite capacity also plays a crucial role in connecting rural and remote regions that remain beyond the reach of terrestrial networks. The Satellite of the Republic of Indonesia (SATRIA)-1 (ANTARA News, 2023) satellite provides 150 Gbps of capacity, specifically supporting connectivity for Indonesia's outer islands, isolated rural communities, and underserved districts.

The Universal Service Obligation (USO) program has been instrumental in expanding mobile coverage to areas not fully served by commercial operators. Nationally, there are more than 5,500 operational Fourth Generation (4G) BTS and over 1,200 USO-supported BTS currently on air, with several hundred others recorded as terminated due to operational challenges.

In Figure 3.17, the map depicts deployment across Indonesia, divided into packages labeled P1 to P17. The legend identifies SATRIA-supported locations, non-SATRIA locations, 4G BTS, USO-funded BTS, fiber optic lines, Palapa Ring connections, and microwave networks. This visualization underscores how rural districts are specifically included in the connectivity expansion plan.

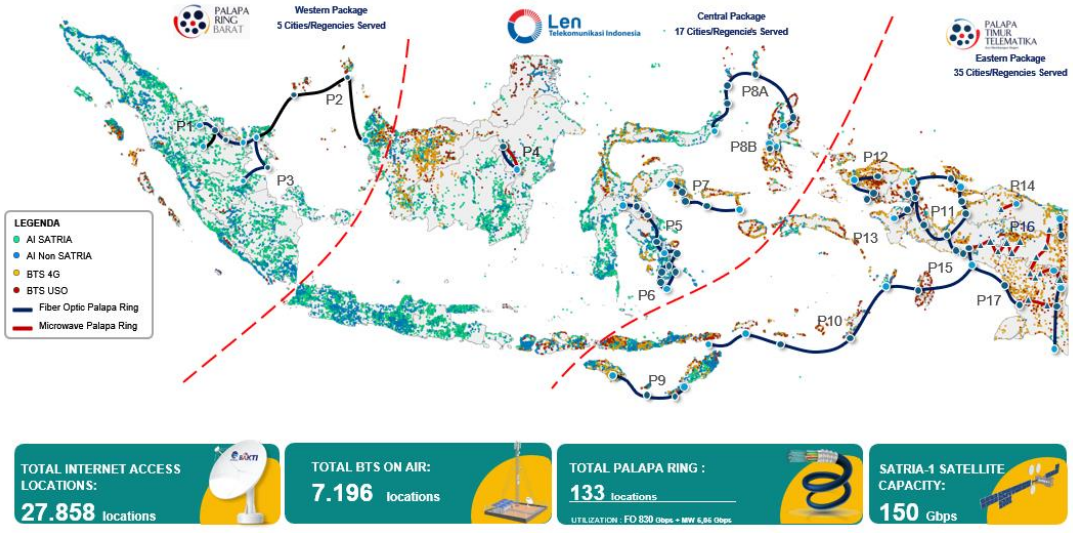



**Figure 3.17: Digital connectivity provision locations by Blu Bakti Komdigi**

The distribution of BTS is uneven across regions, as seen in Figure 3.18. Papua and Maluku account for the largest numbers, reflecting the need for government support in eastern Indonesia, where geography and low population density limit commercial investment. Kalimantan, Sulawesi, and Nusa Tenggara also show significant USO deployments, while Java records only minimal installations, given its strong commercial coverage.

Overall, the program highlights the central role of government intervention in extending mobile services to less accessible areas, complementing commercial networks and ensuring more balanced connectivity across the archipelago.

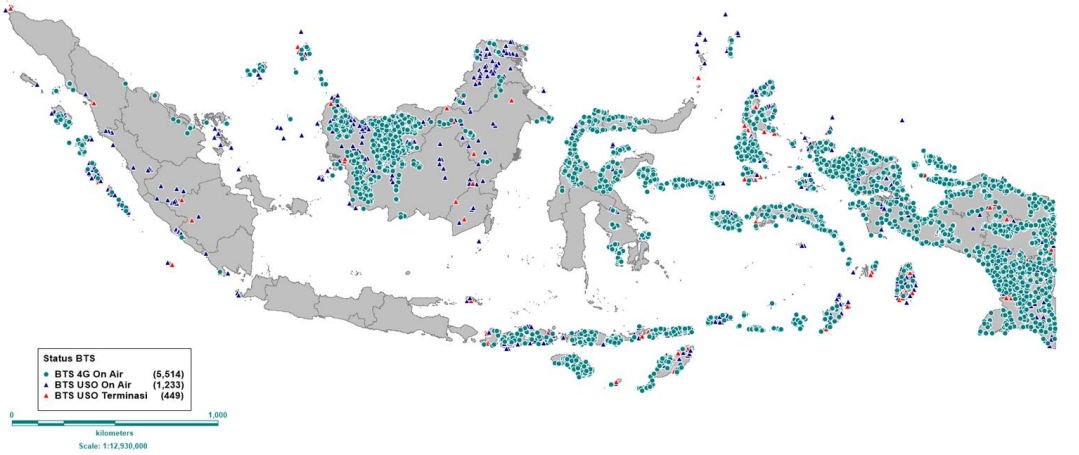



**Figure 3.18: Distribution of BTS in Indonesia**

As seen in Figure 3.19, Indonesia has established 27,858 internet access locations across the country, distributed among its major island groups. Sumatra hosts 7,482 locations, while Java accounts for 4,750. Kalimantan is served by 3,798 access points, Sulawesi by 4,822, and Bali–Nusa Tenggara by 3,861. In the eastern regions, Maluku has 1,516 access points and Papua has 1,629. This distribution reflects a concentration of sites in the more densely populated western islands, combined with deliberate efforts to expand connectivity into central and eastern provinces where access has historically been limited.

The functional allocation of these access points shows a clear prioritization of public services. Education facilities account for the majority, with 19,600 locations, representing more than 70% of the total. Government offices follow with 5,208 sites, or 18.7%, ensuring that administrative services are digitally supported across provinces. Health services represent 1,357 access points, amounting to 4.9% of the total. Smaller numbers are assigned to other community functions, including 422 access points at community centers, 373 at places of worship, and 467 at defense and security posts. Tourism sites host 158 access points, business services 230, and public transport hubs 43.

Taken together, this distribution demonstrates the government's focus on embedding connectivity into core public institutions, particularly schools, government administration, and healthcare facilities, while also providing access at community and sector-specific sites.

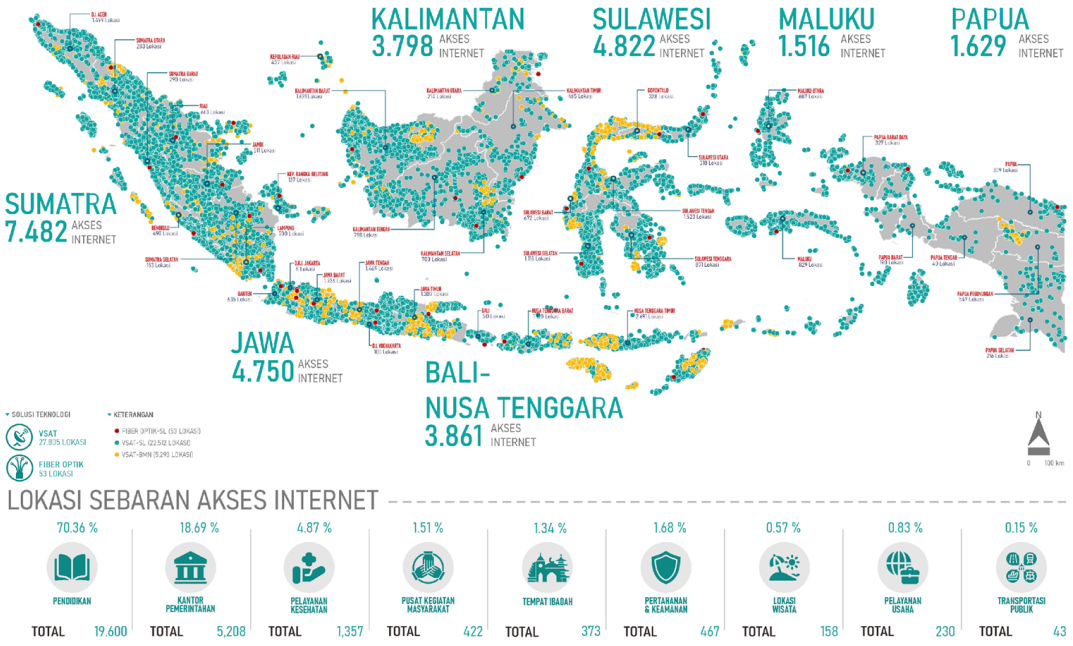



**Figure 3.19: Geographic distribution of internet access locations**

The technological makeup of Indonesia's internet access points is dominated by satellite-based solutions. Of the 27,858 access locations nationwide, 27,805 are supported through the SATRIA program's Very Small Aperture Terminal (VSAT) (ANTARA News, 2023) technology, while only 53 locations are connected via fiber optic networks. This reliance on satellite reflects Indonesia's approach to addressing the logistical challenges of connecting a large and dispersed archipelago, where terrestrial fiber deployment is more practical in urban and peri-urban areas, but satellite remains the most feasible option for smaller or isolated communities.

Indonesia's digital connectivity strategy combines fiber optic expansion, satellite capacity, and mobile BTS deployment to extend access nationwide. The data shows that while urbanized regions are well served by commercial networks, government programs such as USO and SATRIA (ANTARA News, 2023) play a crucial role in expanding infrastructure in less-served regions. The concentration of deployments in education, government offices, and healthcare illustrates a focus on public services, while the reliance on satellite technology highlights the importance of flexible solutions in connecting a geographically diverse country.

Indonesia has set ambitious digital infrastructure goals to support inclusive growth and to reduce the urban–rural divide in connectivity. By 2029, mobile broadband coverage is targeted to reach 98% nationwide for 4G services, up from the current 97.45%. Fifth Generation (5G) networks have begun deployment, with only 4.44% current coverage, and national targets for 2029 remain to be determined.

Fiber optic infrastructure plays a central role in expanding rural accessibility. As of the most recent assessment, fiber optic reach extends to 79.63% of districts. The government's target is to raise this figure to 90% by 2029, enabling rural and remote districts to access more reliable broadband. Supporting this expansion are Indonesia's extensive backbone networks, including

126,073 kilometers of submarine fiber optic cables and 905,406 kilometers of inland fiber optic networks.

Internet speeds represent another area for improvement. Mobile broadband currently averages 40.51 Megabits per second (Mbps), which places Indonesia 83rd out of 112 countries globally and 8th among 10 ASEAN members. Fixed broadband averages only 32.06 Mbps, ranking 119th out of 161 countries globally and 9th of 10 in ASEAN. By 2029, the target is to raise both mobile and fixed broadband speeds to 100 Mbps. This leap is particularly significant for rural regions, where slower connections hinder various opportunities.

### 3.2.2. National Policies and Projects

Indonesia's approach to rural accessibility is guided by a comprehensive policy and regulatory framework that integrates legal mandates with programmatic interventions. National policies provide the foundation for transport services and infrastructure investments, while targeted projects translate these commitments into practical outcomes across rural and remote regions.

As illustrated in Figure 3.20, between 2004 and 2009 Indonesia enacted a series of foundational transport laws across the road, railways, maritime, and aviation sectors, thereby establishing the legal basis for subsequent regulations and subsidy mechanisms. These milestones were intended to provide a comprehensive framework for rural accessibility; however, the resulting provisions have largely remained limited and sectoral. For instance, while maritime law acknowledges the principle of integration, its focus is confined to shipping, and aviation law refers to intermodal connections without outlining concrete mechanisms for implementation. This regulatory fragmentation poses particular challenges for rural and remote regions, where multimodal integration is essential to address accessibility gaps. In the absence of coherent cross-sectoral coordination, investments risk producing only partial solutions that fail to deliver sustainable improvements in rural connectivity.

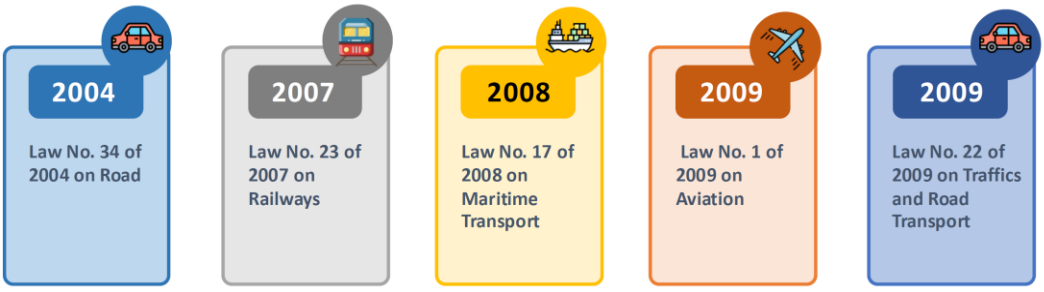



**Figure 3.20: Evolution of Indonesia's transport legislation**

Building upon this legal foundation, Indonesia's rural accessibility framework has expanded into a robust set of laws, regulations, and presidential instructions that define public service obligations and link policy implementation to measurable outcomes. Over time, the regulatory environment has evolved from broad legislative mandates to outcome-oriented instruments such as the Village Index (Bappenas, 2024) regulations and presidential instructions on regional road rehabilitation (see Table 3.6). This policy architecture not only provides regulatory certainty but also ensures that public investments are systematically aligned with accessibility indicators.

**Table 3.6: Indonesian national's policies**

| Year | Policy / Legislation | Focus |
|---|---|---|
| 2009 | Law No. 22 on Road Traffic and Transport | Legal framework for road transport systems |
| 2013 | PM No. 93 | Management of sea transport and pioneer shipping |
| 2014 | Government Regulation No. 74 | Road transport implementation (passenger & goods) |
| 2018 | PM No. 117 | Non-scheduled public transport services |
| 2018 | PM No. 48 | Implementation of public service activities with pioneer vessels |
| 2019 | PM No. 15 | Scheduled public passenger transport |
| 2019 | PM No. 73 | Subsidies for Pioneer Road Transport (replacing Decree No. 60/2007) |
| 2019 | PM No. 55 | Cost & revenue rules for pioneer vessels |
| 2023 | Presidential Instruction No. 3 | Regional road improvement and maintenance (2023–2024) |
| 2024 | PM No. 9 | Village Index dimensions & Special Allocation Fund (SAF) indicators |
| 2024 | Law No. 66 (amending Law No. 17/2008 on Shipping) | Strengthening pioneer shipping framework |

Building on this policy foundation, Indonesia implements a portfolio of large-scale fiscal transfers, targeted transport services, and digital connectivity investments that directly address rural isolation. These projects cover both land and maritime accessibility, reflecting the diverse geography of the archipelago. From subsidized "pioneer" services to village-level fiscal support, each program is designed to integrate remote communities into national markets and services (see Table 3.7).

**Table 3.7: Projects related to rural accessibility in Indonesia**

| Project Name | Focus | Budget |
|---|---|---|
| Village Fund Program (*Dana Desa*) | Support local infrastructure, education, healthcare, and rural markets through fiscal transfers to villages. | Indonesian Rupiah (IDR) 610 trillion (2015–2024); ~IDR 943 million per village in 2024 |
| Rural Transportation SAF | Improve rural road surfaces, quality, public transport, suspension bridges, and inter-village water/land transport facilities. | Integrated in SAF allocations; IDR 2.85 billion (Kumba Wharf, 2023); IDR 3 billion (Sintang Bridge, 2023) |
| Pioneer Road Transport Program (*Angkutan Jalan Perintis*) | Subsidized transport for remote, border, and disadvantaged areas linking to urban centers. | Annual subsidies (vehicle operations); 309 schedules across 32 provinces in 2025 |
| Pioneer Shipping Program | Subsidized maritime routes connecting 480 ports in 28 provinces, mainly in Eastern Indonesia. | Government-funded subsidies; 107 routes in 2025 |
| Digital Connectivity (USO, SATRIA-1, Palapa Ring) | Expand rural broadband through BTS, satellites, and fiber optic networks. | SATRIA-1: 150 Gbps; 27,858 internet access points; 7,196 BTS |

Taken together, the policy instruments in Table 3.6 provide the regulatory certainty required to sustain the investments summarized in Table 3.7. The strong alignment between law, program design, and fiscal transfers ensures that rural accessibility initiatives are not only implemented but also measurable against clear indicators such as road stability, service coverage, and digital access. Indonesia's case demonstrates how combining legal mandates, subsidy mechanisms, and multi-modal infrastructure can bridge geographic divides and promote inclusive development across archipelagic and rural regions.

### Village fund framework

To address the disparities between rural and urban areas, the Ministry of Villages and Development of Disadvantaged Regions assumes the authority to define strategic priorities in the allocation of village funds. Since the enactment of the 2014 Village Law, the fiscal transfer mechanism has steadily expanded, channeling approximately IDR 610 trillion between 2015 and 2024 to support rural equality and development. The allocation per village has increased significantly, from an average of IDR 280.3 million in 2015 to nearly IDR 943 million in 2024, while fund absorption levels have consistently exceeded 95%, reaching 99.9% in several fiscal years. The consistent disbursement and absorption of funds have created a strong fiscal foundation for advancing national development objectives, particularly in line with the President's Asta Cita vision.

Within this framework, twelve priority action areas have been identified to reinforce village transformation and national progress. These include the revitalization of BUMDes and the establishment of the Merah Putih Rural Cooperative to enhance food security and social welfare; the creation of self-sufficient food, water, and energy villages; and the downstream development of flagship village products with an export orientation. Moreover, empowering rural youth, consolidating inter-ministerial programs, accelerating digitalization, and strengthening tourism potential are recognized as integral drivers of sustainable growth. Parallel efforts focus on

fostering investment partnerships with national corporations and foreign investors, while improving governance and oversight mechanisms to ensure transparency and accountability. Equally important, climate-resilient villages and disaster preparedness initiatives are being advanced to safeguard rural communities from environmental risks, while disadvantaged regions receive targeted acceleration programs to reduce structural inequality.

The design of the Village Fund policy is also shaped by specific developmental objectives. A minimum of 15% of the allocation is dedicated to Direct Cash Assistance for households facing extreme poverty, complemented by programs that enhance climate change adaptation, promote rural health services, including stunting prevention, and strengthen food security for the lowest quintile of the population. Other policy directions emphasize the use of local resources, technology adoption for digital villages, and the prioritization of sectors that align with local comparative advantages. Importantly, operational costs of village administrations remain capped at 3% of the total allocation, thereby ensuring that the majority of resources directly support development activities.

The regulatory framework underpinning these initiatives is supported by PMs, which provide detailed guidance for rural development under the RPJMN. The Village Index (Indeks Desa) (Bappenas, 2024) plays a central role in this architecture, serving as a multidimensional tool for assessing the autonomy and development levels of villages. By evaluating parameters such as infrastructure, governance, education, and public services, the Index not only identifies progress toward self-sufficiency (Desa Mandiri) but also functions as a benchmark for measuring the success of national priorities, particularly Priority Six (PN6) on rural development and poverty reduction. Notably, 18% of the indicators within the Index relate to rural accessibility, underscoring the transformative role of transport connectivity in enhancing livelihoods. Indeed, interventions in rural transportation directly contribute to improving nearly one-fifth of the development indicators, demonstrating that mobility and connectivity are fundamental prerequisites for inclusive rural growth.

Through this multidimensional approach, integrating fiscal support, institutional regulation, and performance measurement, Indonesia seeks to transform its villages into resilient, productive, and self-sufficient entities. In doing so, rural development becomes not only a matter of addressing local deficiencies but also a cornerstone for national competitiveness and sustainable growth.

### Rural transportation Special Allocation Fund (SAF)

The Rural Transportation SAF plays a strategic role in supporting the achievement of the Independent Village target outlined in the 2025–2029 RPJMN. Its significance lies in its direct contribution to multiple dimensions and sub-indicators of the Village Index, as stipulated in the Minister of Village Regulation No. 9 of 2024. Specifically, 22 sub-indicators are linked to accessibility and the availability of BUMDes, collectively representing almost 20% of the total weighting. This underscores the critical role of transportation interventions in enhancing rural accessibility, service provision, and local economic development.

**Table 3.8: Dimensions and sub-indicators of the village index**

| Dimension | Sub Indicator | Weight |
|---|---|---|
| **Accessibility** | 1. Road Surface Type<br>2. Road Quality<br>3. Availability of Public Transport<br>4. Operational Public Transport | 0.8% per item |
| **Basic Services** | 1. Kindergarten/Early Childhood Edu Access<br>2. Elementary School/Equivalent Access<br>3. Middle School/Equivalent Access<br>4. High School/Equivalent Access<br>5. Health Facility Access<br>6. Poskesdes/Polindes Access<br>7. Posyandu Access<br>8. Doctor Service Access<br>9. Midwife Service Access<br>10. General Health Service Access | 0.8% per item |
| **Economy** | 1. Market Access<br>2. Trade Access<br>3. Lodging Access<br>4. Food Services Access<br>5. Post and Logistics Services Access<br>6. Cooperative/BUMDes Availability<br>7. BUMDes Availability by Legal Status | 0.8% per item |
| **Disaster Mitigation** | 1. Access to Disaster Mitigation Facilities | 0.8% per item |

The implementation of Rural Transportation SAF activities directly affects the dimensions of Accessibility, Basic Services, Economy, and Disaster Mitigation. In terms of accessibility, improvements in road surface type, road quality, and the availability and operation of public transport significantly reduce rural isolation and increase mobility. Simultaneously, enhanced transportation infrastructure ensures better access to basic services, such as schools, health facilities, and maternal-child healthcare posts, thereby strengthening human development outcomes. Moreover, improved connectivity facilitates access to markets, trade centers, logistics services, and cooperatives, which are vital for rural economic growth. In addition, by ensuring access to disaster mitigation facilities, SAF also contributes to the resilience of rural communities against environmental and climate-related risks.

The scope of SAF interventions is broad and multifaceted. Strategic village roads represent one of the key activities, involving both the improvement and development of rural roads that connect villages and sub-districts with significant strategic value in regional development. Suspension bridges are also targeted, with the renovation or replacement of structures in poor condition to facilitate safe pedestrian and two-wheel vehicle crossings. For communities located in coastal, riverine, or lake areas, SAF provides water transportation facilities through small passenger vessels managed by BUMDes, cooperatives, or community groups. Similarly, land transportation facilities are supplied in the form of microbuses or light vehicles designed to enhance rural mobility and economic exchange. Finally, the development and rehabilitation of small public ports, not included in the National Port Master Plan, further support inter-village water transport and the mobility of people and goods, thereby strengthening rural logistics networks.

Overall, the Rural Transportation SAF contributes not only to the physical enhancement of rural infrastructure but also to broader socio-economic outcomes. By simultaneously improving accessibility, ensuring equitable service delivery, enabling local economic activities, and enhancing disaster resilience, SAF constitutes an integrated mechanism for advancing rural development. Importantly, its alignment with the Village Index ensures that investments are systematically linked to measurable improvements in village status, thereby reinforcing the pathway toward achieving the Independent Village target by 2029.

### Rural transportation SAF in the logistics system

Rural SAF plays a crucial role in strengthening the logistics system in rural areas by enhancing connectivity and improving the mobility of both people and goods through the provision of transportation infrastructure and related facilities. In the context of economic development, particularly about the growth of village-based commodities, the availability of adequate rural transportation infrastructure significantly facilitates the movement of these products to central distribution points, thereby enabling local producers to access broader markets. Moreover, with the establishment of sea toll roads, Rural SAF functions as a feeder and sub-feeder system for rural communities and village commodities, particularly in remote regions, ensuring that these local goods and services can reach transport hubs developed by the central government (see Figure 3.21). In addition, Rural SAF supports the broader concept of integrated transportation and logistics development by coordinating with other physical SAFs and various funding sources to strengthen connectivity, especially in regions identified as Affirmative Areas. Through these efforts, Rural SAF contributes not only to regional accessibility but also to national logistics efficiency and inclusive economic growth.

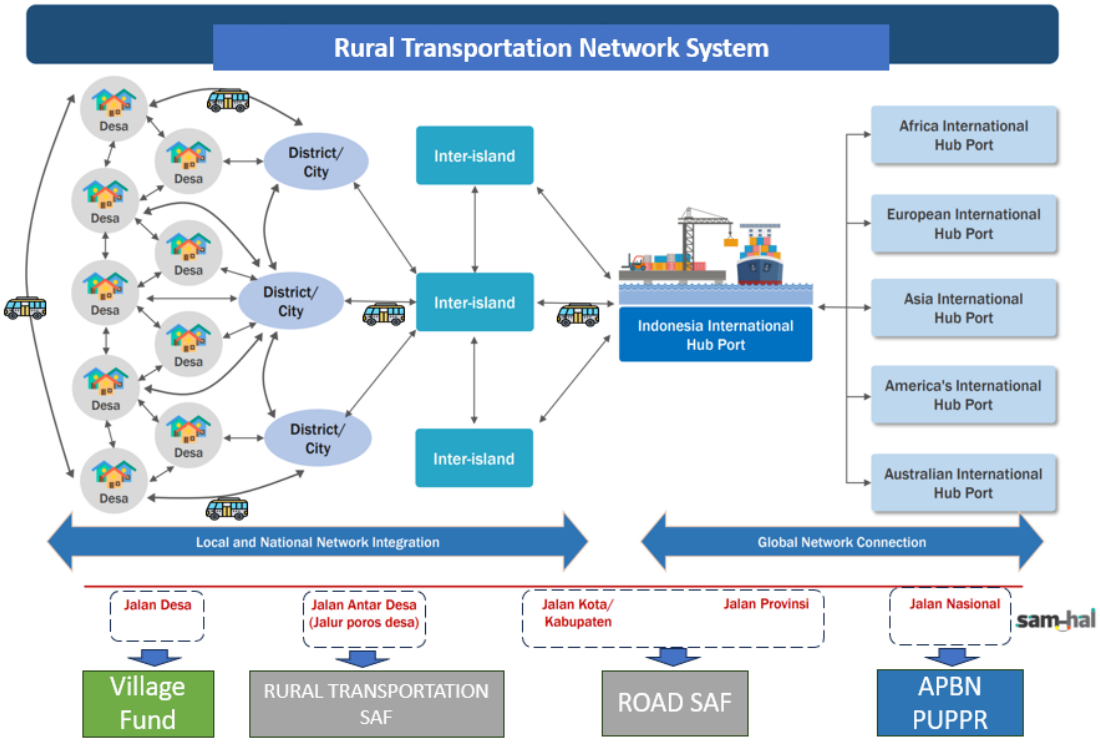



**Figure 3.21: Rural transportation network system**

### Examples of land transportation procurement output

In the 2022 fiscal year, a land transportation procurement initiative was implemented in Taliabu Island Regency to improve rural mobility and logistics. As part of this program, eight modified pickup trucks were allocated to serve three sub-districts, Lede, East Taliabu, and North Taliabu. The vehicles are managed by a BUMDes and are primarily utilized for rural transportation services, facilitating the movement of both people and goods from villages to Lede Port. This port is strategically important as it is served by the Kapal Motor Sabuk Nusantara 76 route, thereby linking rural communities with wider regional and inter-island transport networks. The initiative illustrates how targeted procurement of land transportation assets can enhance connectivity, strengthen local logistics systems, and support inclusive economic development in remote areas.

**Figure 3.22: Land transportation procurement for rural mobility in Taliabu Island Regency**

In the 2023 fiscal year, a river people's wharf was constructed in Kumba Village, located in Jagoi Babang District of Bengkayang Regency, which is designated as a National Border Priority Area (Lokpri). The project had an activity value of IDR 2.85 billion and was designed to support both community transportation needs and the logistics of local commodities. In particular, the wharf facilitates the loading and unloading of palm oil plantation products, providing a vital link between rural production areas and wider distribution networks. By improving accessibility and reducing logistical constraints in a border region, the development contributes to strengthening rural connectivity, supporting local livelihoods, and enhancing cross-border economic integration.


**Figure 3.23: Development of people's wharf in Kumba Village, Bengkayang Regency**

In the 2023 fiscal year, a suspension bridge replacement and renovation project was implemented in Swadaya Village, Ketungau Tengah District of Sintang Regency, with a total project value of IDR 3 billion. The site is located within a National Border Area and serves as a critical crossing point for residents of three surrounding villages. The bridge provides essential access to schools, community health centers, and public administration services. The previous decked bridge had deteriorated significantly and posed serious safety risks for daily users. The renovation not only ensured safer mobility for the rural population but also strengthened

connectivity in a border region where access to basic services is highly dependent on reliable transportation infrastructure.


**Figure 3.24: Renovation and replacement of suspension bridge in Sintang Regency**

In Biak Numfor Regency, a vessel with a capacity of less than seven gross tons (<7 GT) was procured to facilitate crossings between Numfor Island, Biak Island, and Biak City. The vessel serves a dual function: it transports passengers while also carrying fishery and agricultural products from Numfor Island to Biak City, thereby supporting local livelihoods and market access. The operation of this service is managed by BUMKam Suyari of Manggari Village and provides connectivity for five districts, covering a total of 49 villages on Numfor Island. Reports indicate that, beyond improving mobility and logistics efficiency, the vessel generates additional monthly income of approximately IDR 10–11 million for the managing BUMKam, highlighting its contribution not only to transport accessibility but also to local economic empowerment.

**Figure 3.25: Passenger and cargo vessel (<7 GT) in Biak Numfor Regency**

### Transportation strategy of policy direction

The RPJMN, five-year strategy document translates long-term national goals into actionable programs and investment priorities. The 2025–2029 RPJMN is framed as the first step in achieving Golden Indonesia 2045, with transportation connectivity positioned as a foundation for both economic growth and social inclusion. Within this framework, the government seeks to accelerate economic growth, eradicate absolute poverty, and strengthen human resources while maintaining sustainability. Economic growth is targeted at an average of 8% per year, supported by investment in the real sector, downstream industries, and the development of food, water, and energy security. At the same time, national strategic projects are expected to create jobs, stimulate local economies, and support the growth of regional centers across the archipelago.

By 2029, Indonesia aims to increase its Gross National Income per capita to USD 8,000 while reducing poverty levels to 4.5–5.0% and narrowing inequality as measured by the Gini ratio to between 0.372 and 0.375. Other social and environmental targets include reducing greenhouse gas emissions by 45.17% on the path to net zero and increasing the Human Capital Index to 0.59. Achieving these objectives will require an estimated investment of more than IDR 47,500 trillion over five years, sourced from government, state-owned enterprises, and private and community contributions.

For rural areas, the framework places particular importance on ensuring that poverty reduction and human resource development efforts are not confined to urban growth centers. Extending the benefits of national development into smaller cities and rural districts is treated as a prerequisite for equitable progress.

The transportation framework for 2025–2029 places strong emphasis on extending accessibility to underserved and underdeveloped regions. Road improvement programs are directed at both national and regional networks, with particular attention to connecting economic areas, border regions, and rural districts that remain isolated. Complementing this, the government will continue to provide subsidized multimodal “pioneer” services by land, sea, and air, ensuring that basic passenger and freight mobility is available in remote provinces. Safety and security measures are also reinforced through the application of national standards across road, rail, sea, and air transport, alongside stronger search and rescue capacities for difficult-to-reach areas.

Connectivity is also framed as an enabler of balanced growth. The development of port and airport networks includes roll-on/roll-off links, feeder routes, and airstrip upgrades in Papua and other provinces where air travel is often the only means of access. Road connectivity on logistics corridors will be expanded, while rail investments will provide alternative freight and passenger options that link interior regions with coastal markets.

Strategic area support underlines the role of transportation in facilitating food production zones and tourism clusters, many of which are located outside of Java and play an important role in sustaining rural livelihoods. Meanwhile, urban public transport development focuses mainly on larger cities, but metropolitan centers are also treated as hubs that serve surrounding rural catchment areas.

Mainstreaming measures, including human resource development, low-carbon strategies, and digitalization, provide the systemic support needed to make these investments sustainable. Gender and social inclusion are also incorporated to ensure that transport expansion benefits communities in both urban and rural contexts.

A central focus of the transport strategy is the creation of a domestic integration backbone linking sea and air routes with three primary hubs in the west, central, and east of the archipelago. This network is intended to connect Indonesia's global gateways to regional growth centers and, importantly, their hinterlands. The supporting map Figure 3.26 (2025–2029) illustrates the layout of these hubs, showing how major shipping and air corridors are overlaid with logistics routes that tie production regions to domestic and international markets.

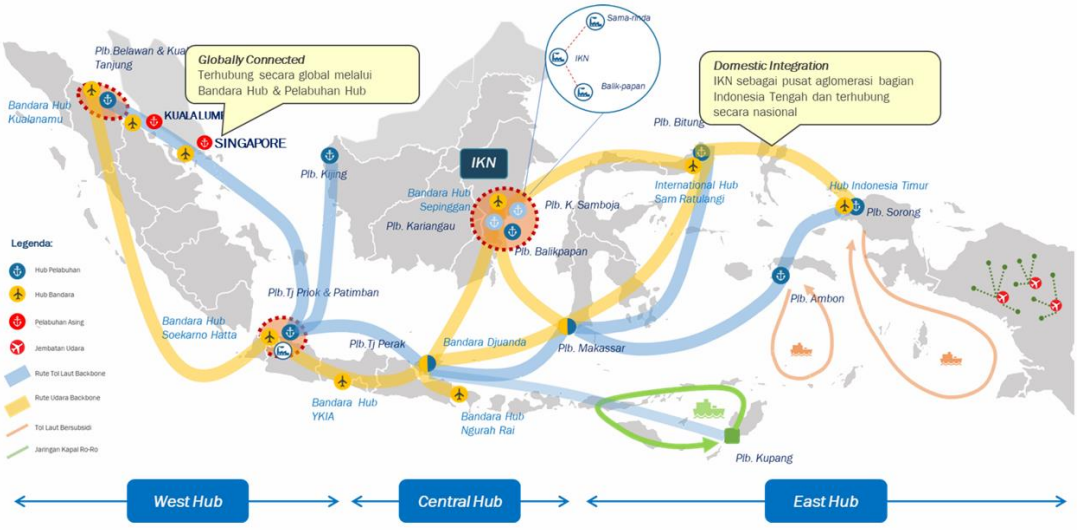



**Figure 3.26: National transportation connectivity hubs and corridors**

The strategy rests on several key pillars. First is the construction and rehabilitation of national roads, ports, airports, and railways, which remain critical to reducing travel time and logistics costs. Second is the continuation of sustainable urban mobility programs, ensuring that metropolitan and secondary cities can function as anchors for broader regional accessibility. Third is the deliberate effort to connect growth centers with surrounding areas, ensuring that rural and smaller districts are able to participate in market activity through improved access to main infrastructure. Logistics networks will be strengthened through integrated logistics centers that link industrial zones with multimodal corridors. Human resource development in the transport sector is also prioritized, ensuring that investments are matched with the skills required to operate and maintain advanced infrastructure.

Priority areas include expanding road connectivity on main corridors with specific extensions into underdeveloped and border regions, strengthening intercity passenger rail and freight rail, and developing an integrated port network that supports both domestic and international trade. The airport system will also be standardized, with feeder and secondary hubs complemented by seaplane facilities in areas where conventional infrastructure is limited. Urban mass transport

will continue to expand in major cities, indirectly supporting rural accessibility by linking urban service centers with their surrounding districts.

As projected outcomes for 2029, infrastructure stock is expected to rise to 48%, logistics costs are targeted to fall to 12.5%, and average national travel time is projected to decline to 1.7 hours per 100 kilometers. Taken together, these measures aim to strengthen Indonesia's competitiveness while gradually reducing disparities in connectivity, particularly between the well-served western regions and more remote areas of the archipelago.

The 2025–2029 RPJMN emphasizes National Priority 6, which is framed as *"building from the village and from the bottom up"*. This priority addresses economic growth, equality, and poverty reduction by focusing directly on Indonesia's 30 officially designated underdeveloped regions and 42 priority border areas. The underlying goal is to transform disadvantaged districts into more developed, self-reliant regions.

The policy begins with recognition of persistent challenges. As of 2023, rural poverty remained at 12.22%. Access to safe drinking water and proper sanitation stood at 84.93% and 76.98%, respectively, while access to basic health services was 75.37%. Schooling in rural areas averaged 7.88 years, highlighting continued disparities with urban centers. Electrification has made substantial progress, reaching 99.85% of rural households in 2024, yet the economic base of rural areas remains weak, with agricultural productivity declining by up to 25% and many workers still concentrated in the primary sector.

The targets for 2025–2029 are focused on raising welfare in disadvantaged areas and strengthening integration with broader national and regional development. Average Human Development Index (HDI) values in disadvantaged and very disadvantaged areas are expected to improve from 62.06–62.56 in 2025 to 64.74–65.24 by 2029. At the same time, the Border Area Management Index is projected to rise from 0.75 to 0.86 across the 204 sub-districts classified as border areas.

Priority projects under this framework include improving connectivity in remote areas, alongside the development of residential and logistical infrastructure in transmigration zones. These efforts are intended to reduce isolation and increase local economic participation. In practice, this means new roads, basic utilities, and service networks that better link rural communities to both domestic and cross-border markets.

The program also emphasizes human and institutional capacity. Education and health services are to be improved to meet national standards. Economic resilience will be supported by integrated agricultural and fisheries centers, local tourism development, and digital innovations designed to strengthen rural enterprises. At the governance level, capacity building for civil servants, the digitalization of services, and stronger inter-regional coordination are prioritized. These measures aim to increase the resilience of communities, ensuring that rural and border populations can withstand economic shocks while maintaining pathways toward independent development.

Indonesia's road network remains uneven in quality, with significant disparities between regions. On Java Island, less than 20% of district and city roads are classified as damaged, reflecting the relatively stronger investment in maintenance. By contrast, in Kalimantan, Sulawesi, and Papua, large areas still record road damage levels exceeding 40%. This uneven

distribution highlights the continued challenge of providing reliable connectivity in rural and frontier regions.

According to the 2024 baseline data, regional roads account for 479,300 kilometers, or approximately 91% of the total road network in the country. Yet the funding available for road maintenance and rehabilitation remains well below the level required to sustain this network. Figure 3.27 illustrates the geographic spread of road conditions, with the most severe deterioration visible in parts of the central and eastern islands.

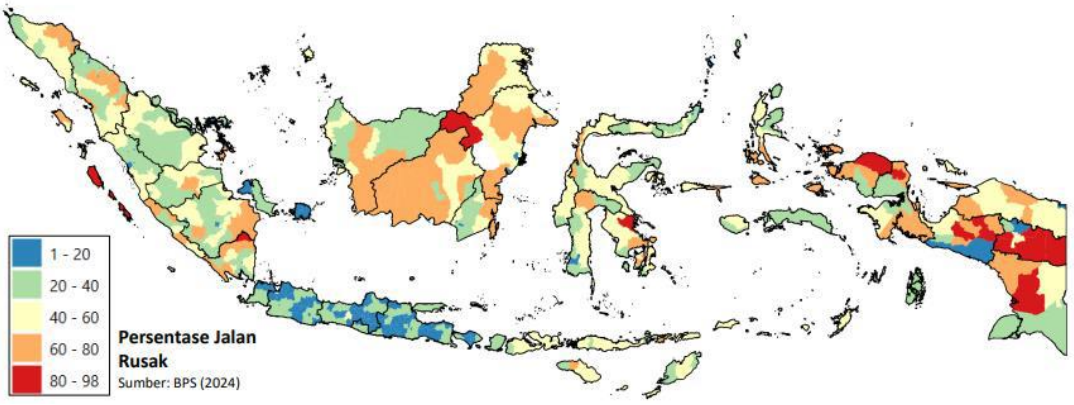



**Figure 3.27: Geographic spread of road conditions in Indonesia**

The government has set road sustainability targets for 2025–2029. For provincial roads, the share in stable condition is expected to rise from 69.6% in 2020–2024 to 76% by 2029. Regency (kabupaten) roads are targeted to reach 66% stability, up from 52.4%. City roads are expected to improve from 80.2% to 85%. Achieving these targets will require filling a substantial funding gap. Current allocations cover only a fraction of the IDR 1,268 trillion needed over five years, with baseline annual budgets at just IDR 350 trillion.

Regional budget expenditure patterns also underscore the challenge. In 2024, the largest share of spending went to operational costs (68.5%), while capital expenditure accounted for only 15.6% and transfers 15.2%. This leaves limited fiscal space for large-scale road rehabilitation and new investments.

The significance of roads is reinforced by their central role in transport and logistics. Current patterns show that 84% of passenger traffic and 90% of freight traffic rely on road infrastructure. This indicates that land-based transport continues to dominate, particularly for linking rural production areas to regional markets.

In sum, the RPJMN 2025–2029 sets measurable road sustainability targets that, if achieved, will reduce disparities between urbanized islands such as Java and less developed areas such as Papua, Kalimantan, and Sulawesi. However, the scale of the funding gap and the dominance of operational expenditure in local budgets present significant obstacles.

Regional roads make up the bulk of Indonesia's road network, covering more than 90% of the total length. Yet their quality remains uneven compared with national roads. In 2024, an estimated 40% of regional roads were classified as damaged, compared with only 8% of national

roads. The disparity is compounded by financing limitations: only about 30% of local governments possess high or very high fiscal capacity, leaving many provinces and regencies dependent on central support. Road management in several regions is therefore fragmented, and road improvement programs remain suboptimal.

During the 2020–2024 period, the RPJMN set stability targets of 75% for provincial roads and 65% for regency and city roads. Actual performance fell short, with provincial roads reaching only 74% and regency/city roads stabilizing at just 64%. 6 provinces and 13 regencies were specifically identified as failing to meet the targets. Despite these gaps, progress was made through programs such as the Regional Road Grant (PHJD), which supported thousands of kilometers of rehabilitation and contributed 1.12% of total regional road stability by 2023 and 1.09% by 2024.

Looking forward, the 2025–2029 RPJMN sets higher stability targets: 76% for provincial roads, 66% for regency roads, and 85% for city roads. Achieving these goals will require both innovation in financing, through road preservation funds and new schemes, and stronger institutional coordination. The continuation of the Regional Road Grant Program (PHJD), is expected to play a key role, alongside synchronized assistance programs that channel central funds to local governments for priority rehabilitation.

To fill the funding gap, estimated at IDR 1,267 trillion between 2025 and 2029, the government is exploring multiple schemes. These include regional budgets (APBD), central transfers (APBN), specific road funds, and blended financing models. The Indonesian Resilient Road Transport Improvement Program (IRRTP), supported by international lenders such as the World Bank and potential co-financing with institutions like Asian Development Bank and Islamic Development Bank, will also contribute. In line with the Presidential Instruction on Regional Roads 2025–2029, funding allocations will be prioritized for disadvantaged areas and regions critical to the national logistics network.

Institutional reform is another important element. The roadmap for 2019–2029 calls for the strengthening of regional road governance through capacity building, better coordination between ministries, and streamlined financing channels.

In 2023, the Government of Indonesia issued Presidential Instruction (Inpres) No. 3/2023 as part of its short-term strategy to accelerate the improvement of regional road quality for the period 2023–2024. This policy reflects the government's recognition of the role that regional roads play in supporting economic growth, reducing logistics costs, and integrating production centers with broader markets. Given that regional roads constitute the majority of Indonesia's road network and are particularly critical in rural districts, the instruction carries significant implications for accessibility in disadvantaged areas.

The program has four main objectives: promoting economic growth, lowering logistics costs, integrating economic centers, and improving road stability. Its scope is broad, ranging from new construction and capacity building to reconstruction, rehabilitation, and routine maintenance. Bridge maintenance and technical support are also included, ensuring that key supporting infrastructure is addressed alongside road surfaces.

The policy direction focuses on ensuring that regional road development activities are connected, integrated, and productivity-enhancing. This includes the allocation and monitoring of budgets, the removal of barriers to implementation, and the improvement of road stability in

areas serving strategic industries. Special attention is given to the new Indonesian Capital City, where surrounding roads will be widened to avoid congestion. Importantly, the instruction also aims to equalize conditions in regions with unstable roads, which has direct consequences for rural accessibility in provinces where damage levels remain high.

The instruction establishes clear criteria for prioritizing road sections:

1. Strategic Area Criteria: Roads that support industrial, tourism, plantation, and agricultural areas are prioritized, including strategic industrial hubs such as Morowali, Weda, Konawe, and Tanjung Selor. This ensures that economic activities in both industrial corridors and agricultural hinterlands are linked more effectively to markets.
2. Road Stability Criteria: Sections of regional roads in unstable condition, whether lightly or severely damaged, are prioritized for rehabilitation. Many of these are located in rural regencies where road quality lags behind urban areas.
3. Road Connectivity Criteria: Roads that serve logistics routes, transportation hubs, and connect with higher-level networks such as toll roads are prioritized. This has particular importance for rural producers, as it facilitates the movement of agricultural goods and raw materials to national and international markets.

For rural and underdeveloped regions, this instruction is significant. By prioritizing roads in unstable condition and those that connect agricultural and plantation areas, the program directly targets the infrastructure gaps that isolate rural communities. Improved stability and connectivity will reduce transport costs for rural producers, expand access to health and education services, and strengthen rural participation in regional supply chains.

As part of the implementation of Presidential Instruction No. 3 of 2023, regional road and bridge maintenance projects have been distributed nationwide. In total**,** 561 projects have been allocated, with a combined budget of IDR 15.5 trillion**,** covering all provinces in Indonesia. Responsibility for implementation is shared across 31 provincial governments, 278 regency governments, and 30 city governments**,** reflecting the multi-level governance structure of Indonesia's road management system.

The scale of the works is significant. Road maintenance projects cover 3,314.95 kilometers, while bridge maintenance spans 3,141.35 meters**.** The map in Figure 3.28 (2023–2024) illustrates the geographic spread of these projects, highlighting both the number of interventions and the financial allocations in each province.


**Figure 3.28: Distribution of regional road and bridge maintenance projects**

For rural and peripheral regions, the distribution of these projects has direct importance. By channeling resources to regency and provincial governments, the program targets the road segments most critical for linking villages and agricultural production zones to markets, services, and higher-level transport corridors. The fact that 278 regency governments are directly involved underscores the rural orientation of the initiative, as these are the jurisdictions where road quality issues most often translate into limited access to education, health, and economic opportunities.

## Rural maritime transport

Indonesia's maritime geography, encompassing over 17,000 islands and a marine jurisdiction of nearly 6.4 million km$^2$, defines both the opportunities and challenges for rural accessibility. The country's exclusive economic zone extends over 3 million km$^2$, complemented by a continental shelf of 2.8 million km$^2$ and inland waters of 3.1 million km$^2$. This vast maritime domain underscores Indonesia's reliance on waterborne connectivity for regional integration, especially in remote and border communities surrounded by neighboring states such as Malaysia, the Philippines, Papua New Guinea, Timor-Leste, and Australia (see Figure 3.29).


**Figure 3.29: Borders of the unitary state of Indonesia**

The government's flagship policy response to these geographic realities is the Sea Toll (Tol Laut) program, designed to strengthen accessibility for the so-called 3TP regions, *tertinggal* (disadvantaged), *terpencil* (remote), *terluar* (outermost), and *perbatasan* (border areas). By ensuring the regular distribution of goods at affordable prices, the Sea Toll mitigates regional price disparities, reduces economic inequality, and fosters new economic opportunities in peripheral regions. Consequently, maritime logistics has been positioned as both an instrument of equitable development and a driver of regional economic growth.

The operationalization of maritime connectivity in 2025 is reflected in the implementation of 39 freight routes (see Figure 3.30) served by 39 vessels, including 15 state-owned ships, five operated by the Indonesian National Shipping Limited Liability Company (PT Pelni), six under the River, Lake, and Ferry Transportation Limited Liability Company (PT ASDP), and thirteen managed by private operators. These services collectively involve 104 ports and are subsidized to cover ship operations, container services, and cargo handling. By mid-year 2025, 155 voyages had been completed out of a targeted 373, corresponding to a realization rate of 41.6%. Cargo flows reached 5,442 Twenty-foot Equivalent Units (TEUs) on outbound journeys, 1,106 TEUs on return, and an additional 377 tons of non-containerized freight. This model, which combines state assignment routes with competitive private auctions, demonstrates Indonesia's effort to balance efficiency, inclusiveness, and fiscal sustainability in its maritime logistics system.

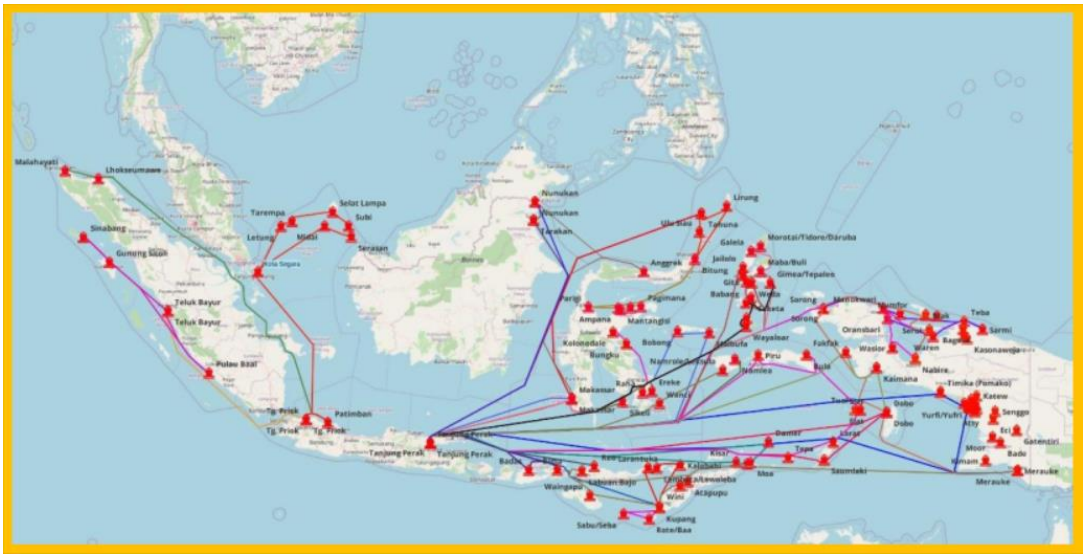


**Figure 3.30: Route map of implementation of maritime freight transportation**

Beyond the Sea Toll, Indonesia's Pioneer Shipping Program plays a critical role in bridging accessibility gaps. Legally defined through Law No. 17 of 2008 on Shipping and reinforced by subsequent regulations, pioneer shipping ensures connectivity to areas that are not commercially viable for private operators. In 2025, the network includes 107 routes served by 107 vessels across 28 provinces, reaching 480 ports of call through 45 designated base ports. Of these, 30 routes are state-assigned and 77 operated by private companies under subsidy contracts. The concentration of services in Eastern Indonesia, where 51% of routes are located, reflects the government's prioritization of regions with the most acute accessibility challenges (see Figure 3.31).

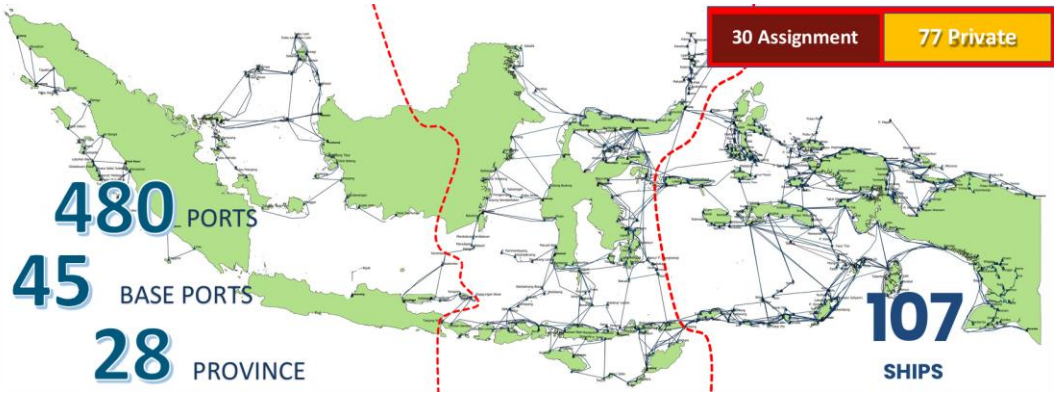



**Figure 3.31: The distribution of pioneer shipping routes across Indonesia's regions**

Between 2015 and mid-2025, the pioneer shipping program transported 7.46 million passengers and 1.33 million tons of goods. Cargo volumes rose from 113,860 tons in 2015 to a peak of 206,551 tons in 2024, before moderating to 104,966 tons in mid-2025. Passenger numbers similarly peaked at 1.44 million in 2022 before stabilizing at around 515,000 by mid-

2025. While the program remains modest in national transport terms, these figures highlight its indispensable role in sustaining mobility for isolated populations (see Figure 3.32 and Figure 3.33).

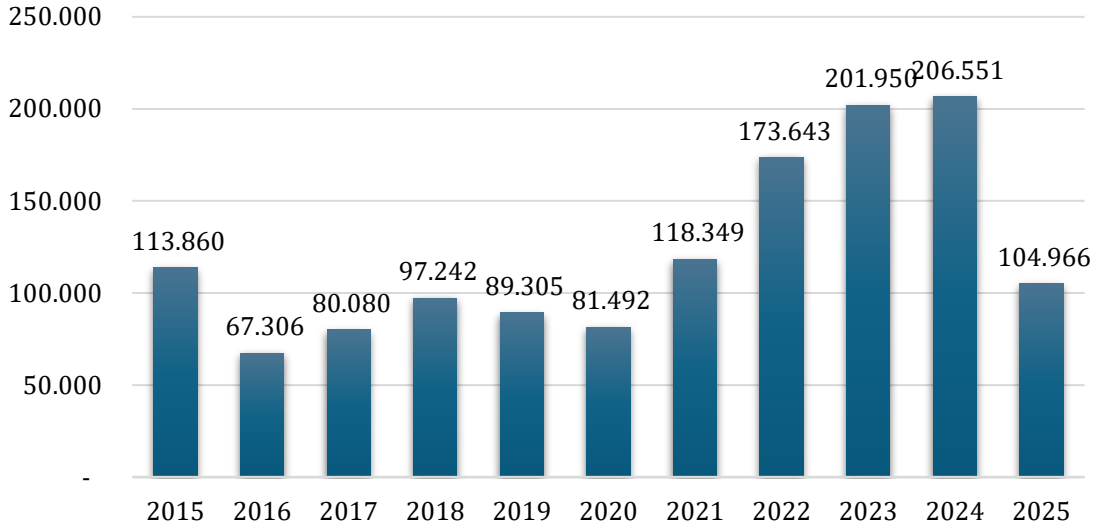



**Figure 3.32: Pioneer shipping cargo volume (tons) (June 2025)**

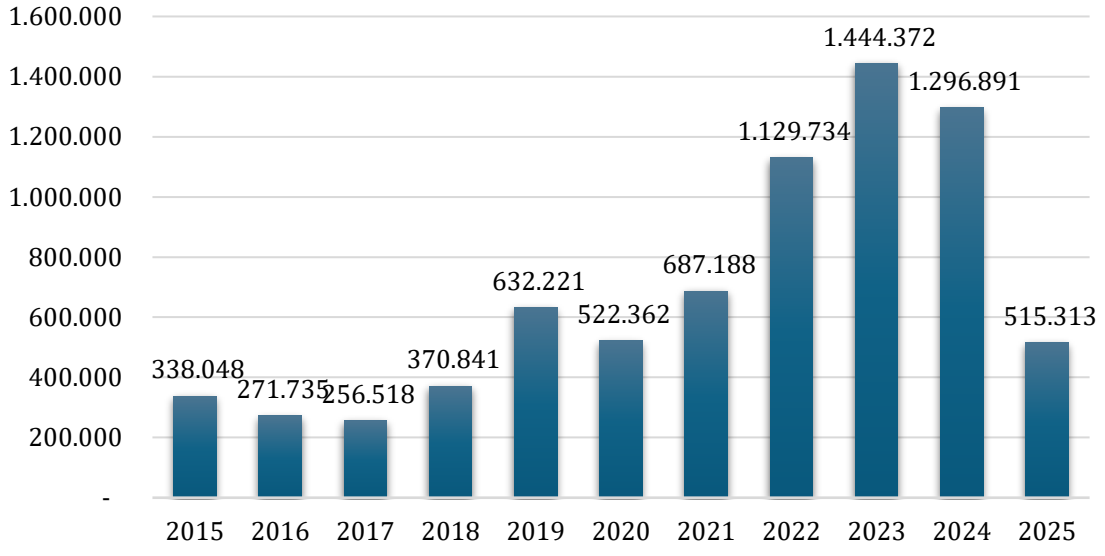



**Figure 3.33: Pioneer shipping passenger numbers (June 2025)**

To enhance efficiency and governance, Indonesia has pursued comprehensive digital integration in its maritime sector. The nationwide rollout of Indonesia Port Network (InaPortNet), an integrated port service system, has standardized vessel clearance and port operations across 264 ports by 2024. This initiative has not only improved efficiency but also earned international recognition from the International Maritime Organization (IMO), positioning Indonesia as a regional leader in maritime digitalization. Complementary systems, such as the Single

Submission Pengangkut (SSm Pengangkut), streamline reporting procedures and have already achieved 51.9% utilization for domestic and international operations by the end of 2024.

The financial impact of these reforms has been substantial. Non-Tax State Revenue from the Directorate General of Sea Transportation increased from IDR 769 billion in 2014 to IDR 6,131 trillion in 2024, with much of this growth attributed to enhanced transparency and efficiency in revenue collection. The modernization agenda also extends to maritime safety, with the introduction of the Indonesia Integrated Monitoring System on Navigation (I-MOTION), which integrates data from Automatic Identification System (AIS), radar, coastal radio, and Closed-Circuit Television (CCTV) feeds. This platform provides real-time surveillance of vessel movements, strengthens incident response, and integrates directly with InaPortNet, thereby aligning Indonesia's safety oversight with international e-Navigation standards.

In conclusion, Indonesia's rural maritime transport strategy reflects a multi-layered approach that combines direct service provision through pioneer shipping, broader economic integration via the Sea Toll, and systemic reforms through digitalization and navigation safety systems. Together, these initiatives address the geographic challenges of the archipelago, sustain vital links for remote communities, and reinforce Indonesia's position as a regional leader in inclusive and resilient maritime governance.

## 3.3. Republic of Türkiye

Türkiye stands as one of the most dynamic emerging economies, ranking 16th in the world by nominal GDP and 7th in Europe, with an estimated GDP of USD 1.32 trillion, accounting for about 1.25% of global economic output (World Bank, 2024a). In 2024, the economy expanded by 3.2%, supported by robust services, industry, and household consumption (TurkStat, 2025b). The population is around 85 million, with a modest annual growth rate of 0.34%, and 77% of citizens reside in urban areas (World Bank, 2023; TurkStat, 2025a). The country benefits from a youthful population, which fuels labor force dynamism, urbanization continues a steady upward trend, reflecting ongoing economic transformations (TurkStat, 2025a).

Geographically, Türkiye occupies a unique position at the crossroads of Europe, Asia, and the Middle East. The Bosphorus Strait remains one of the busiest maritime corridors in the world, while Turkish seaports, airports, and overland corridors make the country a pivotal logistics hub. Türkiye's logistics industry, valued at USD 100 billion, places it among the top 11 globally (EraiTurkey, 2024). Istanbul Airport, ranked the 8th busiest airport worldwide in 2024 with over 80 million passengers, highlights the country's importance as an international transit hub (OAG of Canada, 2024; Transport Chronicle, 2025). This connectivity strengthens Türkiye's role in trade, tourism, and energy transit, while positioning it as a bridge between developed and developing markets.

Approximately 23% of Türkiye's population, nearly 19.2 million people, live in rural areas (NASA, 2023), contributing significantly to agriculture, livestock production, and rural-based industries (TurkStat, 2025a). These communities also play an increasingly visible role in eco-tourism and cultural tourism, highlighting the socio-economic potential of rural regions. Government programs encourage diversification of rural economies beyond agriculture, fostering opportunities in rural tourism, crafts, and small-scale industries. This approach strengthens local livelihoods and contributes to reducing regional disparities.

Rural accessibility plays a crucial role in enhancing service delivery, agricultural productivity, and social cohesion. Türkiye performs relatively well in the RAI, with over 95.79 of its rural population estimated to have access to all-season roads (NASA, 2023). This figure reflects the long-standing prioritization of rural infrastructure within national development strategies. Accessibility improvements directly support healthcare access, education opportunities, and participation in wider markets. Special attention has been given to maintaining all-season road standards, upgrading secondary and tertiary roads, and aligning rural transport planning with sustainable development and disaster resilience objectives.

### 3.3.1. Overview of Türkiye

As of April 2025, Türkiye's road network managed by the General Directorate of Highways (GDH) extends to 68,601 km, including 31,780 km of hot-mix asphalt roads, 34,304 km of surface-treated roads, and 2,517 km of other types. Within this system, 3,796 km are motorways, and a total of 29,742 km (43%) are dual carriageways (GDH, 2025a). Rural accessibility policies place particular emphasis on maintaining all-season road standards and upgrading secondary and tertiary roads, ensuring that even remote settlements remain connected to regional and national networks.


**Figure 3.34: Map of Türkiye's highways** (DGM, 2025)

Türkiye's railway network covers over 13,919 km, with continuous investments in electrification, high-speed lines, and modernization projects (TSR, 2024). While freight transport is dominant, especially grain, minerals, and bulk cargo, the passenger network has expanded with high-speed lines linking Ankara–İstanbul, Ankara–Konya, and Ankara–Sivas. Despite this progress, rural integration into the rail system remains uneven, as many eastern and southeastern provinces are still underserved.

Türkiye's aviation sector, led by Istanbul Airport (the 8th busiest globally in 2024 with over 80 million passengers), includes a total of 57 civilian airports (SAA, 2024). While İstanbul, Ankara, and İzmir airports dominate international traffic, regional airports such as Erzurum, Diyarbakır, and Gaziantep provide critical connectivity for rural hinterlands, linking them to national and global markets. However, accessibility gaps remain in provinces without airports, where rural communities must rely on long road journeys to reach the nearest hub.

Türkiye operates more than 180 seaports and piers, with major hubs such as İstanbul, İzmir, Mersin, and Samsun positioning the country as a strategic maritime logistics hub. Coastal provinces benefit from direct sea access, facilitating both domestic cabotage and international trade, while landlocked rural regions lack direct maritime integration. For rural producers, maritime connectivity is crucial for reaching export markets via hinterland transport corridors.

Rural accessibility has been integrated into these broader transport investments, ensuring that rural settlements are effectively linked to regional and national networks. Special attention has been given to maintaining all-season road standards, upgrading secondary and tertiary roads, and aligning rural transport planning with sustainable development and disaster resilience objectives.

To further consolidate these gains, the government has implemented major programs such as Village Infrastructure Support Project (KÖYDES), Rural Development Investments Support Program (KKYDP), and Instrument for Pre-Accession Assistance in Rural Development (IPARD).

These initiatives have significantly strengthened connectivity, enabling rural communities to access essential services and markets more efficiently (MoAF, 2024) . The 12th Development Plan (2024–2028) emphasizes climate-resilient infrastructure, modernization of rural road networks, and the integration of digital technologies to support rural mobility (PSB, 2023a). Future priorities include the enhancement of public transport options in sparsely populated areas and the development of multimodal solutions that reduce isolation while promoting sustainable growth.

Rural accessibility in Türkiye plays a decisive role in sustaining socio-economic development. Rural areas, home to nearly 14.8 million people (17% of the population), contribute substantially to agriculture, livestock, forestry, and increasingly to eco- and cultural tourism (TurkStat, 2025a). Agricultural supply chains that feed large urban centers depend critically on reliable rural-urban connections, not only for the flow of goods but also for labor mobility and service provision. Enhanced rural accessibility supports poverty reduction, income diversification, and balanced territorial development.

Beyond economic productivity, accessibility underpins social inclusion. Healthcare, education, social services, and administrative functions are often concentrated in district and provincial centers; thus, the ability of rural residents to reach them quickly and reliably is essential for human development outcomes (MoNE, 2023). Similarly, rural households' access to healthcare often depends on family health centers, health houses, and mobile health units introduced by the Ministry of Health. According to the National Rural Development Strategy III (2021–2023), by 2021 a total of 658 mobile health teams were operating across rural Türkiye, particularly targeting remote settlements and disadvantaged groups such as seasonal agricultural workers (MoAF, 2021b)

Geographically, Türkiye exhibits substantial diversity: mountainous Eastern Anatolia, fertile coastal plains, inland basins, and semi-arid central steppes create highly differentiated accessibility conditions (Şimşek, 2015) Settlements in mountainous and dispersed areas face higher isolation risks, especially in winter months when heavy snowfall disrupts secondary and tertiary road usability. Coastal and plain areas, by contrast, typically enjoy higher connectivity due to denser infrastructure and economic clustering. This geographic heterogeneity makes accessibility not only a question of physical connectivity but also of equity across regions (MoAF, 2024)

### Village roads campaign and historical developments

The improvement of rural accessibility in Türkiye has its roots in the 'Village Roads Campaign' launched in the late 1950s, during the early decades of the Republic. The policy emphasized connecting villages to district centers to support education, agricultural marketing, and basic services. Rural road building was closely tied to national development and modernization efforts, with gravel and earth roads gradually upgraded to asphalt in high-priority corridors (SPO, 1963).

### National rural development strategies (UKKS I–II-III-IV)

Since the 2000s, Türkiye has institutionalized rural policy frameworks. The National Rural Development Strategies (UKKS), covering the periods 2007–2013 (UKKS I), 2014–2020 (UKKS II), 2021–2023 (UKKS III), and the newly adopted 2024–2028 (UKKS IV), placed accessibility as a pillar of rural welfare (MoAF, 2007, 2014, 2021b, 2024). Each strategy emphasized the

integration of rural transport networks with national infrastructure investments and the alignment of service accessibility with EU rural development standards (European Commission, 2022).

### Development plans and transport master plans

The 11th Development Plan (2019–2023) emphasized regional balance, digital integration, and rural infrastructure improvements (PSB, 2019) while the 12th Development Plan (2024–2028) prioritizes climate-resilient rural infrastructure, modernization of secondary/tertiary roads, and improved data-based rural definitions (PSB, 2023a).

In parallel, the 2053 Transport and Logistics Master Plan identifies rural accessibility as an indirect but critical element of national connectivity. The plan highlights sustainability, multimodal integration, and digitalization as cross-cutting principles (MoTI, 2023).

### EU accession process and SDGs

The EU alignment process through IPARD has shaped Türkiye's approach by introducing co-financed projects for farm-to-market roads and service accessibility (European Commission, 2022). Furthermore, Türkiye's commitment to the SDGs, particularly Goal 9.1.1 (RAI), has reinforced the monitoring of rural accessibility and service reach (UNSD, 2023).

### Place of rural access in national goals

Accessibility is not only framed as infrastructure but also as a social right and a means of reducing regional disparities. Policy discourse increasingly highlights inclusive mobility for disadvantaged groups, women, youth, elderly, disabled, and seasonal workers, as integral to rural accessibility agendas (MoAF, 2024; MoFSS, 2023).

### Current situation of rural accessibility in Türkiye

Rural accessibility in Türkiye is not merely a matter of physical infrastructure; it is a central pillar of national development strategies that links remote communities with education, healthcare, markets, and administrative services. The focus has historically shifted from building basic connections between villages and district centers to promoting inclusive mobility, disaster resilience, and digital integration. This evolution reflects the recognition that accessibility is a multidimensional enabler of socio-economic development and social equity.

Türkiye's rural accessibility agenda has been shaped by a long historical trajectory of legal frameworks, policy shifts, and targeted investment programs. Starting with the Village Law of 1923, which defined the responsibilities of local administrations for rural roads and basic services (MoI, 2021), successive national campaigns, development plans, and sectoral strategies progressively expanded the scope of accessibility. From the Village Roads Campaign in the 1950s to the Bussed Education system in the 1990s (MoNE, 2023), and later to comprehensive frameworks such as the UKKS I–IV (MoAF, 2007, 2014, 2021b, 2024), and the IPARD programs (European Commission, 2022), each milestone built upon earlier efforts. More recently, internationally co-financed projects such as Türkiye Resilient Landscape Integration Project (TULIP) and Türkiye Climate Smart and Competitive Agricultural Growth Project (TUCSAP) (MoAF, 2025) reflect how resilience and climate-smart agriculture have been integrated into the national rural development vision.

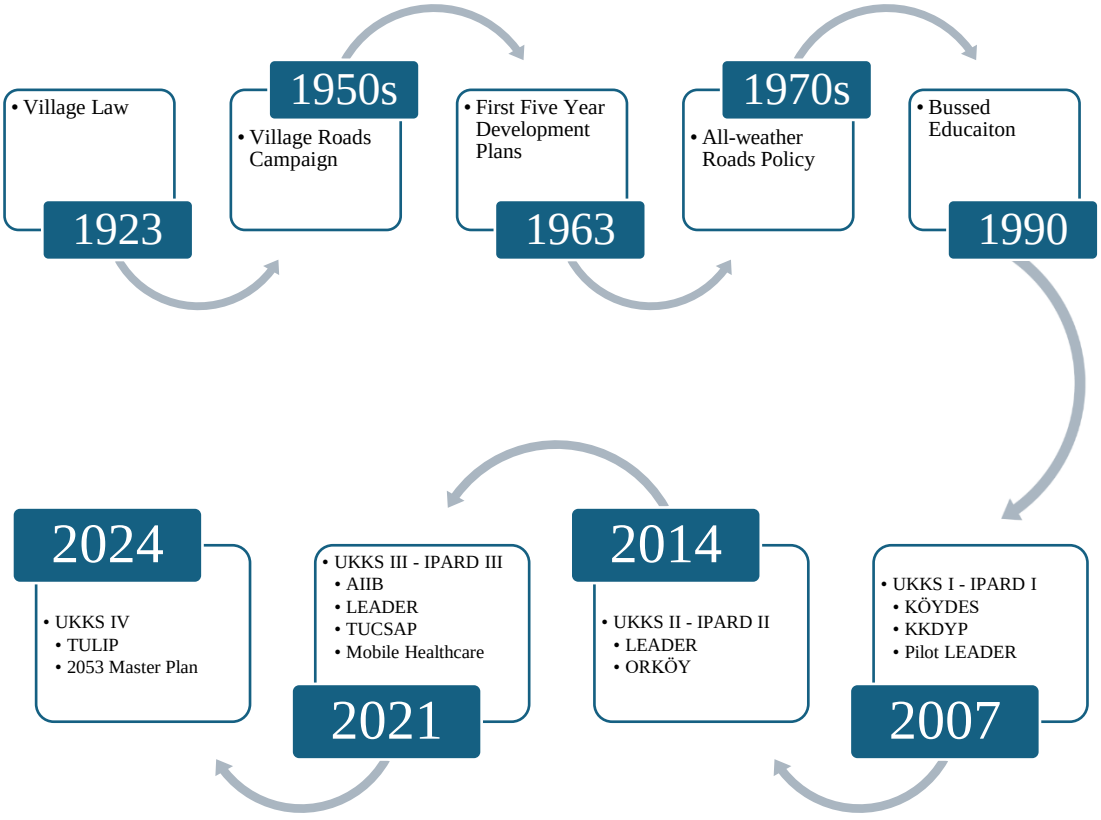



**Figure 3.35: Timeline of rural accessibility policies, strategies, and programs in Türkiye**

Figure 3.35 summarizes the main phases of Türkiye's rural accessibility policies, strategies, and concrete projects between 1923 and 2024. This timeline highlights how Türkiye's approach to rural accessibility has moved from early legal and campaign-based initiatives towards multi-sectoral strategies and internationally financed programs. The progressive alignment of rural policies with national development plans and sectoral strategies, particularly through the UKKS and IPARD frameworks, demonstrates how accessibility is no longer defined only by roads, but also by education, healthcare, digital connectivity, and climate resilience (ICTA, 2024b; MoAF, 2024; MoH, 2022). These milestones provide the foundation for the subsequent analysis of Türkiye's rural transport network and service accessibility.

### *Rural road network*

Rather than only measuring length or capacity, the rural road system demonstrates how state investment has shaped settlement patterns and economic opportunities. Campaigns such as the Village Roads Campaign of the 1950s and more recently KÖYDES highlight the central role of roads in extending all-season access to schools, healthcare facilities, and markets (MoI, 2021). These projects have not only reduced isolation but also ensured that rural households remain

connected to wider production and service networks, thereby supporting agricultural marketing and rural–urban integration.

Thus, while rural roads, forming part of Türkiye's 68,601 km national road network, of which 46% are rural roads composed of approximately 50% hot-mix asphalt and 4% surface-treated roads (GDH, 2025a), remain central, rail, sea, and air networks play complementary roles in linking rural settlements to broader transport corridors.

#### *Railway integration*

The country's 13,919 km railway network crosses several rural regions, providing critical freight connections for grain, minerals, and agricultural goods to ports and industrial centers, though rural passenger services remain limited (TSR, 2024).

The railway system contributes to rural accessibility primarily through its role in integrating agricultural basins and resource-rich areas with national and international markets. While freight has remained dominant, ongoing modernization aligns with the broader accessibility agenda by improving logistical efficiency. The absence of extensive rural passenger coverage underscores the importance of multi-modal strategies: rural accessibility cannot rely on roads alone, but rail enhances resilience by diversifying transport modes and reducing dependence on vulnerable secondary and tertiary roads (MoTI, 2023).

#### *Air and maritime access*

Türkiye's rural transport backbone is predominantly road-based, yet other modes also intersect with rural areas. Türkiye's 57 civilian airports (SAA, 2024) indirectly serve rural populations; regional airports such as Erzurum, Diyarbakir, and Gaziantep are vital for connecting rural hinterlands to national and global markets. Maritime transport supports coastal and island villages, particularly in the Aegean and Marmara, facilitating both passenger and cargo flows.

Airports and ports do not serve every rural community directly, yet their impact on rural accessibility is significant. Regional airports in Anatolia function as gateways for rural hinterlands, connecting producers of perishable goods such as fresh fruits, flowers, and fish to national and global markets. Similarly, seaports support rural producers by enabling export-oriented value chains. Their contribution is indirect but essential: by linking rural production corridors to international logistics networks, they enhance rural competitiveness and create incentives for rural entrepreneurship (DGM, 2025).

### Public transportation in rural areas

Public transportation in rural Türkiye is characterized by a predominance of road-based modes. Shared minibuses, midibuses, and contracted school buses remain essential for daily commuting to district centers.

### *Rural transport methods and modalities*

Rural mobility is dominated by road-based passenger and freight solutions:

- ✓ Shared minibuses, midibuses, and contracted school buses (bussed education *system*) provide daily connectivity between villages and district centers (MoNE, 2023).
- ✓ Freight relies on small trucks, tractors, and cooperative-organized logistics, particularly during harvest seasons (MoAF, 2024).
- ✓ Railways carry bulk commodities from rural production basins to ports and cities, supporting agricultural exports, while maritime services connect rural island and coastal settlements.
- ✓ Air transport, although not village-based, enables perishable rural products (fresh fruits, flowers, fish) to reach urban and global markets via regional airports.

This system illustrates a multi-modal but road-dominated structure, where informal methods (tractors, private cars) remain critical in areas underserved by formal networks.

### *Rural transport business models and licensing*

Rural transport operates under mixed models combining public subsidies and private operators. Passenger services such as minibuses and taxis are typically run by cooperatives or small enterprises licensed by municipalities and provincial administrations (MoTI, 2023). Freight is largely market-driven, though cooperatives sometimes pool resources for shared logistics. The public sector provides targeted subsidies, most notably for bussed education system and rural road investments (MoI, 2021; MoNE, 2023)

Passenger licensing follows a dual framework**:** the Ministry of Transport and Infrastructure (MoTI) regulates intercity services, while local governments manage shared minibus, midibus, and taxi concessions (MoTI, 2023). However, rigid route-based licensing can limit flexibility in sparsely populated villages. As a result, informal transport practices, such as tractors or private vehicles carrying passengers, remain widespread. Taxis, though licensed, are scarce and often too expensive for regular rural use, serving instead as emergency or ad hoc solutions.

### *Role of local governments in rural transport*

Local administrations, municipalities, provincial special administrations, and village unions, are responsible for maintaining secondary/tertiary rural roads and overseeing local passenger services. They coordinate with cooperatives and allocate licenses, but their effectiveness is hampered by budgetary shortages, limited technical capacity, and fragmented responsibilities (PSB, 2023a). Central ministries continue to dominate financing and standard-setting, often leaving local bodies with implementation duties but without adequate resources. This imbalance creates regional disparities, as wealthier provinces are better positioned to maintain rural networks than poorer ones.

### *Transport services for disadvantaged groups*

Women, the elderly, people with disabilities, and seasonal agricultural workers face additional challenges. For these groups, lack of barrier-free vehicles, irregular services, and high fares exacerbate inequalities. Expanding targeted services such as affordable rural transport, mobile clinics, and inclusive digital solutions is vital for equitable rural accessibility. (MoFSS, 2023)

### *Digital connectivity*

Digital infrastructure has become a transformative dimension of rural accessibility. Stable broadband and mobile coverage enable rural households to access e-government platforms, e-commerce, telemedicine, and distance learning opportunities, positioning digital networks as complementary enablers of social inclusion rather than secondary to physical transport.

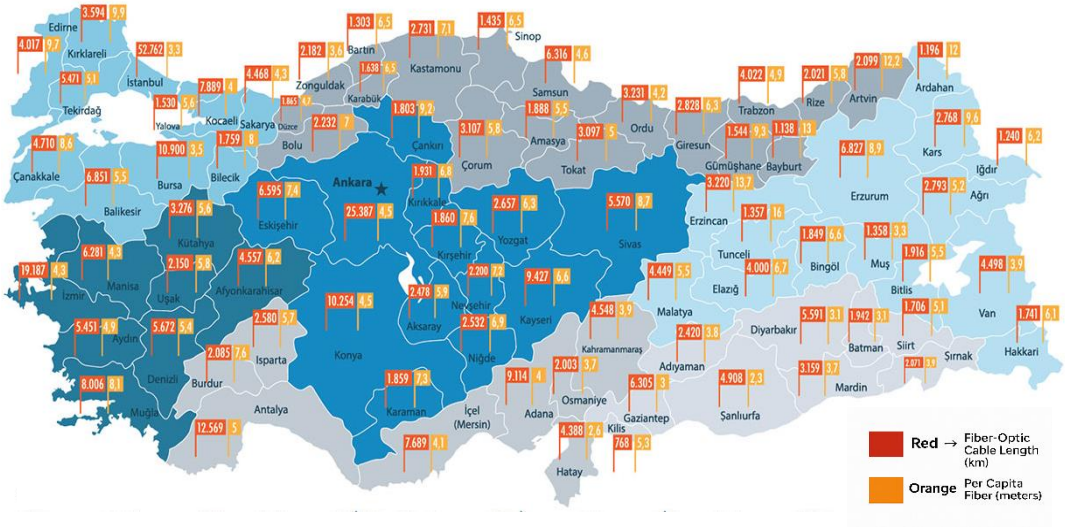



**Figure 3.36: Fiber network coverage by province** (Webtekno, 2024)

In Türkiye, projects such as the National Smart Transport Systems Strategy (MoTI, 2020) and the expansion of the national fiber backbone have reshaped how rural residents connect with essential services. As shown in Figure 3.36, the distribution of fiber-optic infrastructure remains highly uneven across provinces, with major metropolitan regions like Ankara, Istanbul, and Izmir hosting the largest fiber lengths, while eastern and southeastern provinces lag behind in per capita availability (Webtekno, 2024).

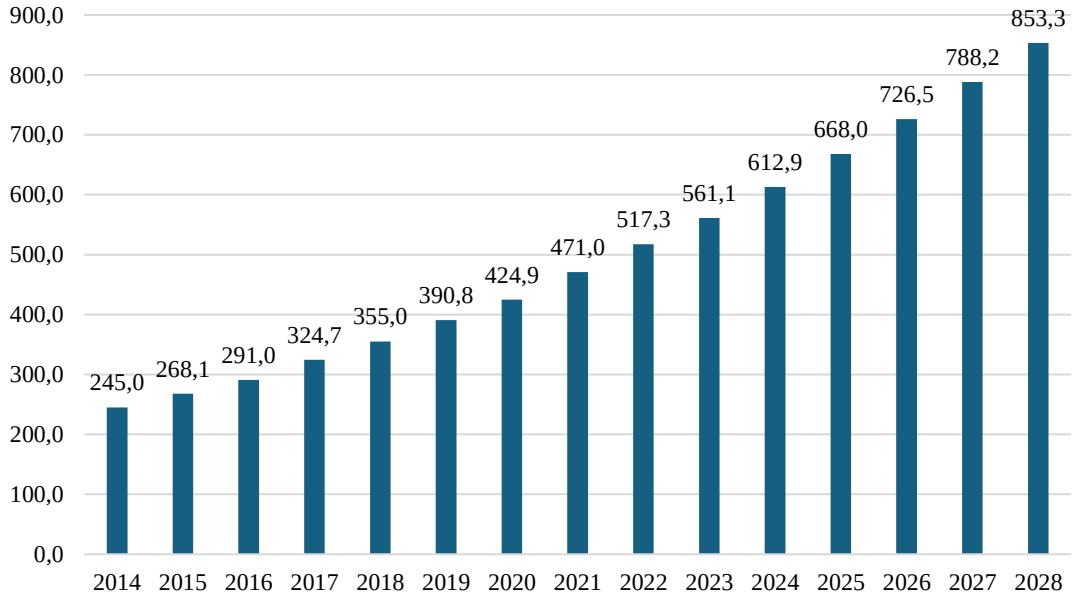



**Figure 3.37: Fiber line length by year in Türkiye (thousand km)** (ICTA, 2024a)

Similarly, Figure 3.37 demonstrates the rapid growth of Türkiye's fiber network, from 245,000 km in 2014 to over 612,000 km in 2024, with projections exceeding 850,000 km by 2028 (ICTA, 2024a). This expansion illustrates significant progress in closing the infrastructure gap, yet rural areas still experience persistent disparities in both speed and reliability.

Despite nationwide 4G rollout and increasing fiber penetration, weak digital connectivity continues to undermine equal access, particularly in low-density settlements. This reinforces the urgency of targeted rural broadband investments, combined with initiatives to improve digital literacy, so that rural communities can fully participate in economic and social life (ICTA, 2024b).

### *Services accessibility*

#### *Education*

The bussed education system has been a cornerstone of rural accessibility policies, ensuring that students from remote villages can attend schools in district centers (MoNE, 2022, 2023). Beyond transport, this system represents an equalization mechanism, ensuring that geographical location does not determine educational opportunity. Table 3.9 illustrates the scale and gender distribution of transported students, highlighting the program's role in bridging educational gaps between rural and urban areas (MoNE, 2025).

**Table 3.9: Bussed education system statistics** (MoNE, 2025)

| Education Year | Primary School | | | Secondary School | | | Total Number of | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Total Transported Students | | | Number of Total Transported Students | | | Of Central School | Of Transported Schools* | Students | | |
| | Total | Males | Females | Total | Males | Females | | | Total | Males | Females |
| 2023-2024 | 258,751 | 131,601 | 127,150 | 355,929 | 180,302 | 175,627 | 12,921 | 31,559 | 614,680 | 311,903 | 302,777 |
| 2022-2023 | 297,995 | 152,069 | 145,926 | 476,630 | 255,070 | 221,560 | 13,050 | 32,404 | 774,625 | 407,139 | 367,486 |
| 2021-2022 | 260,562 | 132,735 | 127,827 | 416,577 | 211,349 | 205,228 | 12,462 | 41,907 | 677,139 | 344,084 | 333,055 |
| 2020-2021 | 288,579 | 146,829 | 141,750 | 433,540 | 220,002 | 213,538 | 12,058 | 41,845 | 722,119 | 366,831 | 355,288 |
| 2019-2020 | 273,382 | 139,089 | 134,293 | 481,173 | 243,769 | 237,404 | 12,095 | 42,210 | 754,555 | 382,858 | 371,697 |
| 2018-2019 | 280,880 | 143,788 | 137,092 | 517,134 | 262,649 | 254,485 | 12,020 | 42,351 | 798,014 | 406,437 | 391,577 |
| 2017-2018 | 276,007 | 140,612 | 135,395 | 534,028 | 272,164 | 261,864 | 12,055 | 43,405 | 810,035 | 412,776 | 397,259 |
| 2016-2017 | 269,114 | 137,291 | 131,823 | 549,725 | 279,789 | 269,936 | 11,918 | 43,514 | 818,839 | 417,080 | 401,759 |
| 2015-2016 | 288,883 | 147,088 | 141,795 | 519,449 | 265,198 | 254,251 | 11,853 | 43,959 | 808,332 | 412,286 | 396,046 |
| 2014-2015 | 302,047 | 153,738 | 148,309 | 548,358 | 282,455 | 265,903 | 10,748 | 54,126 | 850,405 | 436,193 | 414,212 |
| 2013-2014 | 281,068 | 143,238 | 137,830 | 544,022 | 278,196 | 265,826 | 10,551 | 44,534 | 825,090 | 421,434 | 403,656 |
| 2012-2013 | 274,504 | 139,810 | 134,694 | 536,305 | 274,362 | 261,943 | 7,037 | 46,036 | 810,809 | 414,172 | 396,637 |

* Of Transported Schools and Number of Transported Settlement Places without a School

As shown in the Table 3.9, more than 700,000 students rely annually on transported education, with boys and girls benefiting almost equally. This demonstrates how geography no longer determines educational opportunity.

### *Healthcare*

Rural residents often rely on family health centers, health houses, and mobile clinics. Ambulance services exist but face frequent delays, particularly during winter road closures. To address these gaps, mobile health teams, established under the National Rural Development Strategy and supported by the Ministry of Health, extend service outreach to remote communities (MoAF, 2021b; MoH, 2022). Their presence illustrates that accessibility depends not only on distance but also on the proactive delivery of essential services.

### *Finance*

Although rural banking penetration remains limited, many villages continue to lack physical bank branches, compelling households to travel to district centers for credit, insurance, and savings. State-owned banks and Postal and Telegraph Corporation (PTT) Bank provide partial coverage, yet significant spatial disparities persist. Against this backdrop, initiatives through PTT Bank and digital platforms underscore how financial inclusion in rural areas is increasingly linked to digital connectivity. The expansion of mobile and internet banking, used by 53.9% of internet users in 2024, illustrates the potential of digital finance to bridge access gaps. However, persistent digital divides in connectivity and infrastructure across rural provinces undermine the full realization of these opportunities, leaving households in disadvantaged areas at risk of financial exclusion (ICTA, 2024b; TurkStat, 2024).

### *Markets*

Rural marketplaces and weekly bazaars remain integral to household economies, providing vital venues for buying and selling goods as well as maintaining social cohesion in rural life. Yet, accessibility challenges, such as irregular minibus services and high transport costs, continue to limit participation, particularly for women and low-income households. These constraints not only reduce household income opportunities but also weaken local market dynamics.

The National Market Accessibility Index by Province further illustrates these disparities. As shown in Figure 3.38 (Şimşek, 2015), western provinces such as Istanbul, Izmir, and Bursa rank at the top of the index, indicating stronger market integration, while many eastern and southeastern provinces fall into the lowest categories (Şimşek, 2015). This uneven spread highlights the structural barriers rural communities face in reaching markets, reinforcing the importance of targeted interventions.


**Figure 3.38: National market accessibility index by province (in terms of spread)**

National projects such as Links Between Actions for the Development of the Rural Economy (LEADER) and IPARD-supported farm-to-market infrastructure directly address these barriers by strengthening both physical and institutional connectivity, underscoring the critical role of integrated rural transport and development policies in sustaining vibrant local markets (MoAF, 2021a, 2024).

### *Public services*

Administrative services in Türkiye are largely concentrated in district and provincial capitals, creating barriers for residents of remote villages. The e-Government (*e-Devlet — www.turkiye.gov.tr*) platform offers a critical digital alternative by enabling rural citizens to conduct essential procedures, such as taxation, social security, healthcare appointments, and permits, without the need for physical travel (e-government.com, 2025; ICTA, 2024b). This shift illustrates that accessibility is no longer confined to physical transport but extends to functional reach, where digital tools complement mobility systems. Nevertheless, the platform's

transformative potential is constrained by limited digital literacy and uneven internet coverage in rural areas, highlighting the continuing importance of integrating digital capacity-building with transport and infrastructure investments.

### 3.3.2. National Policies and Projects

#### Institutional and legal framework

Türkiye's rural accessibility policies are guided by a multi-layered institutional and legal framework. At the central level, the MoTI and the GDH play leading roles in planning and maintaining rural roads. The Ministry of Agriculture and Forestry (MoAF) contributes by aligning rural accessibility with agricultural productivity, forestry villages, and environmental goals (MoAF, 2024; MoTI, 2023).

At the local level, Provincial Special Administrations, municipalities, and regional development agencies manage rural infrastructure at the provincial and district scale. Development agencies also prepare regional transportation strategies to complement national master plans (MoTI, 2023).

International actors such as the EU, World Bank, Food and Agriculture Organization (FAO), and IFAD have supported rural accessibility projects in Türkiye through technical assistance, funding, and policy dialogue (European Commission, 2022; MoAF, 2024; PSB, 2023b).

Stakeholder participation is increasingly recognized as vital. Civil society organizations, farmer associations, cooperatives, and village councils are consulted in program design, particularly within EU-supported schemes like LEADER. This participatory approach aims to ensure local ownership and sustainability (MoAF, 2021a).

The legal and regulatory framework includes specific legislation on village roads, as well as broader strategic frameworks such as the UKKS, the 12th Development Plan (2024–2028), and the 2053 Transport and Logistics Master Plan. In addition, Türkiye's Intelligent Transportation Systems (ITS) Strategy seeks to integrate digital technologies into rural transport monitoring (MoAF, 2024; MoTI, 2023).

#### Key programmes and initiatives

Several flagship programs directly target rural accessibility:

- **National Campaigns and Rural Road Programs:**

  The "Village Roads Campaign" initiated in the 1950s marked the first systematic effort to integrate rural settlements into the national transport network. Under this program, tens of thousands of kilometers of village roads were constructed or upgraded, aiming to connect rural households with district centers (SPO, 1963). By the late 1970s, the policy focus expanded toward ensuring all-weather connectivity, reducing reliance on earth roads that were prone to seasonal disruption (GDH, 2025a, 2025b)

- **UKKS I–IV:**

  Türkiye institutionalized rural policy frameworks through the UKKS:

  - **UKKS I (2007–2013):** Introduced under the Ninth Development Plan, emphasized farm-to-market road projects and basic service accessibility (MoAF, 2007).
  - **UKKS II (2014–2020):** Focused on multi-sectoral integration of rural infrastructure, including broadband, education, and healthcare (MoAF, 2014).
  - **UKKS III (2021–2023):** Prioritized resilience and disaster preparedness, ensuring rural road durability after floods, landslides, and earthquakes (MoAF, 2021b).
  - **UKKS IV (2024–2028):** The most recent strategy, highlights climate-resilient rural road planning, GIS, and equity-oriented rural service provision (MoAF, 2024).

- **KÖYDES:** Since 2005, focused on improving rural roads, water, and sanitation systems, covering more than 35,000 villages (MoI, 2021).
- **ORKÖY (Forest Villages Development Program):** Provides infrastructure and livelihood support to forest-dependent rural communities, reducing rural isolation (MoAF, 2020).
- **IPARD:** EU-financed program funding farm-to-market roads, storage facilities, and service accessibility (European Commission, 2022).
- **LEADER:** Promotes community-led local development in rural areas, strengthening bottom-up participation (MoAF, 2021a).
- **Bussed Education:** Provides bus services for students from remote villages to reach schools, ensuring equal access to education (MoNE, 2022).
- **Mobile Healthcare Services:** Extends health access to underserved rural communities via mobile clinics (MoH, 2022)
- **TULIP & TUCSAP:** TULIP (2021) and TUCSAP (2022) are World Bank–supported programs with the MoAF to boost rural resilience. TULIP targets watershed and road improvements, while TUCSAP advances climate-smart farming, as noted in MoAF's 2025 interim report (MoAF, 2025; World Bank, 2021)
- **Türkiye Emergency Road Rehabilitation and Reconstruction Project:** This project supported by the Asian Infrastructure Investment Bank (AIIB), was initiated after the February 2023 earthquakes to restore damaged rural roads, tunnels, and bridges. Beyond emergency repair, the project incorporates climate-resilient standards, reflecting Türkiye's approach to align disaster response with long-term rural accessibility strategies (AIIB, 2024)
- **Internationally funded projects**: IFAD-supported rural market access schemes and World Bank co-financed rural connectivity projects have improved road durability and enhanced agricultural supply chains.

Success stories highlight that rural road upgrades have improved access to agricultural markets by around 20–25% in various contexts, boosting farmers' incomes and lowering transport costs (World Bank, 2019). In Türkiye, similar outcomes have been observed under EU co-financed IPARD projects, which strengthened farm-to-market connections and rural service accessibility (European Commission, 2022).

Rural accessibility policies in Türkiye have evolved from nationwide road campaigns in the 1950s to multidimensional strategic frameworks in the 2000s and beyond. The focus shifted from transport-oriented mobilization programs to institutionalized UKKS I–IV and EU-aligned framework programs (IPARD I–III). These frameworks guided investments in roads, digital infrastructure, education, and healthcare. The following table summarizes the main policies and strategy frameworks, their focus areas, financial models, and indicative budgets.

**Table 3.10: Türkiye's national policies**

| Year | Policy / Legislation | Focus | Budget |
|---|---|---|---|
| 1950s | Village Roads Campaign | Village–district connectivity | Financed by the labor of the villagers |
| 1970s | All-weather Roads Policy | Seasonal closure reduction | - |
| 2007-2013 | UKKS I | Farm-to-market roads, basic services | - |
| 2007-2013 | IPARD | Farm-to-market roads, storage facilities | ~ EUR 400 million (2007–2013) |
| 2014-2020 | UKKS II | Broadband, education, healthcare integration | - |
| 2014-2020 | IPARD II | Farm-to-market roads, storage, rural infrastructure, LEADER | ~ EUR 801 million (2014–2020) |
| 2021-2023 | UKKS III | Disaster preparedness in rural roads | - |
| 2021-2027 | IPARD III | Farm-to-market, climate-smart agriculture, rural services | ~ EUR 560–600 million (2021–2027) |
| 2024-2028 | UKKS IV | Watershed & Climate-resilient rural roads | - |

As seen in Table 3.10, the early decades emphasized road construction and all-weather connectivity, while later strategies broadened the agenda to cover social services, digital infrastructure, and disaster resilience. The IPARD programs stand out for channeling substantial EU funds into Türkiye's rural development, complementing national strategies with farm-to-market road projects and community-led initiatives. Together, these frameworks illustrate how rural accessibility became embedded in Türkiye's wider development vision."

In addition to strategic frameworks, Türkiye has implemented a wide range of concrete programs that directly shaped rural accessibility. Nationally funded initiatives such as KÖYDES, ORKÖY, the Bussed Education system, Mobile Healthcare Services, and KKYDP have played a vital role in connecting rural households to essential services. At the same time, internationally financed projects such as TULIP, TUCSAP, and IFAD-supported schemes introduced innovative approaches to road resilience and rural livelihoods. Table 3.11 provides an overview of these implementation programs, their main focus, financial models, and indicative budgets.

**Table 3.11: Projects related to rural accessibility in Türkiye**

| Year | Project Name | Focus | Budget |
|---|---|---|---|
| 1990-ongoing | Bussed Education | School transport for rural students | Turkish Liras (TL) 19.1 billion/annual (2023-2024) |
| 2005-ongoing | KÖYDES | Rural roads, water, sanitation | TL 16.8 billion (2005-2021) + TL 1.8 billion (2022) |
| 2006-ongoing | KKYDP | Processing, storage, infrastructure, market access | TL 4 billion (2006-2022) |
| 2020 | ORKÖY | Forest villages, livelihoods | TL 30 billion (2025 currency) |
| 2021-2028 | TULIP | Watershed & rural road resilience | EUR 111.8 billion |
| 2022-2028 | TUCSAP | Climate-smart farming | EUR 304.8 billion (2022-2028) |
| 2022 | Mobile Healthcare Services | Health access in remote areas | N/A |
| 2022 | LEADER | Community-led local development | Part of IPARD (~ EUR 50 million) |

Table 3.11 highlights the complementarity between national and internationally financed programs. While national programs focus on providing basic infrastructure and services to rural households, international projects have contributed innovations in resilience, climate-smart agriculture, and financing mechanisms. Programs such as KÖYDES and KKYDP illustrate the scale of domestic investment in rural infrastructure, whereas TULIP and TUCSAP show how World Bank loans are combined with national co-financing to promote sustainable solutions. This diversity demonstrates that rural accessibility in Türkiye is shaped by both central budget allocations and global funding partnerships.

## Financing mechanisms

Financing rural accessibility in Türkiye relies on a multi-layered structure, combining central government allocations, municipal resources, international development funds, and private sector contributions. Each of the flagship programs has developed distinct financing approaches to ensure sustainability and coverage. The majority of rural road and infrastructure investments are financed through the national budget, channeled via the MoTI and the MoAF. Programs like KÖYDES receive direct annual allocations from the central budget to support road paving, water supply, and sanitation projects. For example, between 2005 and 2020, KÖYDES benefited from more than TL 17 billion (approx. USD 2.3 billion) in budget transfers (MoI, 2021).

Provincial Special Administrations and municipalities co-finance rural projects, often using Bank of Provinces (*İlbank*) loans and grants. Bank of Provinces plays a crucial role by providing low-interest credit for infrastructure projects such as village road upgrades and rural drinking water networks (Bank of Provinces, 2020). In addition, Türkiye has effectively mobilized international resources to strengthen rural accessibility. The IPARD has funded rural road rehabilitation, farm access improvements, and storage facilities, with more than EUR 1.1 billion allocated since 2007 (European Commission, 2022). Similarly, IFAD and the World Bank have supported rural connectivity and climate-resilient infrastructure projects, focusing on improving farm-to-market linkages.

Beyond these, sector-specific financing mechanisms such as the ORKÖY program are financed through the General Directorate of Forestry, blending government resources with revolving funds aimed at forest-dependent villages. Small-scale credit schemes allow households to invest in renewable energy, road access improvements, and local enterprises (MoAF, 2020). The LEADER approach operates on a co-financing model, where EU funds are matched by national contributions, and local action groups mobilize community resources to support accessibility-related projects (MoAF, 2021a). Programs like bussed education and mobile healthcare services are financed directly by the Ministry of National Education and Ministry of Health, respectively, ensuring sustainable budgetary allocation for service-based rural accessibility.

While limited in rural road contexts, PPP models have been applied in logistics corridors and highway projects that indirectly benefit rural accessibility by improving regional connectivity. There is growing potential to expand PPPs into rural public transport and digital infrastructure, particularly under the framework of the 2053 Transport and Logistics Master Plan (MoTI, 2023). Overall, financing for rural accessibility reflects a blended approach, where central government commitments are reinforced by international cooperation and local co-financing. This structure not only diversifies funding sources but also strengthens resilience against budget fluctuations and ensures broader participation of stakeholders.

### Challenges

Despite significant progress in rural accessibility, Türkiye faces a number of persistent structural and operational challenges. The country's diverse topography, including mountainous Eastern Anatolia, high plateaus, and coastal lowlands, creates substantial barriers to rural road connectivity. In many regions, harsh winter conditions lead to seasonal road closures, particularly in high-altitude villages (GDH, 2025b, 2025a). Maintaining all-weather standards in such contexts requires high capital expenditure and continuous maintenance.

Although programs like KÖYDES and IPARD have mobilized large resources, rising construction and maintenance costs, coupled with inflationary pressures, often limit coverage. Small municipalities and provincial administrations struggle to co-finance projects, leading to uneven distribution of resources (MoTF, 2023; PSB, 2023b). At the institutional level, overlapping responsibilities between central ministries, provincial administrations, and municipalities sometimes hinder effective project delivery. For instance, while the Ministry of Transport oversees national road standards, local governments handle secondary and tertiary rural roads, leading to gaps in monitoring and quality assurance (MoTI, 2023).

Rural depopulation further exacerbates accessibility challenges. The aging population and outmigration of young people reduce demand for transport services but simultaneously increase the vulnerability of remaining groups (TurkStat, 2025a). Disadvantaged populations, which are women, the elderly, and people with disabilities, face additional accessibility barriers to health, education, and employment opportunities. Moreover, climate and disaster risks such as floods, landslides, and earthquakes frequently damage rural road infrastructure. The 2023 Kahramanmaraş earthquakes highlighted the vulnerability of both urban and rural connectivity, necessitating stronger disaster-resilient design (UNDP, 2023).

### Opportunities and strengths

Alongside these challenges, Türkiye possesses significant strengths and emerging opportunities to enhance rural accessibility. A strong policy framework provides continuity and coherence in long-term planning, as reflected in the UKKS IV (2024–2028) and the 2053 Transport and Logistics Master Plan, both of which explicitly integrate rural accessibility goals into broader development agendas (MoTI, 2023; PSB, 2023a). In addition, as a candidate country, Türkiye continues to benefit from access to EU IPARD funds, which not only offer substantial financial support but also introduce EU standards in rural infrastructure planning. Complementary partnerships with international organizations such as the World Bank, IFAD, and FAO further strengthen technical expertise and mobilize resources for rural development (European Commission, 2022).

Moreover, expanding rural road networks support diversification of the rural economy by facilitating eco-tourism, cultural tourism, and agro-tourism initiatives, which in turn create alternative livelihoods for rural populations. Improved accessibility enables local communities to market traditional crafts, organic products, and local gastronomy more effectively, thereby fostering inclusive growth (OECD, 2020b). Parallel to these economic opportunities, Türkiye has embraced digital and technological innovations. The integration of GIS-based rural road inventories and digital monitoring platforms enhances the targeting of investments and improves maintenance planning, while the National ITS Strategy provides a framework for applying smart mobility solutions to rural contexts (MoTI, 2020, 2023).

Finally, the increasing emphasis on climate-resilient infrastructure reflects a forward-looking policy orientation. The 12$^{th}$ Development Plan underscores climate adaptation as a priority, promoting practices such as road surfacing with sustainable materials, deployment of small-scale renewable energy systems for rural transport services, and implementation of erosion control measures. These initiatives demonstrate a growing momentum toward green and resilient infrastructure that can safeguard rural connectivity in the face of environmental and climate-related risks (PSB, 2023a).

## 3.4. Canada

Canada provides a particularly valuable case study in rural accessibility domain due to its unique geographic and demographic characteristics. As the world's second-largest country by land area, spanning nearly 10 million square kilometers, Canada faces the challenge of ensuring equitable connectivity across vast, sparsely populated, and often climatically harsh territories (Statistics Canada, 2023). Approximately 18% of Canadians live in rural areas, yet these communities are spread over enormous distances and encompass diverse geographies, from coastal fishing villages in the Atlantic to Indigenous settlements in the Arctic (World Bank, 2024). This geographic dispersion magnifies the significance of rural accessibility, making it a national priority for fostering cohesion, economic participation, and service delivery.

Canada's context highlights several dimensions that resonate strongly with challenges faced by OIC Member Countries. First, the country's extensive investments in multi-modal infrastructure, ranging from all-weather roads to subsidized air services and digital broadband programs, demonstrate that rural accessibility requires integrated approaches (Lemelin-Bellerose, 2023). Second, Canada's policy framework emphasizes equity, with particular focus on Indigenous communities and remote northern regions, which parallels the concerns of many OIC Member Countries with marginalized or geographically isolated populations. Third, the Canadian experience illustrates how innovation, such as telemedicine and drone-based delivery of medical supplies, can bridge accessibility gaps where conventional infrastructure is not feasible (Transport Canada, 2023).

While Canada represents a high-income country context, the structural issues it faces, low population density, remoteness, and service provision gaps, mirror challenges in many OIC Member Countries, albeit at different scales and under different socio-economic conditions. Thus, Canada's strategies offer transferable insights into how countries can pursue inclusive rural development by aligning infrastructure investment, service delivery innovation, and institutional coordination.

### 3.4.1. Overview of Canada

#### Geographic and demographic context

Canada's vast geography is the primary determinant of its rural accessibility challenges. With a land area of nearly 9.98 million $km^2$ and a population of only 40 million, its density is among the lowest in the world (Statistics Canada, 2025; World Bank, 2024). The population is concentrated in the southern corridor within 200 km of the USA border, while northern territories remain sparsely populated. Roughly 18% of Canadians, about 6.6 to 7 million people, live in rural areas (World Bank, 2024)

Canada performs well in the UN's RAI (SDG 9.1.1): 93.4% of the rural population lives within 2 km of an all-season road (NASA, 2023; Statistics Canada, 2023). Yet, 117 of 5,112 census subdivisions still lack any road or ferry connection to a service center, relying exclusively on seasonal ice roads, ferries, or aviation (Leach, 2022). Disparities are sharpest in Nunavut, Northwest Territories, and northern Quebec (Government of Canada, 2019).

Demographically, rural Canada is older than urban Canada due to youth migration for education and work (Channer et al., 2021). Indigenous peoples comprise a substantial share of rural residents, especially in northern communities, where accessibility challenges are compounded

by historical underinvestment (CIRNAC, 2019). The OECD emphasizes that rural well-being depends on multidimensional accessibility, transport, social services, and digital connectivity, rather than roads alone (OECD, 2020b).

### Economic contributions of rural areas

Rural Canada is economically significant. Agriculture, mining, forestry, and energy industries located in rural regions contribute nearly 30% of Canada's GDP and a large share of exports (Government of Canada, 2019b; World Bank, 2024c). The Prairies produce grain and livestock, the Atlantic supports fisheries, and the North hosts major mining projects. Market access for these industries depends heavily on transport infrastructure.

For farmers, poor rural roads can raise costs and reduce competitiveness. Perishable goods like dairy and vegetables require reliable logistics. Forestry and mining depend on heavy-duty roads to transport raw materials. Where access is weak, rural economies stagnate. In isolated northern communities, food and fuel are often 2–3 times more expensive than in cities, due to high transportation costs (CIRNAC, 2019).

### Physical accessibility

Canada's road network spans approximately 1.13 million two-lane equivalent lane-kilometres, supported by the Trans-Canada Highway and extensive provincial routes that connect most rural areas (Transport Canada, 2025). While this wide coverage places Canada among the global leaders in rural accessibility, maintaining the network is costly and complex. In northern regions, permafrost thaw and flooding frequently damage road infrastructure, intensifying the risk of seasonal isolation if investments are not sustained (Leach, 2022; Warren & Lulham N, 2021). Against this backdrop, the National Highway System (NHS) serves as the strategic backbone of Canada's overland mobility.

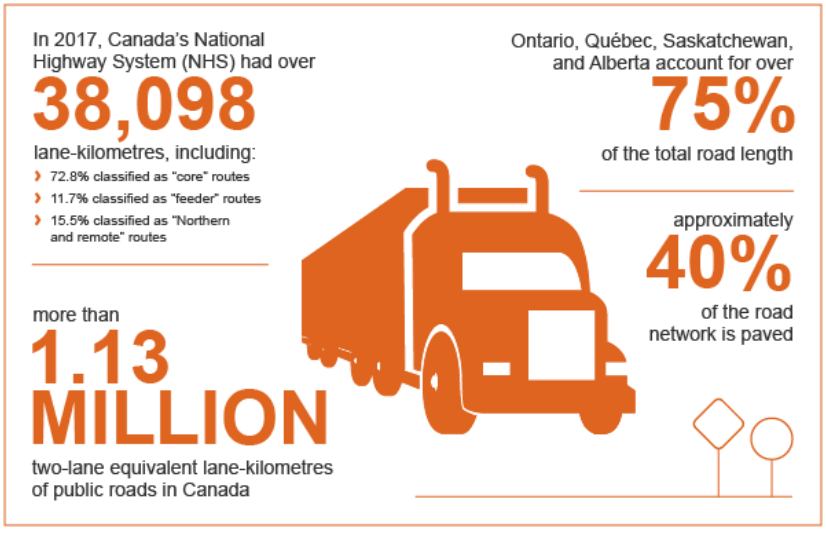



**Figure 3.39: Key statistics on Canada's national highway system**

Figure 3.39 presents the statistics of Canada's NHS, which covers more than 38,000 kilometres of the country's most important highways (Transport Canada, 2020e). Within the system, 72.8% are classified as core routes, 11.7% as feeder routes, and 15.5% as northern and remote routes. In 2017, the NHS comprised over 38,098 lane-kilometres, forming part of the broader road network of 1.13 million two-lane equivalent lane-kilometres. Ontario, Québec, Saskatchewan, and Alberta alone account for more than 75% of the total road length, while approximately 40% of the national network is paved (Transport Canada, 2020e). This classification highlights how accessibility varies across regions, with northern and remote routes particularly vulnerable to geographic and climatic pressures.


**Figure 3.40: Canada's highway system**

As shown in Figure 3.40 (Transport Canada, 2020e), Canada's NHS underscores that accessibility is not only about physical coverage but also about resilience and equity. While core routes secure cross-country integration, feeder and remote routes determine whether smaller and isolated communities can reliably reach service centres year-round. This reinforces the need for continuous investment in maintenance and climate adaptation strategies, ensuring that the extensive road system remains a sustainable foundation for Canada's rural accessibility framework.

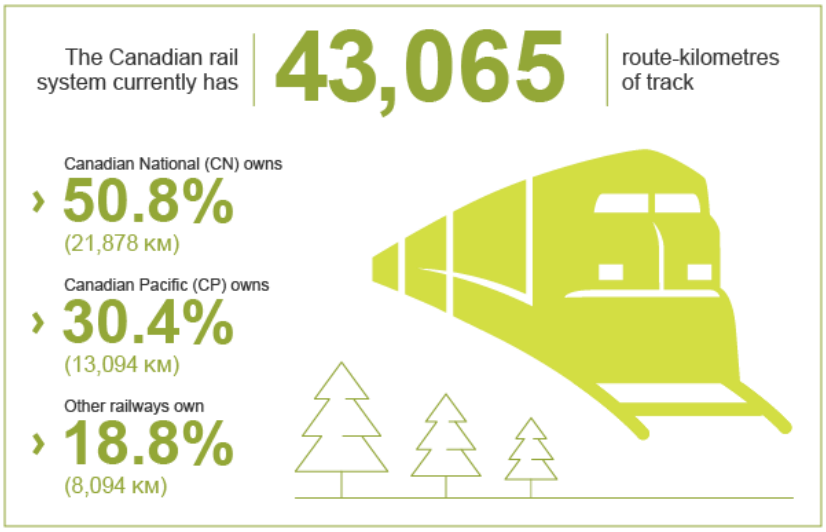



**Figure 3.41: Key statistics on Canada's national rail system**

Rail transport plays a strategic role in Canada's accessibility framework, particularly for freight and selected rural corridors. The Canadian rail system currently has 43,065 route-kilometres of track, making it one of the largest in the world (Transport Canada, 2020d). Two Class I railways dominate the network: Canadian National (CN), which owns 50.8% (21,878 km), and Canadian Pacific (CP), which owns 30.4% (13,094 km). The remaining 18.8% (8,094 km) is operated by regional and short-line railways that connect rural communities to larger corridors and ports (Transport Canada, 2020e) (see Figure 3.41).


**Figure 3.42: National railway system**

As illustrated in Figure 3.42 (Transport Canada, 2020d), Canada's rail infrastructure is structured around extensive east–west and north–south corridors. The figure highlights the ownership breakdown, with CN lines represented in blue, CP lines in red, and other operators in orange. This distribution shows how mainline railways dominate national freight flows, while smaller operators maintain accessibility in rural and resource-based regions. The presence of short lines is particularly important in ensuring that isolated communities remain linked to industrial and trade gateways.

Despite its scale, rural rail transport faces ongoing challenges. Over the past three decades, many low-density branch lines were abandoned due to declining ridership and high maintenance costs. This has increased reliance on road transport in some rural areas, raising concerns about long-term accessibility. Nevertheless, federal support programs and provincial initiatives have sought to preserve essential rail corridors, particularly in the North. In addition, Indigenous-led railway projects in Ontario and Québec illustrate how rail can combine economic development with community ownership, embedding cultural priorities into transport planning (Transport Canada, 2020d). Overall, Canada's railway system demonstrates that freight-dominated infrastructure can also deliver rural accessibility benefits when supported by targeted public service obligations and community partnerships.

Air transport is indispensable for Canada's remote communities. The Remote Air Services Program (RASP) supports approximately 140 communities without permanent road access, ensuring continuity of essential passenger and cargo flights (Transport Canada, 2023a). During the COVID-19 pandemic, the federal government provided up to CAD 174 million in emergency funding to maintain these vital links (Transport Canada, 2020f). In addition, the Airports Capital Assistance Program (ACAP) has invested more than CAD 1 billion in over 900 projects since 1995, supporting small regional airports across the country (Transport Canada, 2023a). The National Airports System (NAS) reflects how Canada ensures geographic coverage by maintaining strategically located airports across all provinces and territories.

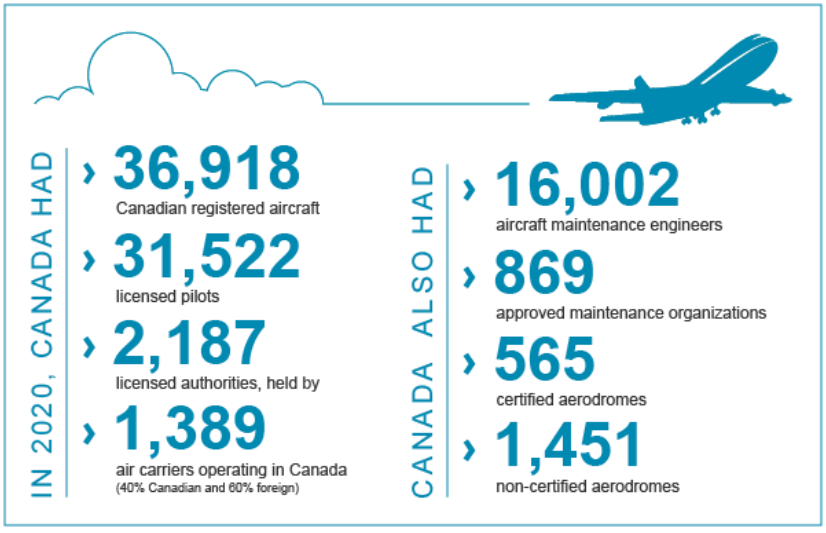



**Figure 3.43: Key statistics on Canada's national aviation system**

As shown in Figure 3.43 (Transport Canada, 2020a) Figure 3.44, the scale of Canada's aviation sector underscores its essential role in accessibility. By 2020, it comprised 36,918 registered aircraft, 31,522 licensed pilots, 2,187 licence authorities, and 1,389 air carriers, 40% Canadian and 60% foreign. The industry also employed 16,002 aircraft maintenance engineers, supported by 869 approved maintenance organizations, and operated through 565 certified and 1,451 non-certified aerodromes (Transport Canada, 2020a). Taken together, this infrastructure confirms that airports are not only transport nodes but also lifelines for freight, passenger mobility, and emergency evacuations. For many isolated regions, particularly fly-in communities in Nunavut, subsidized air connections remain the only year-round means of mobility and access to essential services.


**Figure 3.44: National airports system**

Figure 3.44 (Transport Canada, 2020a) illustrates the 26 airports of the NAS, distributed across the country: seven in the Atlantic Provinces, three in Québec, four in Ontario, six in the Prairies, three in British Columbia, and one in each territorial capital (Transport Canada, 2020a). This configuration demonstrates that even sparsely populated regions are linked through a minimum level of air infrastructure, making the system a critical complement where road or marine access is not feasible.

Marine transport is a critical lifeline for Canada's island and coastal communities. The Ferry Services Contribution Program provides federal subsidies to maintain essential ferry routes, primarily in Atlantic Canada, ensuring that isolated regions have reliable year-round access (Transport Canada, 2025a). Complementing this, Marine Atlantic, a federal Crown corporation, operates vital freight and passenger connections between Newfoundland and Nova Scotia, transporting 367,786 passengers and over 91,008 commercial vehicles annually (Atlantic, 2024).

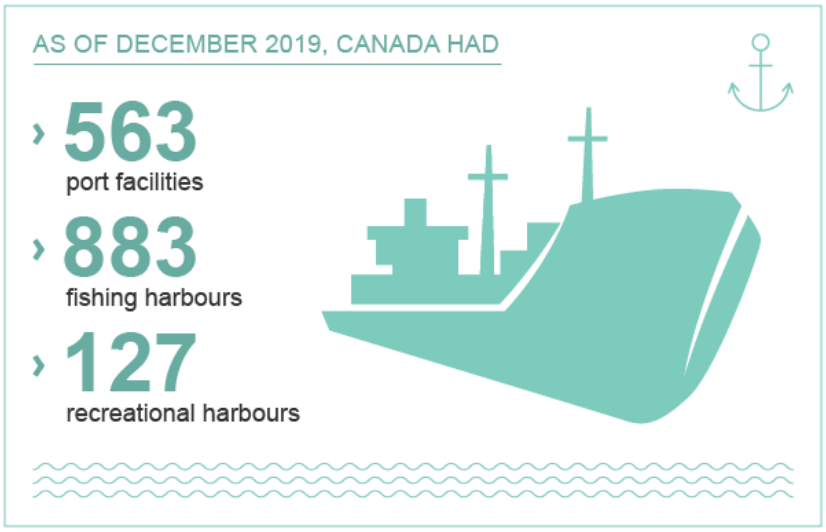



**Figure 3.45: Key statistics on Canada's national maritime system**

Figure 3.46 (Transport Canada, 2020b) presents the distribution of Canada Port Authorities, with 17 major ports across the country, including Halifax, Montréal, Vancouver Fraser, and St. John's. Four are in the Atlantic Provinces, five in Québec, four in Ontario, and four in British Columbia (Transport Canada, 2020b) . As of December 2019, Canada had 563 port facilities, 883 fishing harbours, and 127 recreational harbours.


**Figure 3.46: National ports system**

As shown in Figure 3.46 (Transport Canada, 2020b), ports are not only commercial gateways but also social connectors, ensuring that coastal and island communities remain integrated into national markets.

For the most remote communities, especially in Nunavut, where no permanent road access exists, mobility depends largely on air and seasonal marine routes, driving high costs (CIRNAC, 2019). To address such challenges, alternative solutions have also emerged. For example, the opening of the Inuvik–Tuktoyaktuk Highway in 2017 created the first all-season road to the Arctic Ocean, significantly reducing the cost of living in isolated settlements (GNWT, 2017). This demonstrates how marine services, complemented by selective road investments, together sustain accessibility for Canada's most remote populations.

Marine transport links island and coastal communities. The Ferry Services Contribution Program subsidizes essential Atlantic ferry routes (Transport Canada, 2025a), while Marine Atlantic provides freight and passenger connections between Newfoundland and Nova Scotia (Atlantic, 2024).

### Public transportation and mobility services

Rural Canada is car-dependent: over 90% of rural workers commute by private vehicle (IRPP, 2024). Those unable to drive, seniors, youth, low-income households, face transport poverty (Velaga, Beecroft, et al., 2012).


**Figure 3.47: Public transport assets owned by government organizations**

As illustrated in Figure 3.47 (Transport Canada, 2020c), the scale and diversity of Canada's publicly owned transport assets highlight the country's commitment to maintaining a robust and multi-modal system. In 2019, government organizations across Canada owned 17,896 buses of various types, which remain the backbone of public transit networks, particularly in urban and peri-urban areas. Complementing these are 3,646 railcars that sustain passenger rail services and freight operations across key corridors. Additionally, the system includes 1,281 specialized transit vehicles designed to provide accessible services for people with disabilities, as well as 247 streetcars that play a significant role in urban centers such as Toronto. Finally, the fleet also incorporates 8 ferries, which are vital in connecting island and coastal communities to the mainland. Collectively, these figures demonstrate how Canada integrates diverse transport modes to address both urban and rural mobility needs, ensuring inclusivity and resilience within its national transportation framework.

The collapse of Greyhound's intercity bus network in 2021 worsened mobility gaps, leaving many towns without connections (IRPP, 2024). To address this, the Federal Rural Transit Solutions Fund (RTSF) (2021) provides CAD 250 million for buses, on-demand shuttles, and Indigenous-led mobility projects (Infrastructure Canada, 2021). Local solutions also exist: community buses, volunteer driver programs, and ride-sharing initiatives.

Accessibility is not just about infrastructure but about affordable mobility. Without safe transport, vulnerable groups risk exclusion. The National Inquiry into Missing and Murdered Indigenous Women highlighted unsafe hitchhiking due to lack of transit (IRPP, 2024). Expanding rural transit is thus also a matter of equity and safety.

### Digital infrastructure and intelligent transportation systems (ITS)

In today's world, rural accessibility requires digital connectivity. By 2023, 95% of households had broadband ≥50/10 Mbps, but only 87% in rural areas, compared to 99% in urban centres (Lemelin-Bellerose, 2023). The Universal Broadband Fund (UBF) (2020) allocates CAD 3.2 billion to close this gap by 2030 (ISED, 2020). Canada's Connectivity Strategy sets clear milestones toward universal access, which are shown in Figure 3.48 (ised, 2025).

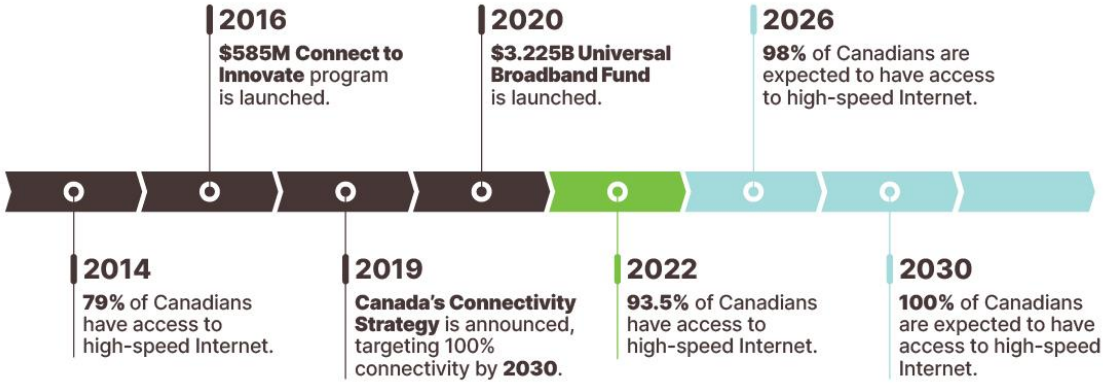



**Figure 3.48: Timeline for achieving universal high-speed internet access**

Figure 3.48 highlights that broadband targets are anchored in a phased national roadmap, not mere aspirations. Reliable Internet is essential for telehealth, e-learning, and e-commerce, without which rural residents face a "double isolation" of being both geographically remote and digitally excluded (Velaga, Beecroft, et al., 2012). As illustrated in Figure 3.49, Long Term Evolution (LTE) coverage approaches universality in urban centres, while rural areas also reach nearly the same access availability (CRTC, 2019).

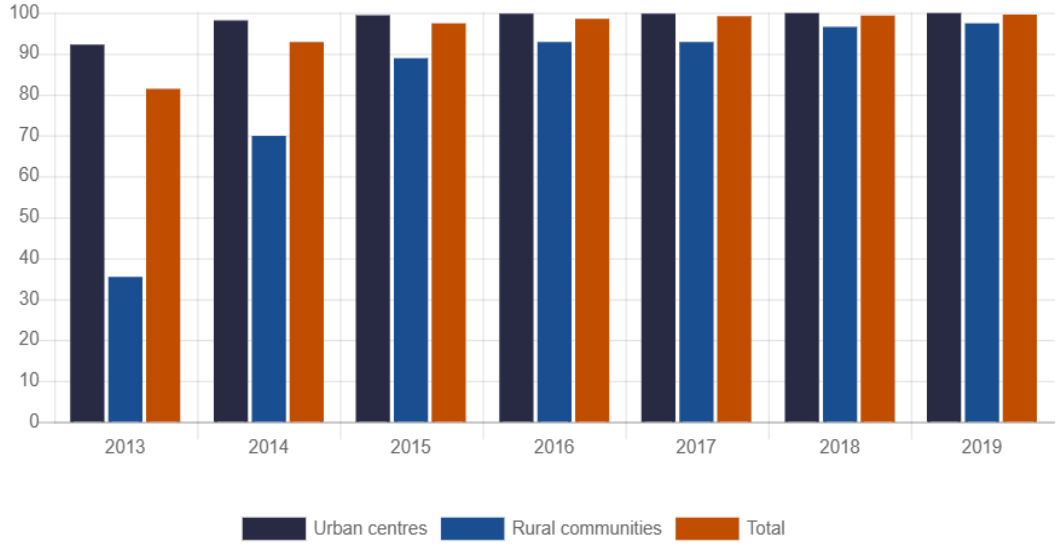



**Figure 3.49: LTE population coverage in Canada, urban centres vs rural communities (%)**

ITS are emerging in rural Canada. Examples include drones delivering medicine to Indigenous communities (Transport Canada, 2023b), real-time road condition sensors in winter, and recent pilots such as the all-season autonomous shuttle in Ottawa's Kanata North Technology Park (AutoTechInsight, 2025). These innovations illustrate how connectivity and intelligent transport solutions can complement traditional physical infrastructure, especially in regions where building all-season roads is prohibitively costly.


**Figure 3.50: A drone model for delivering medical supplies** (CBC, 2021)

One notable example of this innovation occurred during the COVID-19 pandemic, when drones were used to deliver prescription medicines to rural and Indigenous communities. In British Columbia, the Stellat'en First Nation partnered with researchers from the University of British Columbia to pilot drone deliveries to Fraser Lake, a community where residents often travel long distances for essential medications. The project demonstrated how drones can provide a safe, rapid, and contactless transport option in times of crisis, while also serving as a scalable model for rural ITS applications beyond the pandemic (CBC, 2021).

### Access to education, healthcare, and financial services

**Education:** Rural youth often leave their communities to pursue education in urban centres, a trend that weakens rural social and economic cohesion (Dupuy et al., 2000). Broadband expansion enables distance learning, but gaps persist. (Channer et al., 2021).

**Healthcare:** Only about 7% of physicians practice in rural areas, although nearly 18% of Canadians live rurally (CIHI, 2025). As a result, patients in remote regions often travel long distances to consult specialists, such as oncologists or cardiologists. Telehealth initiatives have

helped bridge some of these gaps, but their effectiveness depends heavily on the availability of reliable broadband Internet (ISED, 2025). In emergencies, air ambulances are vital lifelines, with organizations such as STARS (Shock Trauma Air Rescue Service) providing essential medical transport and saving lives across vast rural and remote regions (CIC, 2024)

**Finance:** Between 2019–2023, 561 rural bank branches closed, many in small towns (Chen et al., 2025). Residents adapt through credit unions, postal banking, and fintech, but digital divides persist. Rising reliance on online services risks excluding seniors and digitally underserved communities.

Canada demonstrates how a high-income country can achieve near-universal rural road access (97.7% RAI) while still facing critical gaps in service accessibility. Roads alone are not enough: mobility services, digital infrastructure, healthcare, education, and financial access all shape true rural accessibility (OECD, 2020b).

### 3.4.2. National Policies and Projects

Over decades, Canada has experimented with multiple strategies, gradually moving toward a comprehensive framework. Key national strategies, the Rural Economic Development Strategy, Connectivity Strategy, and Arctic and Northern Policy Framework, set the foundation (CIRNAC, 2019; Government of Canada, 2019; ISED, 2019). These strategies highlight how governance must combine federal vision with provincial, territorial, and Indigenous delivery systems.

Since the financing is vital aspect of rural accessibility projects, Canada blends grants, subsidies, loans, and cost-sharing agreements to sustain projects. This mix reflects recognition that rural accessibility is rarely commercially viable but socially essential.

#### National strategies

Canada's Rural Economic Development Strategy (2019) was the first federal roadmap for rural prosperity. It stressed that nearly 18% of Canadians live in rural or remote areas, contributing about 30% of GDP (Government of Canada, 2019b; World Bank, 2024c). The strategy's objectives are broadband, transport, housing, and service equity. Its leadership lies with Infrastructure Canada and the Minister of Rural Economic Development.

The Investing in Canada Plan (CAD 180 billion over 12 years) complements this strategy. It includes a Rural and Northern Communities Infrastructure Stream worth CAD 2 billion (Infrastructure Canada, 2018). Projects include all-season roads, bridges, and community centers. Provinces and municipalities co-finance these projects, ensuring shared ownership. Federal–provincial coordination is supported through bilateral agreements that legally structure contributions. This approach is reinforced by structured interdepartmental collaboration, where governance, monitoring, financial management, and technology are jointly coordinated across federal actors.

The Connectivity Strategy (2019) set a goal of universal broadband by 2030. It recognized Internet access as a right comparable to electricity or water (ISED, 2025). The strategy mobilizes federal programs like UBF and Canadian Radio-television and Telecommunications Commission (CRTC) Broadband Fund, and innovative financing from the Canada Infrastructure Bank (CIB). Innovation, Science and Economic Development Canada (ISED) coordinates, while CRTC enforces service obligations. This institutional framework ensures accountability across multiple domains. This accountability framework is further clarified through the designation of

collaborators, business owners, product owners, and strategic advisors, each fulfilling distinct responsibilities.

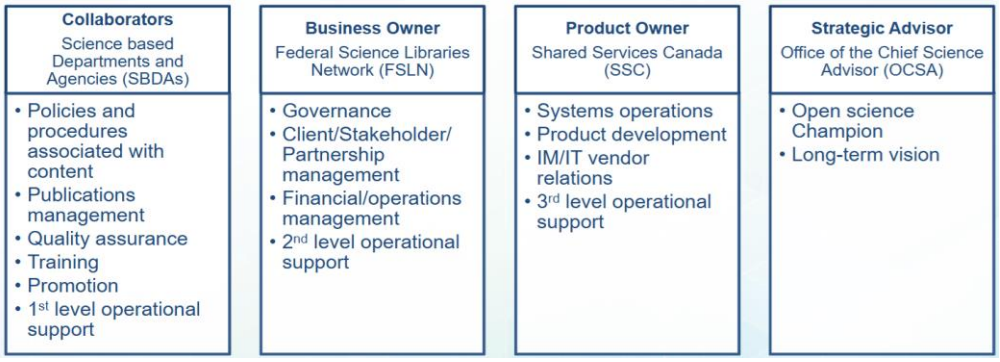



**Figure 3.51: Roles of collaborators and owners** (FOSRC, 2022)

As illustrated in Figure 3.51, science-based departments and agencies focus on content and publications, the Federal Science Libraries Network acts as business owner, Shared Services Canada ensures product development and operations, while the Office of the Chief Science Advisor provides long-term vision and guidance. This division of roles strengthens both operational efficiency and strategic alignment.

The Arctic and Northern Policy Framework (2019) reflects Canada's responsibility toward northern and Indigenous communities. Co-developed with territorial and Indigenous partners, it sets a vision to "close the gaps" in infrastructure and services (CIRNAC, 2019). The framework emphasizes climate resilience, the development of transportation corridors, and Indigenous self-determination. It also underscores that accessibility is not only a technical matter of roads, ports, or broadband, but a question of sovereignty and social justice. Building on the Rural Economic Development Strategy and the Connectivity Strategy, the Arctic and Northern Policy Framework highlights how Canada integrates national vision with local realities. While the first strategy set broad development goals and the second established universal connectivity targets, this framework anchors them in the lived experiences of remote and Indigenous populations. Together, these three strategies illustrate how Canada's institutional design combines equity, resilience, and inclusiveness in addressing rural accessibility challenges.

### Broadband strategy and digital divide

Canada's Connectivity Strategy (2019) established universal targets: 95% of households connected by 2026, and 100% by 2030 (ISED, 2019). High-speed Internet was reframed as an essential right, comparable to electricity or water. To meet these goals, Ottawa has invested over CAD 8 billion since 2019, mainly through the UBF, CRTC Broadband Fund, and CIB financing (OAG of Canada, 2023).

Progress has been tangible, but gaps remain. In 2021, 90.9% of households had access to 50/10 Mbps broadband, yet only 59.5% in rural regions compared to 99.3% in urban centres. On-reserve First Nations fared worst, with just 42.9% coverage (OAG of Canada, 2023).

Policy design acknowledges this divide. Federal funds prioritize underserved and Indigenous communities. Specific allocations, like CAD 50 million for Indigenous mobile access, signal

equity-driven programming (ISED, 2021). Canada's lesson is clear: setting universal targets must be matched with prioritization of those furthest behind.

Canada's broadband rollout employs technology neutrality, recognizing that no single solution fits all geographies. Fibre optic is the gold standard for densely populated regions, offering stable high-speed connectivity. Yet fibre is prohibitively expensive in sparsely populated or remote zones. There, fixed-wireless towers and satellite Internet are more viable (ISED, 2019)

Low Earth Orbit satellites such as Telesat's Lightspeed are central to reaching the final 5% of households. Ottawa invested CAD 600 million in satellite capacity to guarantee coverage in northern and remote communities (OAG of Canada, 2023). This illustrates flexibility: advanced technologies fill gaps where fibre is infeasible.

The UBF includes a Rapid Response stream, fast-tracking projects that can be implemented within months. For very remote projects, subsidies cover up to 90% of costs, reducing financial risk (ISED, 2021). This pragmatic approach balances ambition with realism, combining fibre, wireless, and satellite to reach universal coverage.

### Rural transportation and innovation

The Inuvik–Tuktoyaktuk Highway, completed in 2017, was a landmark project that connected Arctic communities to Canada's road grid, significantly reducing freight costs, enabling year-round access, and spurring tourism (GNWT, 2017). Alongside this, provinces continue to modernize rural highways through federal cost-sharing, such as Saskatchewan's upgrades to grain roads and Manitoba's investment in flood-resilient bridges. Rail transport, while symbolic, remains vital for many rural and remote communities. The Tshiuetin Railway, owned by the Innu and Naskapi First Nations, provides discounted fares to Indigenous riders, seniors, and youth, while Manitoba's Keewatin Railway offers both passenger and freight services to isolated towns, exemplifying how connectivity initiatives can be combined with Indigenous ownership and management (Transport Canada, 2024a). For many northern communities, particularly the 25 fly-in settlements in Nunavut, air transport serves as the only year-round link. Programs such as the ACAP fund runway and equipment upgrades, while the RASP allocated CAD 174 million during COVID-19 to guarantee essential flights. In addition, marine transport plays a crucial role, with Marine Atlantic ferries ensuring Newfoundland's connection to the mainland through substantial subsidies, including CAD 1.8 billion invested since 2015 (Transport Canada, 2024c).

### Indigenous leadership and equity

Indigenous leadership is a defining feature of Canada's rural policies. Indigenous Services Canada (ISC) administers the First Nations Infrastructure Fund, supporting schools, clinics, and broadband (ISC, 2025a). Indigenous-owned Internet Service Providers (ISP) manage fibre and wireless networks, negotiating spectrum rights directly (ISED, 2025).

The Tshiuetin Railway exemplifies Indigenous-led transport solutions. Owned and operated by Innu and Naskapi Nations, it provides culturally relevant services while supporting local economies (Transport Canada, 2024b). Similar approaches extend to broadband, where First Nations-owned ISPs deliver tailored services in ways national carriers cannot.

The federal UBF mandates engagement with Indigenous governments in project design. This reflects Canada's recognition that inclusion means more than funding, it requires co-governance.

Such practices not only improve uptake but also advance reconciliation goals. Canada's insight is clear: accessibility and equity are inseparable when Indigenous communities lead.

### Financing approaches

Canada's rural framework blends grants, subsidies, cost-sharing, and loans. The UBF covers up to 75% of broadband project costs, while the RTSF awards up to CAD 10 million per project (Infrastructure and Communities Canada, 2025; RTSF, 2025).

Cost-sharing under the Investing in Canada Plan typically divides contributions, with the federal government covering up to 40% for provincial projects, up to 50% for municipal projects, and up to 75% for projects in the territories and Indigenous communities (Infrastructure Canada, 2024a). This ensures shared ownership, though smaller municipalities often struggle to meet their share. Subsidies sustain unprofitable services. Marine Atlantic ferries and northern flights are prime examples, treated as public goods (Transport Canada, 2022, 2024c).

Grants remain the dominant tool in Canada's rural financing framework. The UBF covers up to 75% of broadband costs, with an even higher share for remote or Indigenous communities (UBF, 2024). Similarly, the RTSF provides grants of up to CAD 10 million for community transit initiatives (RTSF, 2025). These grant programs are critical for small municipalities, which often lack the fiscal capacity to assume debt, allowing them to deliver essential broadband and transit projects without compromising local budgets. Complementing grants, cost-sharing ensures a degree of collective responsibility among orders of government. Under the Investing in Canada Plan, the federal share is set at 40%, provinces at 33%, and municipalities at 27% (Infrastructure Canada, 2024a) . While projects in Saskatchewan and Ontario illustrate this balanced approach, many rural municipalities struggle to meet their contributions, which can delay implementation.

Beyond grants and cost-sharing, subsidies guarantee access to essential but unprofitable services. Marine Atlantic ferries, for example, have received over CAD 1.8 billion in federal funding since 2015 to maintain freight and passenger connections between Newfoundland and Nova Scotia (Transport Canada, 2024c). Likewise, the RASP provides per-flight subsidies to sustain vital air links for northern communities, with CAD 174 million allocated during COVID-19 to preserve continuity (Transport Canada, 2022). These subsidies are justified as public goods, ensuring equitable access to transportation and basic services across Canada's most isolated regions

Loans and equity investments provide important alternatives to traditional grant-based financing. The CIB has committed CAD 2 billion in broadband loans, with the goal of connecting approximately 430,000 households (CIB, 2024). Beyond digital infrastructure, the CIB has also financed a CAD 24 million biomass project in Quebec and provided a CAD 6.7 million loan for Nunavut's first wind project, underscoring how these models can advance sustainability while fostering private sector participation (CIB, 2025c, 2025b).

At the international level, Canadian contributions are generally structured as grants. For example, Canada's pledges to the IFAD are pooled with other donor resources to support rural agriculture and women's cooperatives worldwide (Global Affairs Canada, 2024). Increasingly, blended financing models are being used in Canada's rural development efforts. Broadband expansions frequently combine UBF grants, CIB loans, provincial funding, and private capital, thereby distributing risk and maximizing leverage (ISED, 2025). The OECD has recognized Canada's blended approach as an international benchmark (OECD, 2024a).

### Policy coordination and iteration

Canada's framework shows the importance of coordination and iteration. Initially, broadband programs underspent due to slow approvals. Applications to the CRTC Broadband Fund averaged 17 months, exceeding the 10-month target (OAG of Canada, 2023). Reforms in 2024 simplified criteria, prioritized Indigenous-led projects, and streamlined decision-making (CRTC, 2024). This reflects iterative governance: policies evolve through stakeholder input.

Coordination spans multiple institutions. Infrastructure Canada manages rural infrastructure (Infrastructure Canada, 2024b); ISED leads broadband (ISED, 2021); Transport Canada covers multimodal transport (Transport Canada, 2024e); ISC funds Indigenous services (ISC, 2022); CIB provides loans (CIB, 2025a); and CRTC regulates telecom (CRTC, 2024). Regional Development Agencies (FedNor, PrairiesCan, ACOA) ensure local delivery (ACOA, 2025; FedNor, 2025; PrairiesCan, 2025). This ecosystem balances national vision with local adaptation, enhancing responsiveness.

### Major national projects

Road initiatives extend beyond the Inuvik–Tuktoyaktuk Highway (GNWT, 2017). Provinces use cost-sharing to modernize highways crucial for agriculture and forestry (Infrastructure Canada, 2024a). Through cost-sharing agreements, provinces have modernized infrastructure critical for rural economies, for example, Saskatchewan's Rural Integrated Roads for Growth program upgraded grain roads, while Manitoba reinforced bridges to withstand flooding (SARM, 2025; Ulyatt & Eng, 2007).

Air services are indispensable in northern Canada. In Nunavut, 25 communities rely exclusively on flights for food, medicine, and healthcare (Transport Canada, 2021a). The ACAP has supported major investments such as runway paving and rehabilitation at Iqaluit and Rankin Inlet airports, projects also documented in federal environmental assessments (Transport Canada, 2023a). During the COVID-19 pandemic, the RASP ensured continuity by providing up to CAD 174 million in subsidies to maintain essential flights to isolated communities (Transport Canada, 2021).

Marine transport in Canada extends well beyond Atlantic ferry services. On the west coast, BC Ferries operates one of the largest ferry systems in the world, with 25 routes connecting Vancouver Island, the Gulf Islands, and the mainland, carrying over 22.6 million passengers and 9.6 million vehicles annually (McCullough, 2025; TransCanada, 2025). Such routes are critical lifelines for rural island communities, ensuring reliable access to goods, services, and employment. Similarly, in Quebec's Magdalen Islands, federal subsidies sustain year-round ferry services, highlighting the importance of marine transport for isolated coastal residents (Transport Canada, 2025a).

Rail projects in Canada demonstrate strong elements of community ownership. Tshiuetin Rail, operating between Quebec and Labrador, is the country's first Indigenous-owned line and exemplifies how rail can sustain rural and Indigenous autonomy (Transport Canada, 2024a). In Manitoba, the Keewatin Railway Company, owned and operated by three First Nations, provides the only year-round connection between The Pas and Pukatawagan, ensuring isolated communities remain linked to essential services (KRC, 2025).Together, these examples highlight rail's enduring symbolic and functional value for rural and northern Canada.

Public transit pilots supported under the RTSF are bringing innovation to rural mobility. In Alberta, the Stoney Nakoda Nation received over CAD 2.3 million to acquire six buses and develop on-demand routing and infrastructure, connecting communities to nearby service hubs like Cochrane and the Bow Valley corridor (Infrastructure and Communities Canada, 2024). In Nova Scotia, the federal government allocated CAD 2.77 million towards 12 rural transit projects, including on-demand minibuses, vehicle purchases, and supporting infrastructure such as bus shelters and stops (Infrastructure and Communities Canada, 2024). These initiatives illustrate how small-scale, flexible transit services can significantly reduce "transport poverty" by improving access to essential services.

Digital connectivity programs increasingly rely on federal–provincial partnerships. In Ontario, the Accelerated High Speed Internet Program combined provincial investments with the federal UBF, aiming to connect 266,000 households (ISED, 2025; Ontario, 2022). In British Columbia, Indigenous internet service providers partnered with the CIB to secure loans for expanding fiber networks to remote communities (CIB, 2022). Together, these examples highlight blended financing approaches that integrate federal, provincial, and Indigenous-led initiatives.

Social infrastructure complements connectivity. ISC has invested CAD 2.29 billion in 337 school infrastructure projects since 2016, aiming to strengthen local education and reduce youth outmigration from First Nations communities (ISC, 2025b). Similarly, telehealth pilots supported by Canada Health Infoway have reduced unnecessary hospital travel, cutting costs and improving access to care, especially in rural and northern areas (Health Infoway, 2022). Together, such projects illustrate how infrastructure improvements translate into better quality of life.

Canada engages globally through the OECD Rural Development Working Party, where the OECD Rural Outlook 2024 praised Canada's blended broadband financing as a best practice (OECD, 2024a). Canadian researchers also contribute insights on Indigenous partnerships in rural development. The Arctic Council fosters cooperation on permafrost-resilient transport and renewable energy across circumpolar regions, with Canada's leadership ensuring that Indigenous voices shape international discussions (Arctic Council, 2016). Through the IFAD, Canada pledged CAD 100 million for 2025–2027 to support rural agriculture and women's cooperatives, linking global food security debates to Canadian policy priorities (Chaumont, 2024). Canada also participates in G7 and G20, endorsing commitments to halve digital divides by 2030, demonstrating coherence between domestic strategies and international agendas (PressCouncilFair, 2024).

Table 3.12 summarizes the main national policies and legislative instruments that structure Canada's approach to rural accessibility, highlighting how federal strategies have increasingly emphasized integration, Indigenous participation, and resilience.

**Table 3.12: Canada's national policies**

| Year | Policy / Legislation | Focus |
|---|---|---|
| 2018 | Investing in Canada Plan (12-year program) | National infrastructure investments; Rural & Northern Communities stream for rural/remote projects |
| 2019 | Rural Economic Development Strategy | Roadmap for rural prosperity; broadband, transport, housing, and service equity |
| 2019 | Connectivity Strategy | Universal 50/10 Mbps broadband by 2030; inter-agency accountability |
| 2019 | Arctic and Northern Policy Framework | Closing infrastructure/service gaps in the North; Indigenous co-development |
| 2020 | UBF | Prioritizes underserved & Indigenous communities; Rapid Response stream |
| 2021 | RASP | Maintains essential flights for remote/road-inaccessible communities |
| 2023–24 | CRTC Broadband Fund – Reforms | Simplified approvals; priority for Indigenous-led projects |
| 2024–25 | CIB – Rural Focus | Broadband loans + clean energy investments in remote regions |

Taken together, these policies demonstrate that Canada's rural accessibility strategy is anchored in long-term planning and iterative governance. By combining legal mandates with flexible financing mechanisms and equity-focused reforms, the country has institutionalized a framework where rural accessibility is considered a public good, closely tied to national cohesion and competitiveness.

While policies establish the framework, Canada's rural accessibility achievements are most visible in concrete projects that extend essential services to communities across the country. These initiatives span multiple sectors, roads, railways, aviation, maritime, and broadband, and are often characterized by a mix of grants, subsidies, and co-financing arrangements. Importantly, many projects prioritize Indigenous and remote populations, illustrating how accessibility is intertwined with reconciliation and social inclusion.

Table 3.13 outlines the key national programs and projects that directly contribute to rural accessibility. They collectively highlight Canada's blended financing model and its emphasis on combining physical and digital infrastructure with equity-driven service delivery.

**Table 3.13: Projects related to rural accessibility in Canada**

| Project Name | Focus | Budget |
|---|---|---|
| UBF | Last-mile broadband for rural/remote & Indigenous communities | CAD 3.2 billion |
| CRTC Broadband Fund | Supports backbone, regional carriers, and last-mile broadband | ~CAD 0.75 billion |
| CIB – Broadband Portfolio | Long-term loans to connect ~430,000 households | CAD 2 billion |
| RTSF | Grants for rural buses, on-demand services, Indigenous mobility | CAD 250 million |
| RASP | Subsidizes flights to ~140 road-inaccessible communities | CAD 174 million (COVID-19) |
| ACAP | Runway/safety upgrades for small airports | > CAD 1 billion (since 1995) |
| Marine Atlantic Subsidy | Maintains ferry link Newfoundland–Nova Scotia | CAD 1.8 billion (2015–2024) |
| Investing in Canada Plan – Rural & Northern Communities Stream | Roads, bridges, community infrastructure | CAD 2 billion |

Overall, these projects reflect Canada's commitment to addressing rural accessibility not only as an infrastructural challenge but also as a social and economic imperative. By blending national priorities with localized delivery, Canada has built a system that balances fiscal sustainability with inclusivity, offering lessons that are particularly relevant for OIC member countries with similarly dispersed and underserved rural populations.

## 3.5. Commonwealth of Australia

Australia serves as an important case study for improving rural accessibility due to its vast landmass, dispersed rural population, and innovative approaches to transportation and infrastructure development. With a total population of approximately 26.7 million, of which 13% reside in rural areas (World Bank, 2023), ensuring equitable access to essential services remains a key challenge. Australia's RAI of 95.35 (NASA, 2023) reflects the country's significant efforts to improve connectivity for rural communities despite the vast distances and often difficult terrain.

One of the primary challenges in Australia is the geographical distribution of its rural population. Most Australians live in major cities rather than in regional or remote areas. As at 30 June 2022, the proportion of Australians by area of remoteness was (AIWH, 2024): 72% in major cities, 18% in inner regional areas, 8.1% in outer regional areas, 1.2% in remote areas, and 0.8% (ABS, 2023) in very remote areas. Many rural and remote communities are located in the outback or in difficult-to-access regions, where transportation infrastructure is limited. In these areas, accessibility is often affected by extreme climatic conditions, such as droughts, bushfires, and floods, which disrupt road networks and isolate communities. Additionally, in some remote locations, air travel remains the only reliable means of transportation, making accessibility expensive and logistically complex.

To address these challenges, Australia has implemented several key infrastructure programs. The Roads of Strategic Importance (ROSI) (DITRDCA, 2021a) initiative focuses on improving road networks that connect rural and remote areas to major urban centers, ensuring better access to services such as healthcare, education, and employment. The Remote Airstrip Upgrade Program (RAUP) (DITRDCA, 2024e) has also been instrumental in enhancing air connectivity for isolated communities by improving airstrips and ensuring regular transport services. Furthermore, smart mobility solutions, such as Autonomous Vehicles (AV) and drones, are increasingly being explored to facilitate deliveries of medical supplies and other essential goods to remote areas.

In addition to infrastructure investments, policy frameworks play a significant role in improving rural accessibility in Australia. Programs such as the Regional Development Australia (RDA) (RDA, 2024) initiative and the National Rural Health Alliance (NRHA) (NRHA, 2025) work to bridge the accessibility gap by advocating for better transport services and infrastructure funding in rural areas. Digital connectivity is also enhanced through the Rural and Regional Connectivity Program (DITRDCA, 2024e), which expands broadband access to support telemedicine, remote education, and business operations in rural communities.

Australia's approach to rural accessibility demonstrates the importance of integrating infrastructure development with technological advancements and policy initiatives. By investing in strategic road networks, air transport solutions, and digital connectivity, the country has made significant progress in ensuring that rural populations have access to essential services. These efforts provide valuable insights for OIC Member Countries seeking to improve rural accessibility in similarly vast and challenging terrains.

The following sub-sections comprehensively examine Australia's rural accessibility landscape, offering valuable insights for developing effective frameworks in OIC Member Countries. Section 3.5.1 presents a general overview of Australia's geographic and demographic context, setting the stage for understanding the accessibility challenges and solutions employed nationwide. First subsection introduces the ARIA+ Index (ACHR, 2025), Australia's primary tool for measuring remoteness based on road distance to service centres. Building upon this, second subsection

explores the Remoteness Area (RA) classification system (ABS, 2023), which translates ARIA+ scores into standardized regional categories. The last section discusses key national policies and infrastructure projects that aim to improve rural accessibility. Also, this section outlines the broader implications of Australia's rural accessibility framework, highlighting lessons and best practices that could inform strategic planning in other national contexts.

### 3.5.1. Overview of Australia

Australia presents a unique demographic and geographic context in discussions of rural accessibility due to its vast landmass and relatively sparse population. As of 2025, Australia's total population stands at approximately 26.7 million, with around 3.6 million individuals, roughly 13.1%, residing in rural areas. This indicates a highly urbanized population, with over 86% living in urban centres (WorldBank, 2023). Nonetheless, Australia's rural and remote regions remain critical to the country's social, economic, and cultural fabric.

Geographically, approximately 85–90% of Australia's landmass is classified as remote or outer rural (ABS, 2024). These areas include a diverse range of landscapes such as deserts, coastal zones, plains, and mountainous regions. The population density in these remote areas often falls below 3.5 persons per square kilometer, and nationally it is estimated at just 3.38 persons/km$^2$ as of 2022 (ABS, 2024; WorldBank, 2024). This sparse distribution poses inherent challenges for service delivery and infrastructure development, making rural accessibility a priority concern. Australia's exceptionally low population density, as illustrated in Figure 3.52, highlights the vast geographic dispersion of its population and underscores the challenges of ensuring equitable access to services across remote and rural regions.

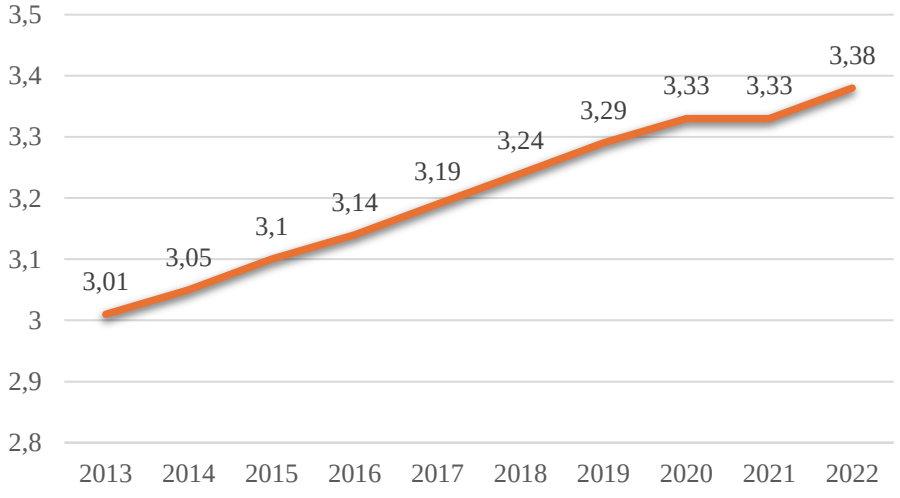



**Figure 3.52. Australia population density (people per sq. km of land area)**

Rural Australia is characterized by a higher proportion of older adults, largely due to the continued outmigration of younger populations to urban centres in search of education and employment opportunities (Alston, 2016). Indigenous Australians are significantly represented in these rural and remote areas, approximately 64% of the Indigenous population resides outside urban centres, highlighting the need for culturally appropriate and geographically equitable access to services such as health, education, and cultural institutions (AIHW, 2024).

Economically, rural regions contribute significantly to key sectors such as agriculture and mining. Agriculture alone accounted for approximately 2.57% of the national GDP in 2023, reflecting a gradual recovery from a dip to 2.01% in 2020, with a peak of 2.70% recorded in 2017 (DAFF, 2025). Beyond GDP contribution, agriculture underpins rural livelihoods, enables efficient logistics, and reduces food spoilage, especially in remote supply chains. Similarly, the mining sector relies heavily on rural accessibility for workforce mobility, equipment transport, and export logistics. The contribution of agriculture, forestry, and fishing to the national economy can be observed in terms of value added as a percentage of GDP, as illustrated in Figure 3.53.

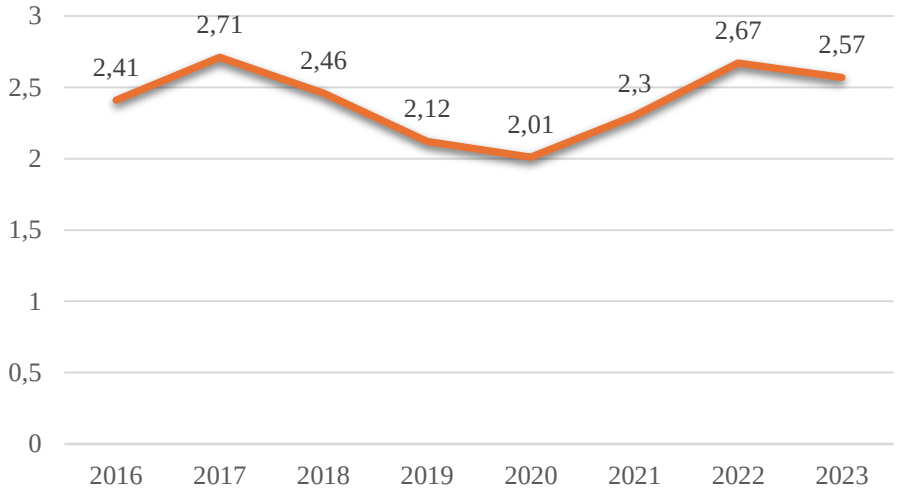



**Figure 3.53. Agriculture, forestry, and fishing, value added (% of GDP)**

In this context, improving rural accessibility is essential for promoting social equity, supporting Indigenous communities, and sustaining economic resilience in Australia's remote regions. Enhanced connectivity not only enables better access to basic services but also facilitates inclusive development and national cohesion.

### The accessibility/remoteness index of Australia (ARIA+)

The Accessibility/Remoteness Index of Australia (ARIA+) is a comprehensive and nationally consistent geographic measure of remoteness developed to assess the accessibility of services across Australia. ARIA+ was developed by the Australian Centre for Housing Research at the University of Adelaide. It has served as the official classification of remoteness by the Australian Bureau of Statistics (ABS) for over two decades (ABS, 2023).

ARIA+ is a continuous index ranging from 0 (indicating high accessibility) to 15 (indicating extreme remoteness). The index is calculated based solely on road distance from more than 12,000 populated localities to service centres, which are categorized into five tiers according to population size. These categories range from major urban areas (Category A: >250,000 population) to small service towns (Category E: 1,000–4,999 population). Each locality's distance to the nearest service centre in each category is standardised against national mean

values, and values exceeding three times the mean are capped to reduce outlier effects. The final ARIA+ score is derived as the sum of these standardised distances (ACHR, 2025).

This purely geographic approach ensures that the ARIA+ index remains free from demographic or socio-economic bias, enabling objective spatial comparisons across Australia. Moreover, its application to a 1-km resolution grid allows for precise remoteness scoring at any location, making it an invaluable tool for rural service planning, policy formulation, and demographic research.

The ARIA+ index offers several key advantages. First, it ensures national consistency by employing a uniform methodology applicable across all regions. It also provides geographic objectivity, focusing solely on physical accessibility without incorporating population size or socio-economic variables. The index is flexible in application, allowing use as a continuous variable or within standard classification categories such as Major Cities, Inner Regional, Outer Regional, Remote, and Very Remote areas. Additionally, ARIA+ is highly scalable, making it adaptable to various spatial units, including administrative boundaries or statistical areas. Finally, it maintains methodological stability over time, which makes it particularly suitable for longitudinal studies.

Due to its precision, transparency, and widespread adoption across Australia, the ARIA+ index serves as a valuable reference model for the development of accessibility indices in OIC Member Countries. In particular, it offers a robust foundation for countries aiming to identify and address rural access disparities through objective, distance-based metrics. Central to the ARIA+ methodology is the classification of service centres based on population size, which enables a standardized approach to measuring remoteness. This classification (ACHR, 2025) is presented in Table 3.14.

**Table 3.14. Categories of service centres in ARIA+ based on population size**

| Category | Population Size |
|---|---|
| A | 250,000+ |
| B | 48,000 – 249,999 |
| C | 18,000 – 47,999 |
| D | 5,000 – 17,999 |
| E | 1,000 – 4,999 |

This classification underpins the ARIA+ index by defining five hierarchical levels of service centres, each assumed to offer progressively fewer services as population size decreases. Localities with at least 1,000 residents are considered capable of providing basic services and are thus treated as potential service centres. The road distance from a given locality to the nearest centre in each category is measured and used to compute the remoteness score. This structure ensures a nuanced and scalable understanding of service accessibility, which is critical for identifying spatial disparities and informing rural development policies.

### Remoteness area classification

In the context of spatial and service planning, Australia's RA classification offers a systematic framework for analyzing the accessibility of services across the nation. Developed to support the release and analysis of statistics grounded in geographic accessibility, the RA system categorizes areas into five levels of remoteness based on objective criteria (ABS, 2023). These levels include "Major Cities of Australia", "Inner Regional Australia", "Outer Regional Australia", "Remote Australia" and "Very Remote Australia". The classification aims to inform decision-making related to infrastructure investment, policy implementation, and equitable service provision in both urban and rural contexts.

The RA classification is underpinned by ARIA+, which remains Australia's primary geographic indicator of remoteness. ARIA+ was developed by the Australian Centre for Housing Research at the University of Adelaide and is based entirely on road distance from over 12,000 localities to five categories of service centres determined by population size (ACHR, 2025). These distances are standardized against the national average and capped at three times the means to limit outlier influence, with final scores ranging from 0 (high accessibility) to 15 (high remoteness). The resulting index is mapped as a continuous 1-kilometre grid across the Australian landmass, allowing for high-resolution, location-specific analysis.

Each grid cell in ARIA+ is assigned a remoteness score, which the ABS aggregates to the Statistical Area Level 1 (SA1) to define RAs. These areas are mutually exclusive and collectively exhaustive, ensuring full spatial coverage without overlaps or omissions. Importantly, RAs are not constrained by state or territory boundaries and may comprise non-contiguous zones that reflect similar levels of remoteness (ABS, 2023). While each remoteness class may not be present in every state or territory, the classification maintains national consistency and comparability.

To ensure the continuity with previous RA structures, refinements are periodically applied. These adjustments correct anomalies that may arise from the ARIA+ computation alone. For example, a small SA1 entirely surrounded by a different remoteness class, and not part of an urban centre, may be reclassified to reflect surrounding conditions (ABS, 2023). The classification is thus both robust and adaptable, allowing for reliable longitudinal comparisons across censuses.

RA classifications are dynamic and subject to change over time. Urban expansion, infrastructure development, road network changes, and updates to statistical boundaries all influence accessibility scores and, by extension, RA designations. Additionally, the Australian Statistical Geography Standard (ASGS) provides urban definitions used in the classification, such as Significant Urban Areas (SUAs) and Urban Centres and Localities (UCLs), based on the most recent census data (ABS, 2023). This adaptive approach ensures that RA classifications remain relevant and reflective of the evolving geographic and demographic landscape.

The structured and transparent methodology of ARIA+ and the RA system makes Australia's model an exemplary reference for OIC Member Countries seeking to develop or refine national remoteness classifications. Its purely geographical basis, devoid of socio-economic or administrative biases, ensures a fair assessment of physical accessibility to services. The clear definitions, consistent application, and integration into national statistics demonstrate its broad utility for evidence-based planning, particularly in rural accessibility and service delivery.

The University of Adelaide supplies ARIA+ to the ABS as a one-kilometer grid that covers all of geographic Australia. Each grid cell contains an ARIA+ score representing its relative geographic remoteness. This is used by the ABS to calculate the average ARIA+ grid values for each SA1 to

apply the correct remoteness class for the resulting value. The RA classes and their associated ARIA+ ranges are shown in Table 3.15 (ABS, 2023). RAs aggregate to States or Territories and cover the whole of Australia without gaps or overlaps.

**Table 3.15. RA categories, names, and values**

| RA Category | RA Name | SA1 Average ARIA+ Value Ranges |
|---|---|---|
| **0** | Major Cities of Australia | 0 to 0.2 |
| **1** | Inner Regional Australia | greater than 0.2 and less than or equal to 2.4 |
| **2** | Outer Regional Australia | greater than 2.4 and less than or equal to 5.92 |
| **3** | Remote Australia | greater than 5.92 and less than or equal to 10.53 |
| **4** | Very Remote Australia | greater than 10.53 |
| **5** | Migratory - Offshore - Shipping | Not Applicable |
| **9** | No usual address | Not Applicable |

**Table 3.16. RA naming and coding structure**

| State or Territory Code | State or Territory Name | RA Category | RA Code | RA Name |
|---|---|---|---|---|
| **1** | New South Wales | 0 | 10 | Major Cities of Australia |
| **1** | New South Wales | 1 | 11 | Inner Regional Australia |
| **1** | New South Wales | 2 | 12 | Outer Regional Australia |
| **1** | New South Wales | 3 | 13 | Remote Australia |
| **1** | New South Wales | 4 | 14 | Very Remote Australia |
| **1** | New South Wales | 5 | 15 | Migratory - Offshore - Shipping (NSW) |
| **1** | New South Wales | 9 | 19 | No usual address (NSW) |

Table 3.16 (ABS, 2023) presents the naming and coding structure of RA as defined by ABS (2023). Each row outlines how regions within the state of New South Wales are classified according to their relative accessibility to services. The table includes the state code and name, the RA category (ranging from 0 to 5 and 9), corresponding RA codes, and descriptive RA names. These categories span from “Major Cities of Australia” (indicating high accessibility) to “Very Remote Australia” (indicating limited access), as well as special classifications such as “Migratory - Offshore - Shipping” and “No usual address.” This standardized coding system ensures consistent identification and analysis of geographic remoteness within ABS datasets.

### 3.5.2. National Policies and Projects

The Australian Government has implemented a comprehensive and multi-layered strategy to enhance rural accessibility, addressing both infrastructure development and social equity. Recognizing the unique challenges posed by Australia's vast and sparsely populated regions,

policies have been designed to bridge the accessibility gap between urban and rural areas. This approach involves coordinated efforts across federal, state, and local government levels, aiming to ensure equitable access to essential services, employment opportunities, and social infrastructure for all citizens, regardless of geographic location.

A cornerstone of this strategy is the development of ARIA+ a national accessibility index (ACHR, 2025), which enables policymakers to systematically assess disparities in transport and service access across various regions. By making this data publicly available, the government fosters transparency and accountability, promoting a data-driven policy environment. This index assists in prioritizing investments in underserved areas, facilitating targeted interventions based on measurable needs rather than political or geographic biases.

Substantial financial resources have been allocated to the development and maintenance of rural transport infrastructure, reflecting a significant commitment by the Australian government to enhance regional connectivity. Programs such as the National Stronger Regions Fund (NSRF) (NSRF, 2016) have played a key role in this effort by directing substantial funding toward infrastructure projects that not only promote economic growth but also address disadvantages faced by regional communities. Specifically, the NSRF was established with a commitment of Australian Dollars (AUD) 1 billion over five years, targeting investment-ready projects that contribute to both economic sustainability and regional development across Australia. A general timeline outlining the progression of the Australian government's policies related to rural transport infrastructure is presented in Figure 3.54.

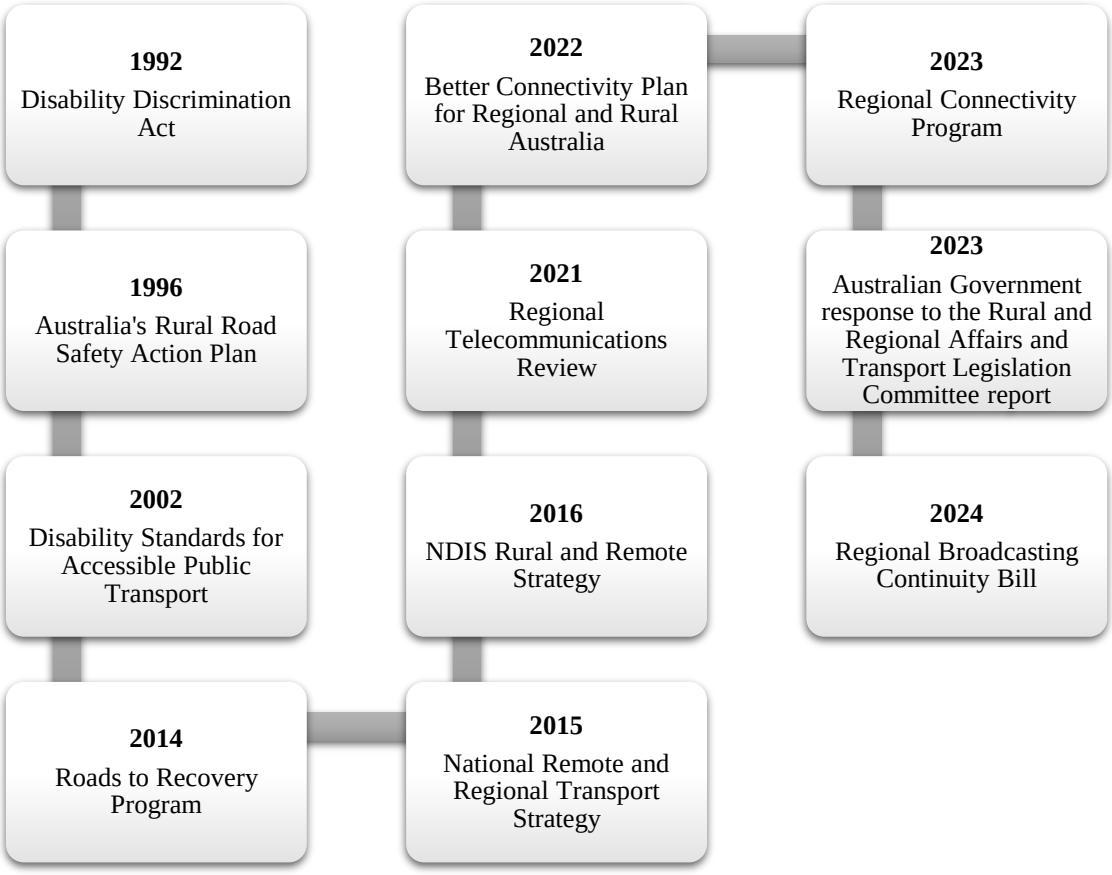



**Figure 3.54. Australian government's policy timeline**

Equity and inclusion are central to Australia's policy approach. Specific attention has been paid to addressing the unique challenges faced by disadvantaged groups, including Indigenous communities and those living in remote or isolated areas. Programs have incorporated equity-based funding criteria to ensure that marginalized populations receive proportionate support. Participatory planning mechanisms have been emphasized, encouraging local engagement in identifying needs and co-creating solutions.

Furthermore, Australia's rural policy framework promotes integrated service delivery, acknowledging that accessibility encompasses more than just physical transport. Efforts have been made to co-locate services or develop mobile delivery models that bring essential services such as healthcare, education, and employment opportunities directly to people, reducing the need for long-distance travel.

The Australian Government's policies on rural accessibility demonstrate a strong commitment to equity, data-driven decision-making, and long-term infrastructure development. This strategic approach reflects an understanding that addressing rural accessibility requires not only physical infrastructure but also inclusive planning and evidence-based policymaking. Moreover, the holistic and inclusive nature of these policies provides a valuable reference model for other countries aiming to improve rural accessibility through integrated and sustainable approaches. In this context, the policies and legislation adopted by the Australian government

have evolved over the years in response to shifting priorities and emerging needs (see Table 3.17), highlighting the dynamic and adaptive nature of the country's rural development agenda.

**Table 3.17. Australia's national policies**

| Year | Policy / Legislation | Focus |
|---|---|---|
| 1992 | Disability Discrimination Act | Equal access to services & infrastructure for people with disabilities |
| 1996 | Australia's Rural Road Safety Action Plan | Reducing rural road trauma through improved infrastructure, education, enforcement, and community engagement |
| 2002 | Disability Standards for Accessible Public Transport | Accessible public transport infrastructure |
| 2015 | National Remote and Regional Transport Strategy | Improving transport connectivity and accessibility in remote and regional areas |
| 2016 | NDIS Rural and Remote Strategy | Disability support services in rural & remote areas |
| 2021 | Regional Telecommunications Review | Evaluated remote digital & mobile access (Hartsuyker Review) |
| 2022 | Better Connectivity Plan for Regional and Rural Australia | AUD 1.1 billion investment in regional/rural connectivity |
| 2023 | Regional Connectivity Program | AUD 368.4 million funding for local rural digital projects |
| 2023 | Australian Government response to the Rural and Regional Affairs and Transport Legislation Committee report | The plan focuses on improving infrastructure, connectivity, and services in rural and regional Australia |
| 2024 | Regional Broadcasting Continuity Bill | Ensures ongoing access to broadcast TV in remote communities |

Table 3.17 outlines a chronological overview of key policies and legislative measures implemented by the Australian Government to address accessibility, infrastructure, and service delivery in rural and regional areas. These interventions reflect a growing recognition of the structural and geographic challenges faced by non-urban communities and a commitment to promoting equity and inclusion through targeted strategies.

The timeline begins with the 1992 Disability Discrimination Act (DITRDCA, 1992), which laid the foundation for equal access to services and infrastructure by prohibiting discrimination against people with disabilities. This legislative milestone was further operationalized by the 2002 Disability Standards for Accessible Public Transport (DITRDCA, 2002), which mandated accessible transport systems, thus directly influencing physical accessibility in both urban and rural contexts.

Road safety in rural regions was specifically addressed with the 1996 Rural Road Safety Action Plan (FORS, 1996), which adopted a multifaceted approach combining infrastructure improvement, public education, law enforcement, and community engagement to mitigate the disproportionately high rates of road trauma in rural Australia.

In response to the persistent issue of geographic isolation, the 2015 National Remote and Regional Transport Strategy (DLI, 2015) marked a significant policy effort to enhance transport connectivity across Australia's remote landscapes. Complementing this, the 2016 NDIS Rural and Remote Strategy (NDIS, 2016) aimed to ensure equitable disability support services in areas typically underserved due to logistical and demographic constraints.

Recognizing the digital divide as a modern accessibility issue, the government initiated several policies focusing on telecommunications infrastructure. The 2021 Regional Telecommunications Review (DITRDCA, 2021b), also known as the Hartsuyker Review, provided a detailed evaluation of the state of digital and mobile connectivity in remote regions. This was followed by the 2022 Better Connectivity Plan (DITRDCA, 2022), which allocated AUD 1.1 billion to improve digital infrastructure across regional and rural Australia. Similarly, the 2023 Regional Connectivity Program (DITRDCA, 2023c) provided an additional AUD 368.4 million in funding for localized digital projects, emphasizing community-led solutions.

In 2023, the Australian Government responded formally to findings from the Rural and Regional Affairs and Transport Legislation Committee (DITRDCA, 2023a), articulating a comprehensive plan to improve infrastructure, connectivity, and essential services. This reflects a more integrative and holistic understanding of rural development.

Most recently, the 2024 Regional Broadcasting Continuity Bill (DITRDCA, 2024b) ensures that residents in remote communities continue to receive broadcast television services. This policy highlights the government's commitment not only to digital inclusion but also to information equity, which is essential for participation in civic and cultural life.

In summary, the policies presented in Table 3.17 demonstrate a long-term, multi-sectoral, and evolving commitment by the Australian Government to address the unique challenges of rural and regional communities. From physical infrastructure and disability access to digital inclusion and service continuity, these interventions collectively form a robust framework aimed at enhancing rural accessibility and bridging urban-rural disparities. On the other side, the projects of the Australian government presented in Table 3.18 provide a more detailed insight into the country's investments in transportation infrastructure and the areas of focus for these projects.

Australia has implemented a range of strategic infrastructure initiatives aimed at improving rural and remote accessibility, particularly in areas with sparse populations and limited transport services. Table 3.18 outlines selected government programs that focus on enhancing transportation, health access, and regional development in remote parts of the country. These projects serve as valuable case studies for OIC Member Countries aiming to strengthen rural connectivity and promote inclusive regional growth.

Key programs such as the Roads to Recovery Program (DITRDCA, 2024f), Black Spots Program (DITRDCA, 2024a), and Remote Roads Upgrade Pilot Program focus on improving road infrastructure and safety in underserved areas. The RAUP (DITRDCA, 2024e) and Regional Airports Program (RAP) (DITRDCA, 2024d) highlight targeted aviation investments that address the accessibility challenges faced by isolated communities. Moreover, initiatives like the Local Roads and Community Infrastructure (LRCI) (DITRDCA, 2023b) and the Growing Regions

Program (GRP) (DITRDCA, 2024c) provide integrated support for local governments to deliver community-enhancing projects.

Australia's approach emphasizes sustainability, safety, and economic integration, offering replicable models for rural infrastructure development in OIC countries. The inclusion of health-related infrastructure through the Rural Health Outreach Fund (RHOF) (DHAC, 2024) further underscores the importance of ensuring comprehensive service delivery in rural accessibility planning.

**Table 3.18. Projects related to rural accessibility in Australia**

| Project Name | Focus | Budget |
|---|---|---|
| Roads to Recovery Program | To fund local road projects to improve accessibility, safety, and regional development across Australia. | 2024–25 and 2028-29 Budget: AUD 4.4 billion over five years |
| Black Spots Program | To enhance road safety by funding improvements at high-risk crash sites to prevent serious injuries and fatalities. | AUD 150 million per year |
| Remote Roads Upgrade Pilot Program | To address significant deficiencies on key regional and rural roads that limit community access, pose safety risks, and impact on the economic development of the surrounding area | AUD 150 million per year |
| RAUP | The program aims to improve safety and accessibility of aerodromes in remote and very remote parts of Australia. | 2024–25 Budget: AUD 50 million over three years |
| ROSI | Enhance key regional roads linking agriculture/mining areas to ports and markets. | AUD 297 million |
| RAP | The Government supports aviation's vital role in regional and remote Australia through various programs. | 2024–25 Budget: AUD 40 million over three years |
| LRCI | Supports local governments to deliver priority road and community projects. | AUD 3.25 billion the LRCI Program over four phases |
| GRP | The program aims to deliver investment in infrastructure across Australia's regional, rural, and remote areas. | AUD 600 million over four years |
| RHOF | The Fund's goal is to ensure Australians living in rural and remote communities can access medical services no matter where they live. | AUD 115 million over four years |

# CHAPTER 4: SURVEY METHODOLOGY AND KEY FINDINGS

Rural accessibility is a critical driver of socio-economic development, particularly in regions with large rural populations. Inadequate transport links in rural areas can severely restrict mobility, limit access to markets and essential services, and perpetuate poverty. Nearly half of the population in OIC member countries lives in rural areas, underscoring the necessity of improving rural accessibility as a foundation for inclusive growth.

In response to these challenges, a comprehensive survey was conducted under the Enhancing and Sustaining Rural Accessibility in OIC Member Countries initiative. The survey was designed to capture the perspectives of a wide range of stakeholders, including policymakers, practitioners, and academics, on the multifaceted issues shaping rural accessibility today.

## 4.1. Objective of the Survey

The primary objective of the survey was to generate evidence-based insights that could inform policy recommendations for enhancing rural accessibility in OIC member countries. While the survey was designed with the OIC context at its core, responses were also collected participants from non-OIC countries, adding comparative perspectives that enrich the analysis. This broader participation allows the findings to be benchmarked against global practices and enhances the policy relevance of the study.

Beyond this overarching purpose, the survey pursued several secondary objectives. It aimed to assess the adequacy of rural transport systems, examine the potential role of technological developments, and explore sustainability and social dimensions alongside governance and policy frameworks. The survey also sought to identify key challenges and opportunities in rural transport while capturing innovative practices and successful models that could be adapted across different contexts. Together, these objectives ensure that the survey findings contribute not only to OIC-focused policy recommendations but also to a wider understanding of rural accessibility dynamics in an international context.

## 4.2. Scope of the Survey

The scope of the survey was designed to capture the multidimensional nature of rural accessibility by addressing both structural and contextual factors. It covered key themes such as the adequacy of transport infrastructure and services, accessibility for disadvantaged groups, the potential role of new technologies, sustainability and social impacts, and the governance and policy environment. In addition, respondents were invited to provide open-ended recommendations and examples of best practices to complement the structured questions.

By combining quantitative and qualitative items, the survey was able to capture not only measurable trends but also nuanced insights from diverse professional perspectives. This broad scope ensured that the survey findings provide a holistic picture of rural accessibility challenges and opportunities, reflecting the interplay between infrastructure, technology, social equity, and policy design. The inclusion of responses from both OIC and non-OIC participants further expanded the scope, enabling the results to be understood not only within the OIC context but also in comparison with global experiences.

## 4.3. Sample Selection

The survey employed purposive sampling to ensure that responses were obtained from individuals with relevant expertise and experience in rural transport and accessibility. Targeted invitations were sent to governmental authorities, academic institutions, NGOs, and private sector representatives who are directly or indirectly engaged in rural mobility, policy-making, or service provision. Participants were identified through professional networks, institutional directories, and relevant public databases to maximize diversity across countries, sectors, and disciplines.

In total, 84 valid responses were collected, covering a broad spectrum of stakeholders. A majority of participants were affiliated with central government institutions, while others from universities, research centers, NGOs, and the private sector. The respondents came from both OIC and non-OIC countries, providing not only region-specific insights but also comparative perspectives. This diversity in sample composition enhanced the representativeness of the results and strengthened the value of the survey as a basis for policy analysis.

## 4.4. Survey Design

The survey was structured to capture both quantifiable trends and nuanced expert perspectives on rural accessibility. It combined approximately 50 closed-ended statements, rated on a five-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree*, with a set of open-ended questions designed to elicit qualitative insights. This design enabled respondents not only to express levels of agreement with structured statements but also to share recommendations, highlight challenges, and provide examples of best practices.

To ensure that all relevant aspects of rural accessibility were addressed, the questionnaire was organized into six thematic categories:

- **Demographics and Background:** Capturing respondents' institutional affiliation, professional role, years of experience, and country of reference.
- **State of Rural Transportation and Accessibility:** Assessing the adequacy of infrastructure, availability and affordability of services, and accessibility for disadvantaged groups.
- **Role of Technological Developments:** Exploring perceptions of how innovations such as autonomous vehicles, electric mobility, mobile applications, and digital platforms could transform rural transport.
- **Sustainability and Social Dimension:** Examining the environmental, social, and economic impacts of rural transport
- **Policy Orientation and Governance:** Evaluating governance structures, institutional coordination, and policy effectiveness in rural accessibility.
- **Open-Ended Recommendations and Examples:** Allowing participants to provide qualitative insights, propose solutions, and share best practice projects.

The survey adopted a mixed-method approach, integrating both quantitative and qualitative items to provide a comprehensive understanding of rural accessibility. While closed-ended questions ensured comparability across respondents, open-ended items allowed for deeper

exploration of country-specific challenges and innovative solutions. This methodological framework facilitated analysis that was both consistent across diverse contexts and sensitive to local particularities. By combining structured data with expert perspectives, the survey established a robust evidence base to support informed decision-making and to strengthen the formulation of policy recommendations.

## 4.5. Administration and Procedure

The survey was administered using the SurveyMonkey online platform, which served as the sole channel for collecting responses. Distribution was carried out through both direct delivery of paper-based invitations and targeted email circulation to identified stakeholders, but in all cases respondents were directed to complete the questionnaire online via SurveyMonkey. This approach ensured efficiency in data collection and consistency in response format.

The survey was open from 31 July 2025 to 2 September 2025, during which regular reminder emails were sent to encourage participation and maximize response rates. At the outset, participants were informed of the purpose of the survey, the approximate completion time, and the anonymity of their responses. Participation was entirely voluntary, and no personally identifiable information was gathered.

Prior to full deployment, the questionnaire was pre-tested with a small group of experts to check clarity, logical flow, and usability. Feedback from this pilot stage was incorporated into the final version, ensuring that the survey was both user-friendly and aligned with the study's objectives. By combining multiple outreach channels and applying careful pre-testing, the administration process minimized barriers to participation and helped secure a diverse and credible pool of responses.

## 4.6. Data Analysis

This section presents the survey findings, organized by the main thematic categories of the questionnaire. Both quantitative results from the structured questions and qualitative insights from open-ended responses are included to provide a comprehensive understanding of rural accessibility issues. The analysis begins with the demographic and institutional profile of respondents, followed by their assessments of rural transport infrastructure and services, the role of technological developments, sustainability and social dimensions, governance and policy orientation, and concludes with recommendations and examples of best practices. Together, these results form the empirical foundation for the policy implications and recommendations presented in subsequent chapters.

### 4.6.1. Respondent profile

The survey engaged a total of 84 respondents, representing a broad cross-section of stakeholders. A majority of participants (66 respondents, 79%) were from OIC member countries, while 18 respondents (21%) came from non-OIC contexts. This distribution ensures that the results reflect the specific realities of OIC states while also benefiting from comparative global perspectives. The following subsections summarize the characteristics of the participants.

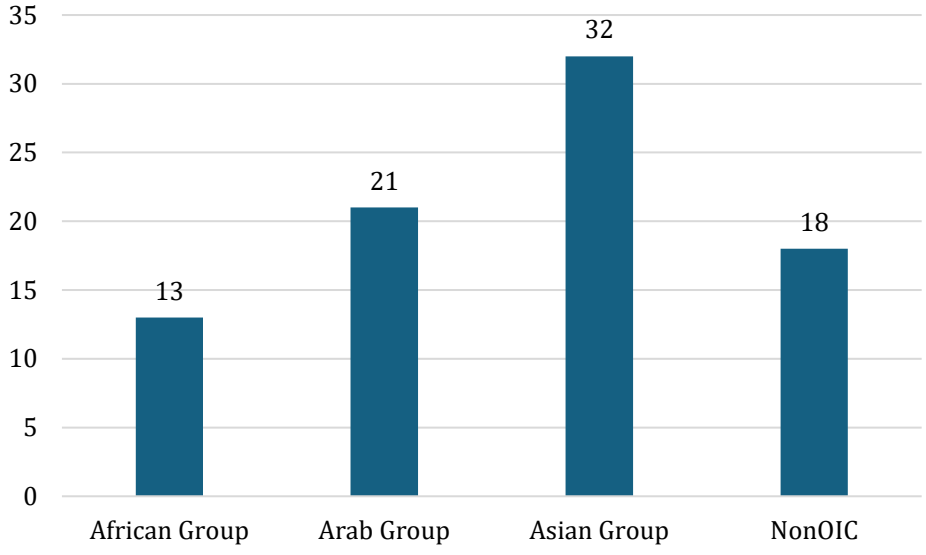



**Figure 4.1: Country group distribution of respondents**

Respondents were drawn from across OIC regions and beyond. The majority were affiliated with OIC member states, particularly from the Asian Group (32 responses, 38%), Arab Group (21 responses, 25%), and African Group (13 responses, 15%). Non-OIC respondents accounted for 21% with 18 responses, providing comparative perspectives that enrich the dataset. This mix ensures that the findings reflect both the specific realities of OIC member countries and lessons from global contexts.

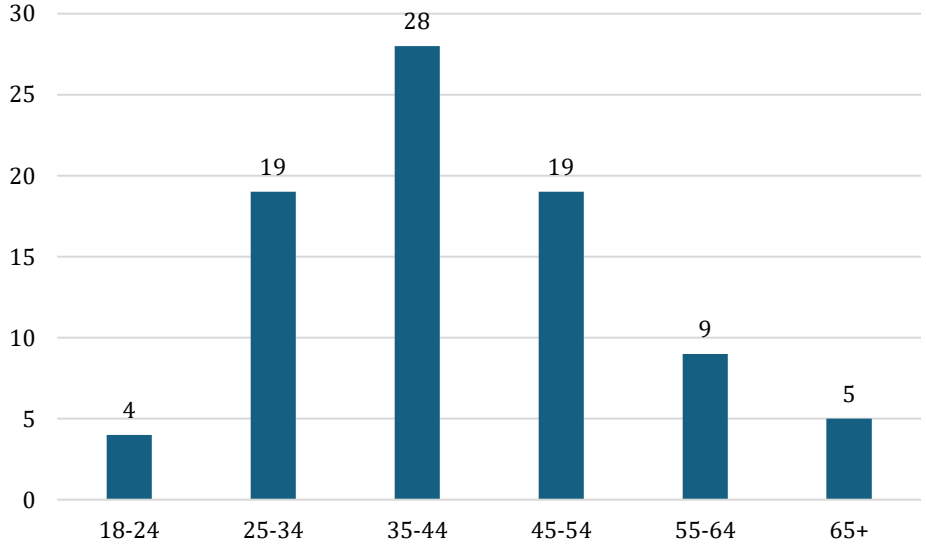



**Figure 4.2: Age distribution of respondents**

The age distribution indicates that respondents were predominantly mid-career professionals. The largest group was 35–44 years (28 responses 33%), followed by 25–34 (19 responses, 23%) and 45–54 (19 responses, 23%). Smaller but important contributions came from both younger professionals (18–24) and senior experts (55+). This generational spread combines fresh ideas with long-term policy experience, offering a comprehensive view of rural accessibility challenges.

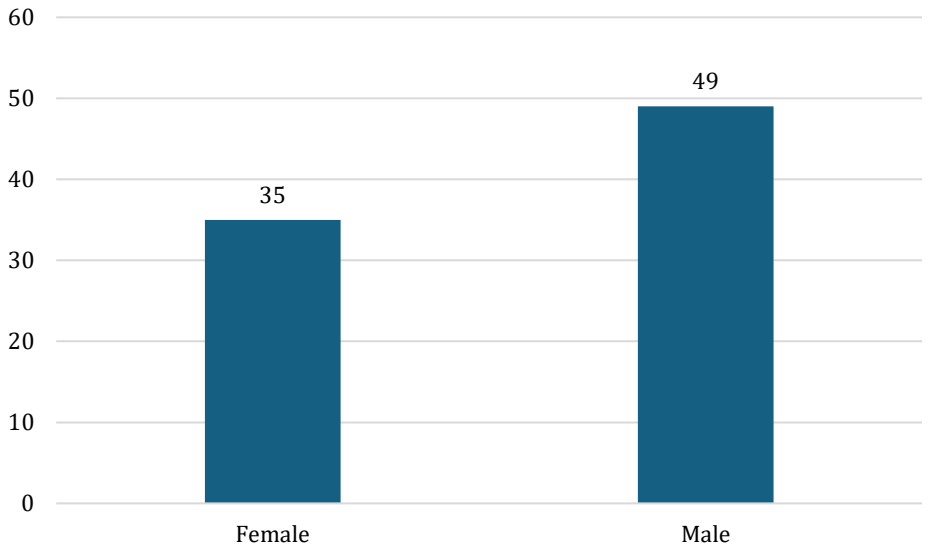



**Figure 4.3: Gender distribution of respondents**

The gender composition was relatively balanced, with 58% (49 responses) male and 42% (35 responses) female respondents. Female participation at this level is significant in the transport and infrastructure domain, where women are often underrepresented. Their strong presence adds critical perspectives on mobility and service needs, particularly regarding gendered aspects of rural accessibility.

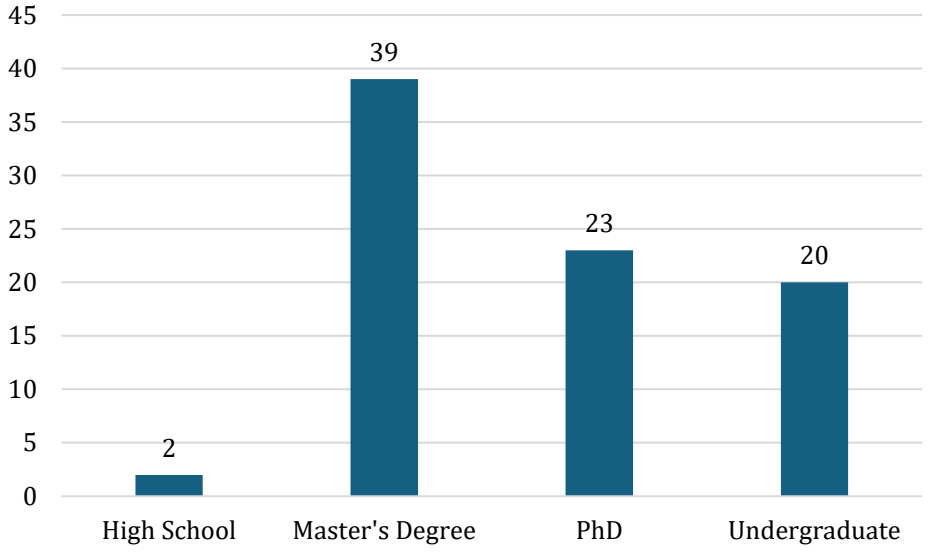



**Figure 4.4: Education level of respondents**

The respondents were highly educated, with nearly three-quarters holding advanced degrees. Specifically, 46% (39 responses) held a Master's degree and 27% (23 responses) a PhD, meaning that almost three in every four participants possessed postgraduate qualifications. An additional 24% (20 responses) held undergraduate degrees, while only a very small fraction reported high school education. This academic depth ensures that the survey results are grounded in expert-level knowledge, complemented by practical viewpoints from less academically oriented participants.

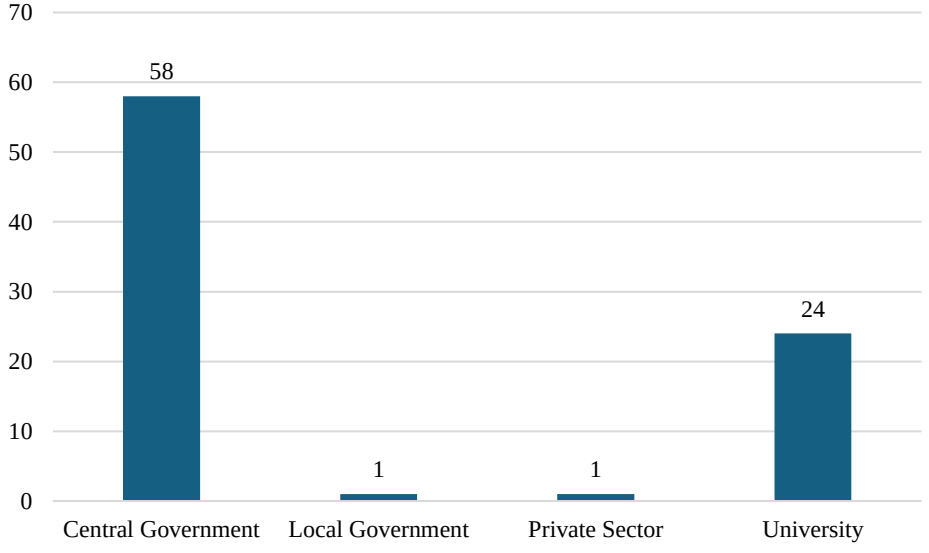



**Figure 4.5: Institutional affiliation of respondents**

Institutionally, the largest share of respondents, 69% (58 responses) were affiliated with central government agencies, underscoring the policy-oriented character of the dataset. Universities followed with 29% (24 responses), while local governments and the private sector were minimally represented. This distribution reflects the dominant role of national authorities in shaping rural accessibility, while also capturing perspectives from academia and, to a lesser extent, practitioners outside government.

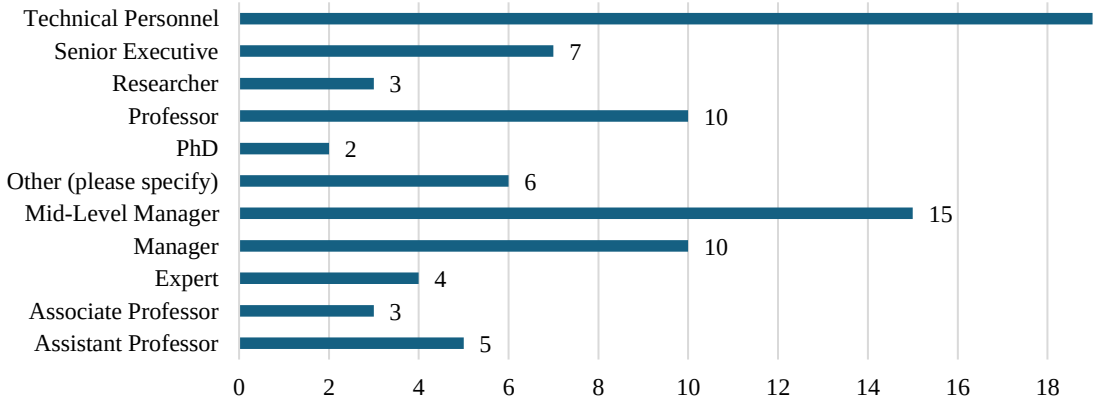



**Figure 4.6: Professional titles of respondents**

The distribution of professional titles shows that the largest group of respondents were technical personnel (19 responses, 23%), followed closely by mid-level managers (15 responses, 18%), while professors (10 responses, 12%) and managers (10 responses 12%) also represented significant shares. In addition, senior executives, assistant professors, experts, researchers, and associate professors contributed to the survey, ensuring that perspectives from leadership, academia, and operational levels were all reflected. This diverse mix of roles illustrates that the dataset combines the insights of practitioners, policymakers, and academics, thereby reinforcing the breadth and credibility of the findings.

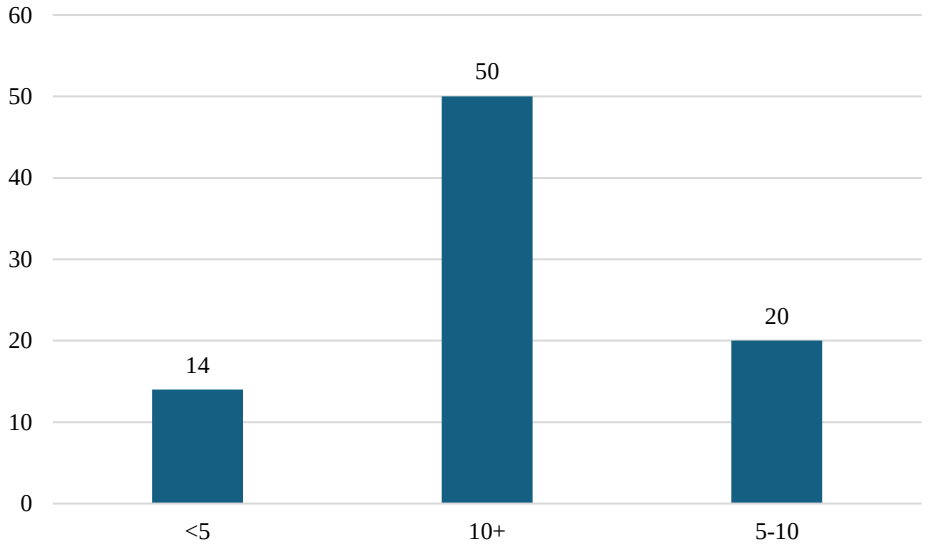



**Figure 4.7: Years of professional experience of respondents**

The survey drew on the insights of highly experienced professionals. A majority (50 responses, 60%) reported more than 10 years of professional experience, while 24% (20 responses) had between 5–10 years and 16% (14 responses) less than 5 years. This depth of experience ensures that the findings are rooted in long-standing expertise, while the contributions of early-career professionals add fresh perspectives and innovative thinking.

### 4.6.2. State of rural transportation and accessibility

The survey results provide a detailed picture of how stakeholders perceive the current state of rural transportation systems. Respondents rated sixteen statements on a five-point Likert scale, revealing clear patterns across Accessibility and Service Coverage, Financing and Institutional Capacity, Infrastructure and Maintenance and Policy, Governance, and Technology

**Accessibility and Service Coverage**

As shown in Figure 4.8, respondents highlighted the persistent reliance on private vehicles and the compensatory role of informal transport in shaping rural mobility. These responses underscore the continuing challenges of ensuring affordable and inclusive access in rural areas.

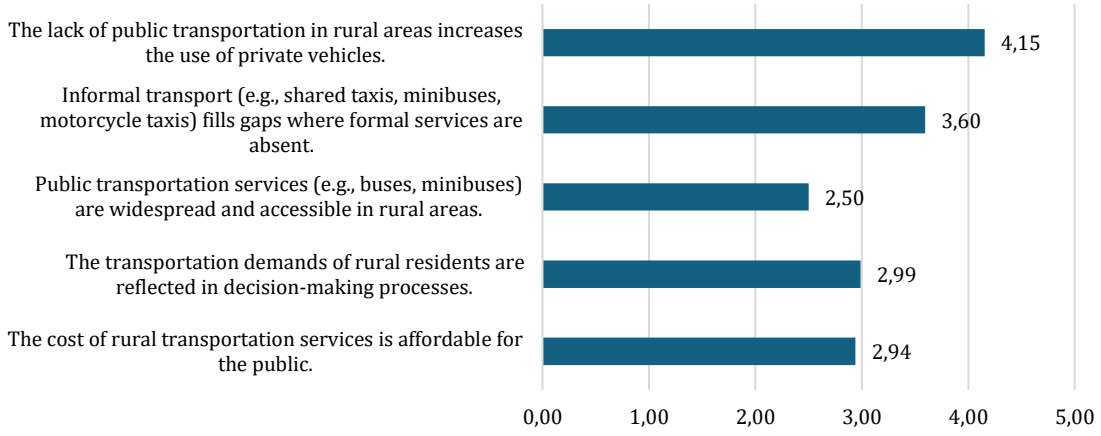



**Figure 4.8: Accessibility and service coverage**

The highest level of agreement was recorded for the dependence on private vehicles due to lack of public transport (mean 4.15), followed by the role of informal modes in bridging service gaps (3.60). By contrast, the affordability of rural transport services (2.94) and the extent to which residents' transport needs are reflected in policies (2.99) received comparatively lower levels of support. The particularly low score for the availability of public transport in rural areas (2.50) further illustrates the structural deficit in formal service provision, reinforcing household reliance on informal and private modes.

### Financing and institutional capacity

According to the results presented in Figure 4.9, respondents expressed relatively low confidence in the financial and institutional foundations of rural transport. The scores point to a widespread perception that both funding and administrative capacities fall short of what is required to sustain effective rural mobility.

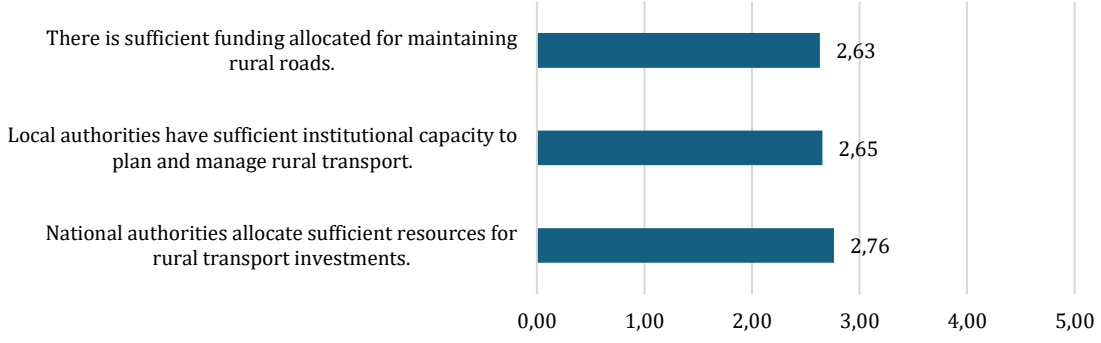



**Figure 4.9: Financing and institutional capacity**

The mean score for national funding allocated to rural transport was 2.76, only slightly higher than the institutional capacity of local authorities (2.65) and the sufficiency of road maintenance funding (2.63). Taken together, these results underline persistent concerns that neither central nor local resources are adequate to ensure sustainable investment and upkeep in rural transport systems.

**Infrastructure and Maintenance**

The findings in Figure 4.10, highlight the continuing structural constraints that undermine reliable rural transport. Respondents strongly emphasized geographical disparities and connectivity gaps as critical barriers to accessibility.

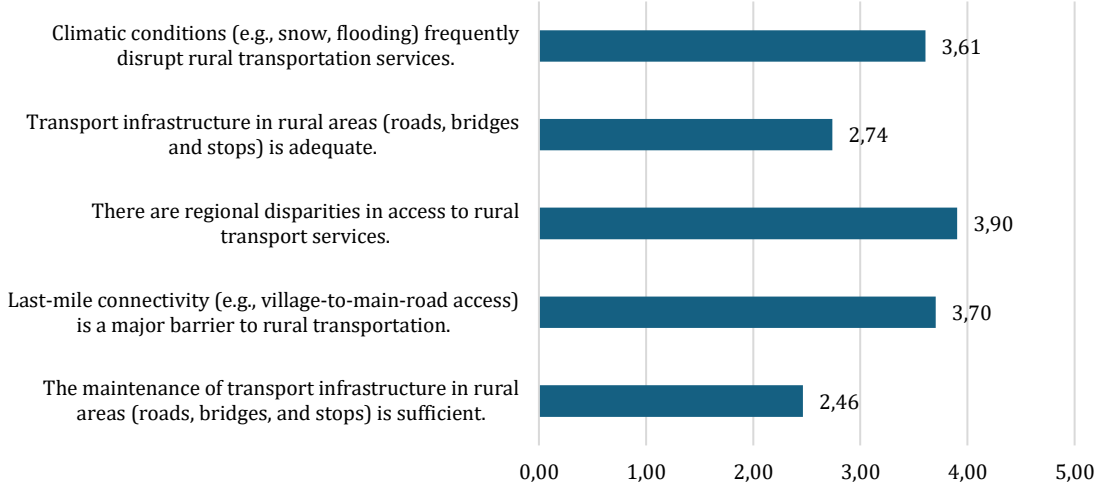



**Figure 4.10: Infrastructure and maintenance**

The highest agreement was recorded for regional inequalities in transport accessibility (mean 3.90), followed closely by last-mile connectivity barriers (3.70) and the disruptive effects of adverse climatic conditions such as snow or flooding (3.61). In contrast, the adequacy of rural transport infrastructure (2.74) and the sufficiency of infrastructure maintenance (2.46) were rated considerably lower, revealing widespread concerns about the physical quality and upkeep of transport networks. Collectively, these results confirm that structural and environmental challenges remain fundamental obstacles to sustainable rural accessibility.

**Policy, Governance, and Technology**

Figure 4.11 demonstrates that while data availability for planning is seen as a moderate strength, broader policy adequacy and technological readiness are viewed with skepticism. The results underscore a gap between policy frameworks and the tools needed to support evidence-based and digitally enabled rural transport planning.

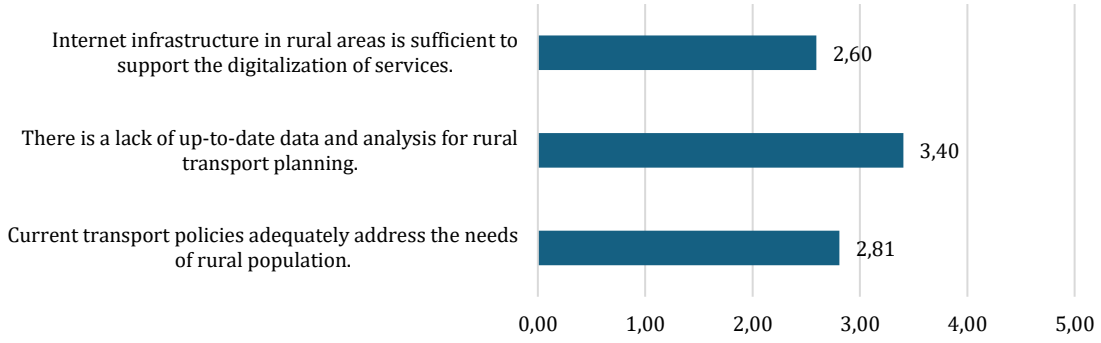



**Figure 4.11: Policy, governance, and technology**

The shortage of updated data for rural transport planning received the highest mean score (mean 3.40), suggesting that respondents recognize the importance of accurate information but also acknowledge gaps in current systems. By comparison, the adequacy of current rural transport policies was rated lower (2.81), and the readiness of rural internet infrastructure even lower (2.60). Together, these findings indicate that without stronger digital infrastructure and more effective policy frameworks, efforts to enhance rural accessibility may struggle to achieve lasting impact.

### Services for disadvantaged groups

Respondents were asked to evaluate the adequacy of six key services, basic needs and commerce, health and social services, education and training, transportation and communication, community and cultural services, and financial services, for different demographic groups in rural areas. The ratings, measured on a five-point scale, reveal significant disparities across groups.

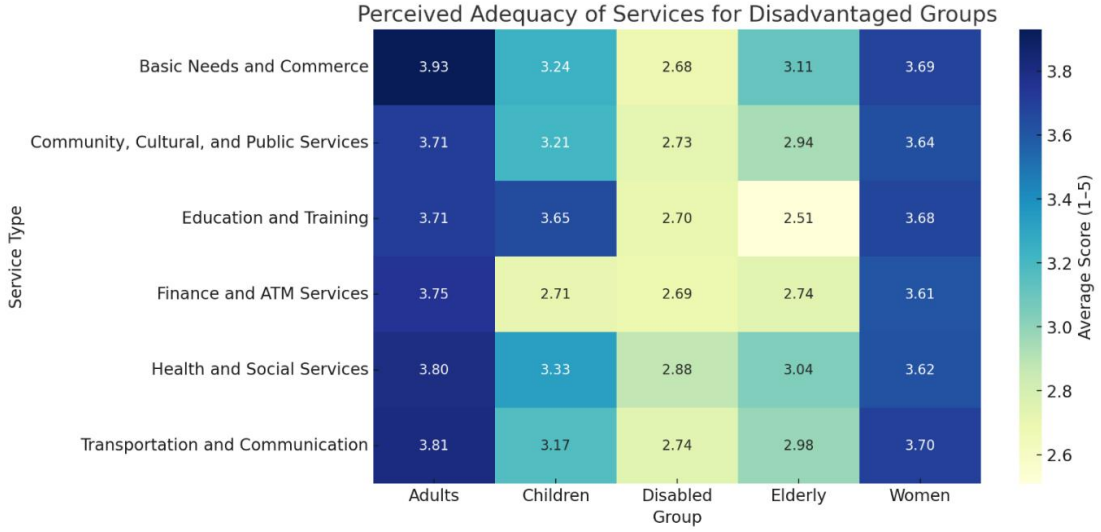



**Figure 4.12: Average scores on service adequacy for disadvantaged groups *(1–5 scale)***

Adults consistently received the highest ratings, with average scores ranging from 3.7 to 3.9, suggesting that most services are perceived as relatively adequate for this group. Women were also rated positively, with scores between 3.6 and 3.7, only slightly below adults. By contrast, children, the elderly, and especially persons with disabilities were perceived to face greater service gaps. Children's ratings ranged between 3.2 and 3.6, but fell sharply in financial services (2.7). Elderly respondents were perceived as disadvantaged in areas such as education and training (2.5) and finance (2.7), while persons with disabilities consistently received the lowest ratings across all service categories, with averages between 2.7 and 2.9.

Service-specific patterns also emerged. Basic needs and commerce were rated highest for adults (3.9) but lowest for persons with disabilities (2.7). Education and training was considered adequate for adults (3.7) and children (3.6), yet highly inadequate for the elderly (2.5) and persons with disabilities (2.7). Transportation and communication showed a similar divide, with adults (3.8) and women (3.7) scoring relatively high, while the elderly (3.0) and persons with disabilities (2.7) scored much lower.

Overall, the analysis highlights that while adults and women in rural areas are perceived to have comparatively better access to essential services, children, the elderly, and especially persons with disabilities remain systematically underserved. The disparities are most pronounced in education and financial services, where structural barriers appear to disproportionately affect vulnerable groups.

### 4.6.1. Role of technological developments

#### Barriers to technology implementation

As illustrated in Figure 4.13, respondents clearly identified a set of structural and financial barriers that limit the feasibility of technology-based rural transport solutions. These barriers reflect both infrastructural shortcomings and the high costs associated with advanced mobility options.

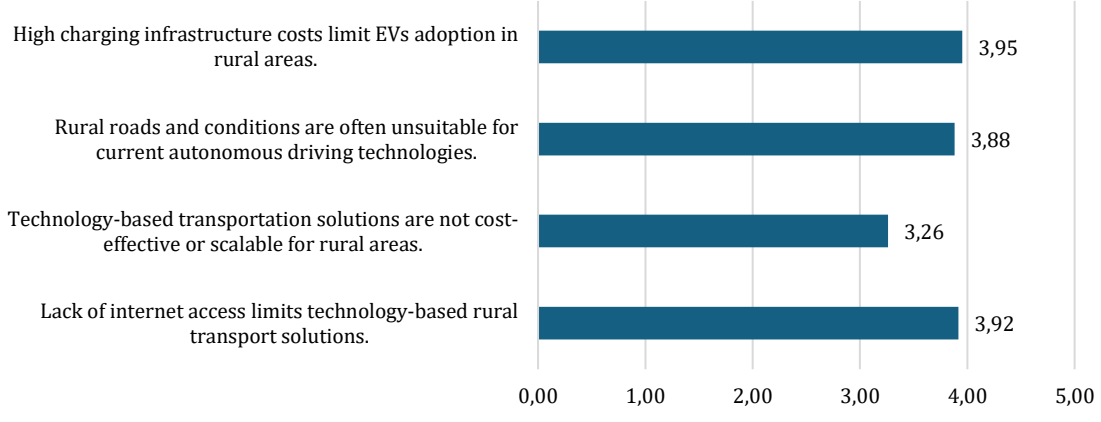



**Figure 4.13: Barriers to technology implementation**

The highest concern was expressed regarding the high costs that hinder EV adoption (mean 3.95), followed closely by limited internet access (3.92) and the unsuitability of rural roads for autonomous vehicles (3.88). The comparatively lower but still significant score for the low cost-effectiveness of technology-based solutions (3.26) reinforces the perception that new-generation technologies are often financially unrealistic in rural contexts. Collectively, these results emphasize that without targeted subsidies, infrastructure upgrades, and supportive frameworks, technological innovations risk deepening rather than reducing rural accessibility gaps.

### Capacity and maintenance support

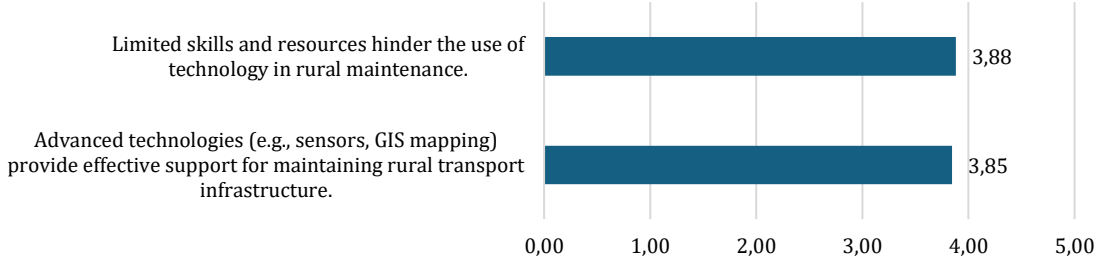



Figure 4.14, respondents consistently emphasized both the opportunities and constraints associated with the use of advanced technologies in rural transport maintenance. The findings reveal a dual perspective: while new tools are seen as beneficial, their practical application is hindered by capacity gaps.

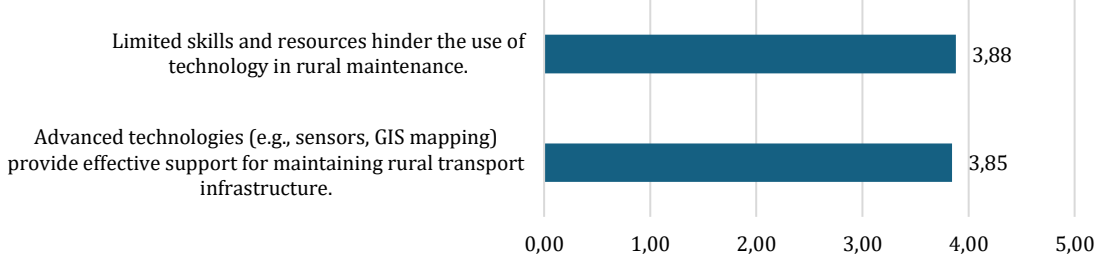



**Figure 4.14: Capacity and maintenance support**

The use of advanced technologies such as sensors and GIS mapping to support maintenance received a relatively high score (mean 3.85), reflecting recognition of their potential value. At the same time, the slightly higher score for limited skills and resources as a barrier (3.88) indicates that human and institutional capacity remains a decisive factor in whether these technologies can be effectively deployed. Together, these results suggest that rural maintenance strategies must be accompanied not only by technological investments but also by parallel efforts to strengthen skills and resources at the local level.

### Integration and adoption

The results presented in Figure 4.15 show a strong endorsement of demand-based transport models as an effective pathway for improving rural accessibility, while overall integration of new technologies was viewed more critically. These findings reflect both optimism about certain innovations and hesitation regarding systemic adoption.

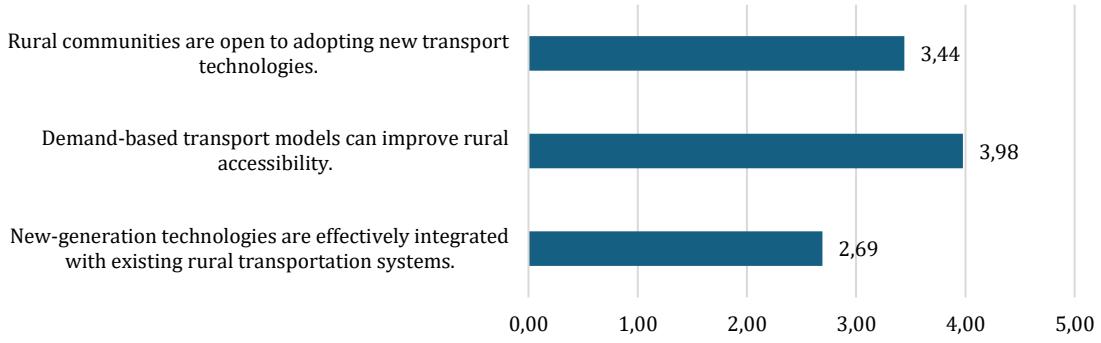



**Figure 4.15: Integration and adoption**

Respondents expressed the highest agreement with the potential of demand-based transport to improve rural access (mean 3.98), making it the most positively evaluated item in this group. Openness among rural communities to adopting new transport technologies also received moderate support (3.44), suggesting a readiness to engage with innovations if practical benefits are clear. By contrast, the effective integration of new technologies with existing rural transport systems scored much lower (2.69), highlighting concerns about institutional readiness and systemic compatibility. Taken together, these results suggest that rural stakeholders may selectively embrace technologies that address immediate mobility gaps while remaining cautious toward broader system-wide integration.

## Potential of emerging technologies

As depicted in Figure 4.16, respondents expressed cautious optimism about the role of new-generation technologies in addressing rural mobility challenges. While overall perceptions of their broad potential were modest, specific tools such as smart mobility systems and digital platforms were viewed much more positively.

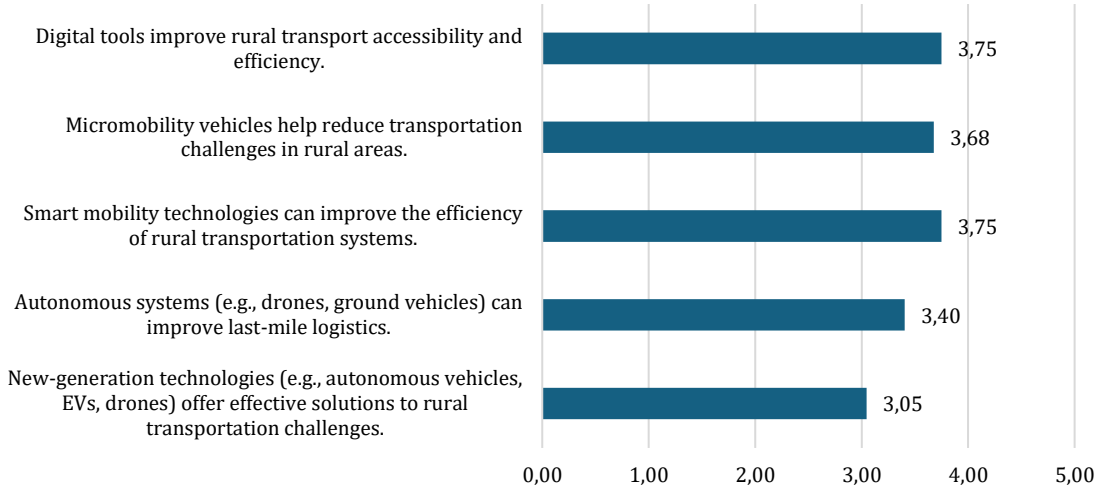



**Figure 4.16: Potential of emerging technologies**

The highest scores in this group were recorded for smart mobility technologies that improve efficiency (mean 3.75) and digital tools that enhance accessibility (3.75). Both of which suggest strong recognition of practical benefits already evident in many transport contexts. Micromobility solutions, such as e-bikes, also attracted favorable views (3.68), reflecting their perceived value for short-distance travel in rural settings. By comparison, autonomous systems for last-mile logistics were rated moderately (3.40), and the overall potential of new-generation technologies received only limited support (3.05). Together, these findings suggest that stakeholders distinguish between technologies with immediate, tangible benefits and those whose practical application in rural areas remains more uncertain.

### 4.6.2. Sustainability and social dimension

#### Financial and modal sustainability

As illustrated in Figure 4.17, respondents underlined the decisive role of private vehicles in sustaining rural mobility, while expressing mixed views on alternative modes and long-term financial sustainability of public transport. These results highlight the structural dependence on individual motorized transport within rural areas.

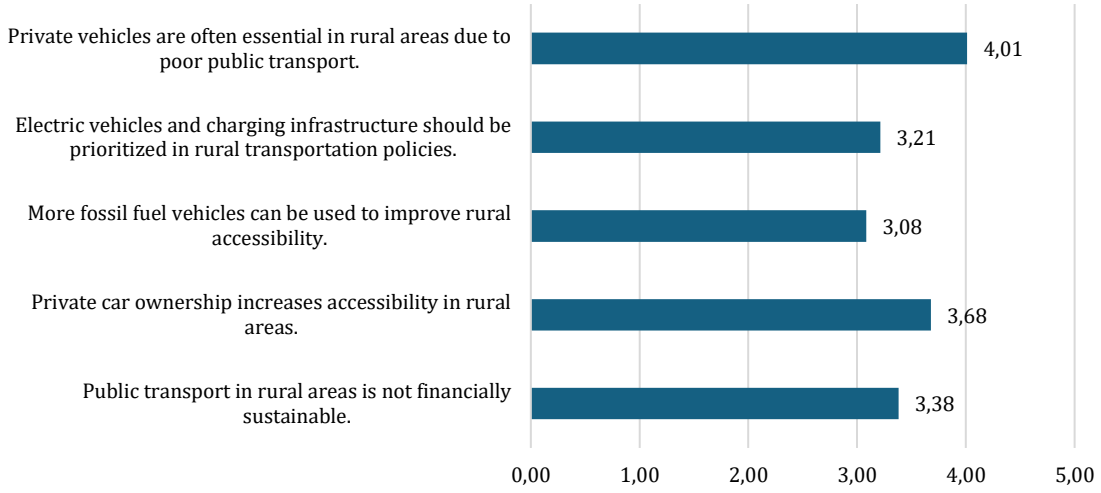



**Figure 4.17: Financial and modal sustainability**

The strongest agreement was recorded for the statement that private vehicles are essential in rural areas (mean 4.01), followed by the recognition that private cars increase accessibility (3.68). In contrast, public transport was widely regarded as financially unsustainable (3.38), and fossil fuel vehicles as a solution for improving accessibility received only limited support (3.08). Similarly, prioritizing electric vehicles and charging infrastructure scored relatively low (3.21), suggesting that while respondents recognize the importance of clean alternatives, confidence in their feasibility for rural contexts remains modest. Overall, these findings demonstrate that private vehicle ownership continues to be the cornerstone of rural accessibility, whereas other modes face significant challenges related to cost, infrastructure, and sustainability.

### Maintenance and Long-Term Reliability

The findings in Figure 4.18 underscore a near-unanimous recognition among respondents of the central role that regular maintenance plays in sustaining rural accessibility. Both items in this group were rated at the highest levels, reflecting a shared understanding that upkeep is not just a technical necessity but a fundamental condition for safety and reliability.

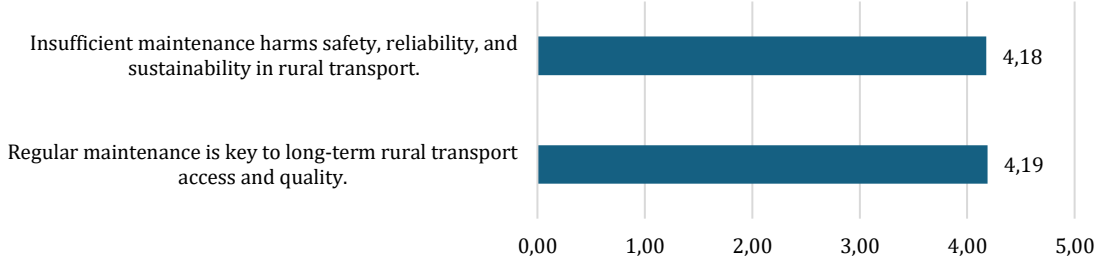



**Figure 4.18: Maintenance and long-term reliability**

Regular maintenance as the key to ensuring long-term access and quality scored the highest in this section (mean 4.19), closely followed by the statement that poor maintenance undermines safety and reliability (4.18). The near-identical scores highlight a consistent perception across stakeholders: without adequate and continuous maintenance, rural transport systems are at risk of rapid decline, threatening both accessibility and user safety.

## Social needs and quality of life

According to the results presented in Figure 4.19, respondents overwhelmingly emphasized the social dimension of rural transport, linking it directly to quality of life and equitable access. These findings reveal strong support for policies that place social priorities at the center of rural mobility planning.

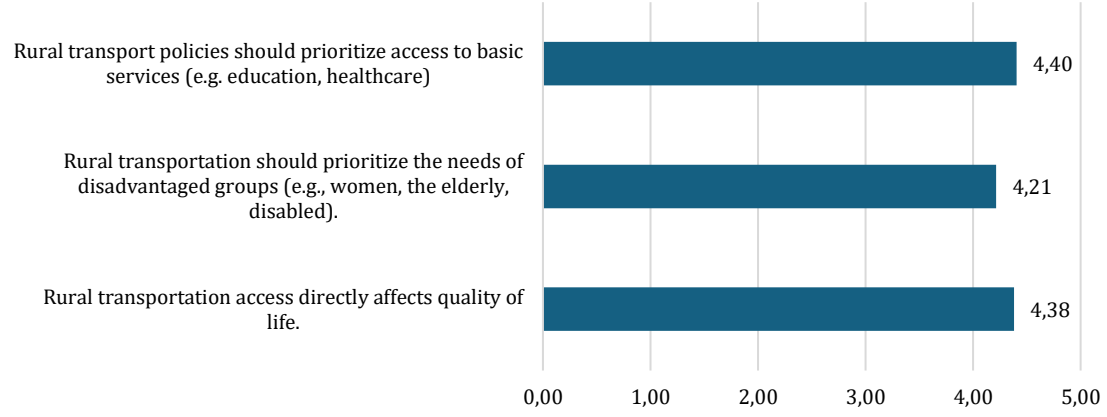



**Figure 4.19: Social needs and quality of life**

Ensuring access to essential services such as education and healthcare received the highest score (mean 4.40), followed closely by the recognition that transport access itself improves overall quality of life (4.38). Prioritizing the needs of disadvantaged groups, including women, the elderly, and persons with disabilities, also attracted very high agreement (4.21). Collectively, the results highlight a strong consensus that rural transport systems must be designed not only as logistical networks but also as vehicles of social inclusion and well-being.

## Sustainability vs. accessibility trade-offs

The findings in Figure 4.20 highlight the delicate balance between environmental objectives and the day-to-day accessibility needs of rural communities. Respondents generally supported climate alignment in rural transport, but they also expressed concern that strict environmental measures could undermine essential mobility.

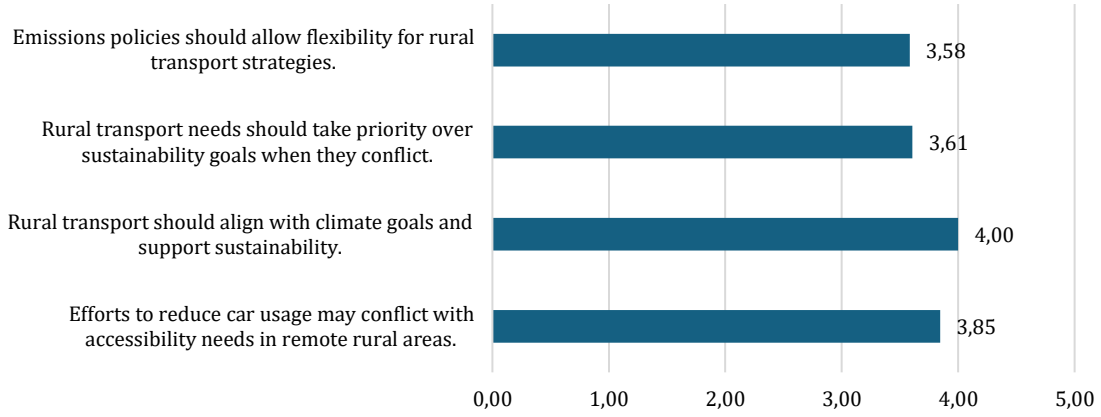



**Figure 4.20: Sustainability vs. accessibility trade-offs**

The strongest agreement was registered for aligning rural transport with climate goals (mean 4.00), indicating that stakeholders acknowledge the importance of sustainability in long-term planning. At the same time, many respondents recognized the tension between reducing private car use and ensuring accessibility in sparsely populated areas (3.85). Lower though still notable support was observed for prioritizing transport needs over sustainability goals (3.61) and for allowing greater flexibility in emissions policies (3.58). Taken together, these results suggest that while sustainability is seen as a necessary priority, it must be carefully balanced against the unique mobility requirements of rural residents.

### 4.6.3. Policy orientation and governance

#### Financing and partnerships

As depicted in Figure 4.21, respondents underlined the importance of establishing reliable funding streams for rural transport, with a particular emphasis on ensuring resources for ongoing maintenance. These findings point to financing models as a cornerstone of sustainable rural mobility.

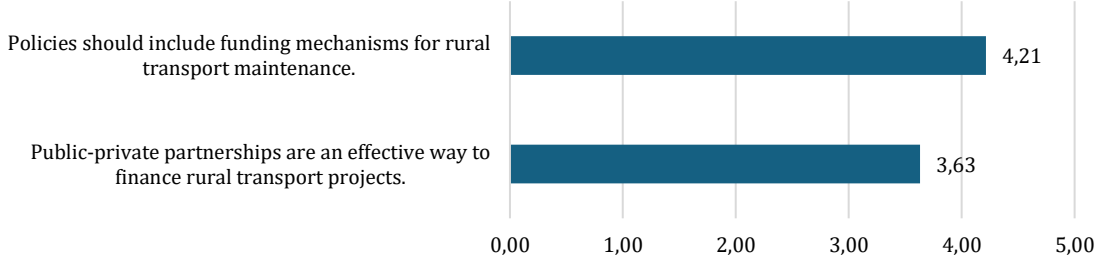



**Figure 4.21: Financing and partnerships**

The highest level of agreement was recorded for the inclusion of dedicated funding mechanisms for rural transport maintenance (mean 4.21), showing that stakeholders view consistent

financial support as essential for reliability and safety. PPPs for financing rural transport projects also received considerable backing (3.63), reflecting recognition of their potential role in supplementing limited public budgets. Together, these results emphasize that effective financing requires both guaranteed maintenance funds and innovative partnership models.

### Policy strategy and integration

Figure 4.22 clearly shows that respondents place strong importance on rural-specific policy frameworks and the integration of transport with broader development strategies. These results highlight that tailored approaches, rather than generic national policies, are considered vital for improving rural accessibility.

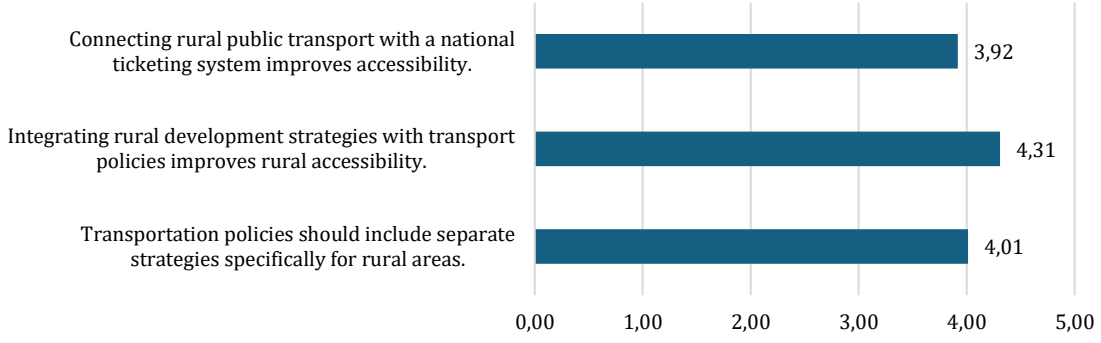



**Figure 4.22: Policy strategy and integration**

The highest support was expressed for integrating rural development strategies with transport policies (mean 4.31), underscoring the view that accessibility improvements are most effective when coordinated with wider development goals. Separate strategies specifically targeting rural transport also received very high agreement (4.01), while connecting rural public transport to a national ticketing system was also positively rated (3.92). Collectively, these findings point to a broad consensus that effective rural transport planning requires both policy differentiation and stronger integration mechanisms.

### Roles of local and central authorities

As illustrated in Figure 4.23, respondents highlighted the need for a balanced governance approach in which both central and local actors play stronger and more clearly defined roles in shaping rural transport. The findings reflect a consensus that effective accessibility requires coordination across different levels of authority.

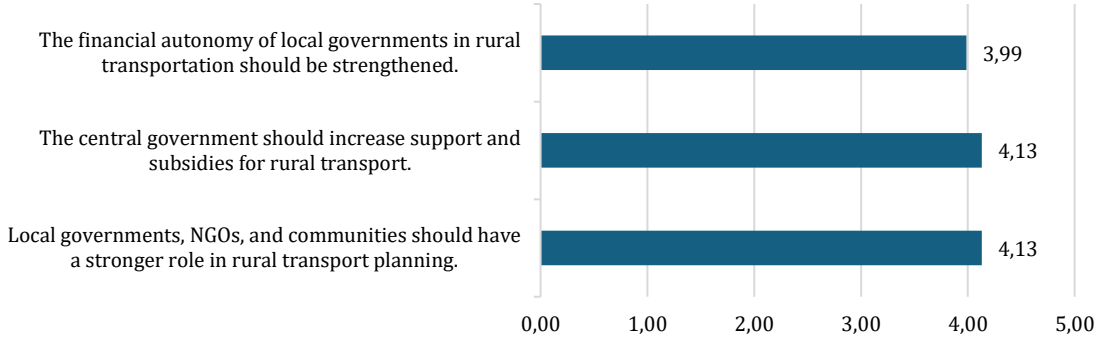



**Figure 4.23: Roles of local and central authorities**

The strongest support was tied equally to calls for a stronger role for local actors in planning (mean 4.13) and increased central government support and subsidies (4.13). Strengthening the financial autonomy of local governments also received substantial backing (3.99), suggesting that stakeholders see decentralized resources as a prerequisite for responsive rural transport systems. Taken together, the results underscore that both top-down and bottom-up commitments are needed to sustain inclusive rural transport policies.

### Service priorities and governance mechanisms

The findings in Figure 4.24 highlight that respondents place the highest priority on ensuring rural transport systems provide reliable access to essential services. At the same time, governance mechanisms such as performance monitoring and clearly defined roles in maintenance are also viewed as critical to achieving sustainable outcomes.

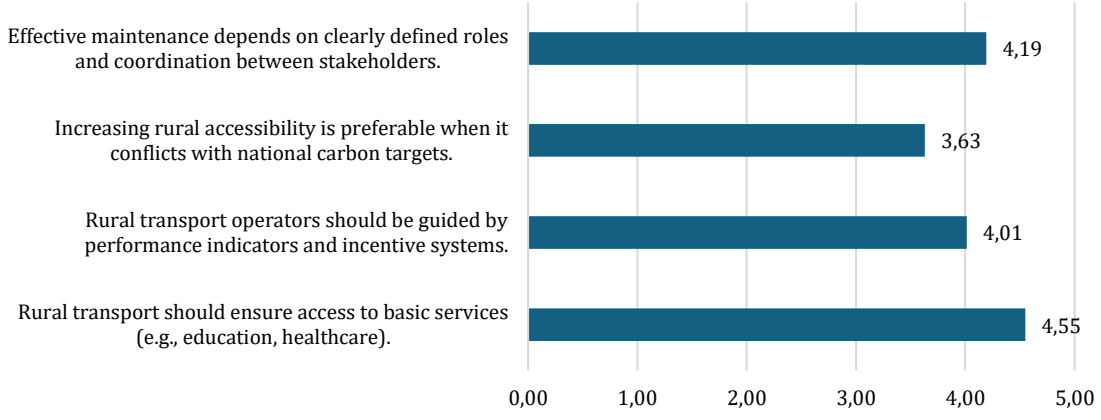



**Figure 4.24: Service priorities and governance mechanisms**

Guaranteeing access to basic services such as education and healthcare received the strongest support (mean 4.55), followed by the importance of clearly defined roles for effective maintenance (4.19). The use of performance indicators and incentive systems for operators also ranked highly (4.01), reflecting the need for accountability and efficiency in service delivery. By

contrast, prioritizing accessibility over national carbon goals received lower, though still meaningful, agreement (3.63), suggesting that while environmental objectives are important, respondents generally expect rural mobility needs to take precedence in cases of conflict. Collectively, these results demonstrate that rural transport strategies must combine social priorities with robust governance mechanisms to ensure effective and equitable outcomes.

### 4.6.4. Stakeholder priorities: policies, technologies, practices, and challenges

#### Policy options for improving rural transport

Respondents placed a clear emphasis on the fundamentals of rural transport policy. As shown in Figure 4.25, the top three policy priorities, building and maintaining rural roads (61), expanding rural public transport services (52), and improving transport access to health and education (46), reflect a strong demand for tangible, service-oriented interventions. These selections confirm that stakeholders consider physical connectivity and access to essential services as the foundations of rural development.

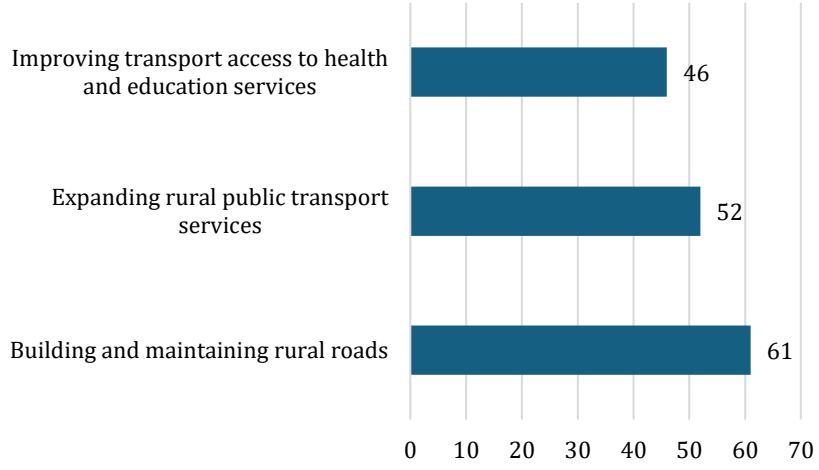



**Figure 4.25: Top-ranked policy options for improving rural transport**

At the same time, Figure 4.26 illustrates that other policy measures received far less attention. Policies such as training for local governments (8), applying climate-resilient construction methods (8), using digital tools (8), and promoting electric and low-emission vehicles (7) were least frequently selected. This does not necessarily indicate irrelevance, but rather suggests that respondents perceive them as longer-term or secondary priorities. Stakeholders in many OIC contexts appear focused on immediate gaps in infrastructure and service provision, while advanced or climate-oriented strategies are likely to be pursued once core transport deficits are addressed.

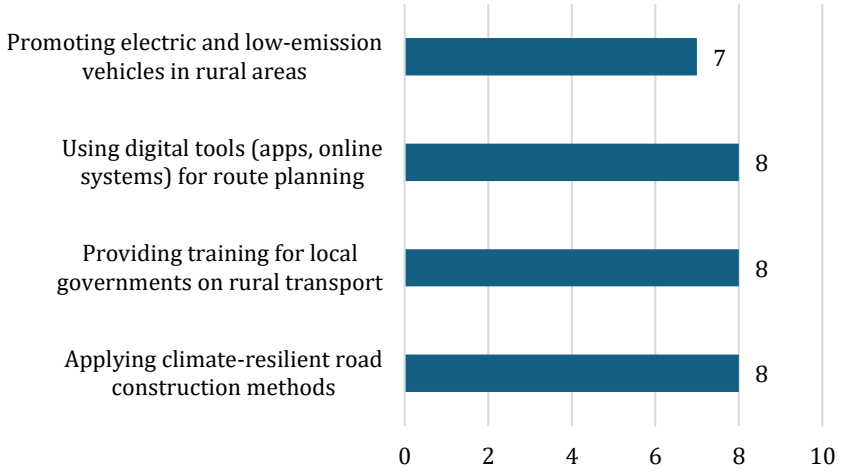



**Figure 4.26: Least-supported policy options for improving rural transport**

These findings align with broader development patterns in OIC member countries, where investment often prioritizes basic infrastructure and service delivery before moving toward advanced technological or sustainability measures.

### Technology pathways for rural mobility

As shown in Figure 4.27, respondents gave the highest priority to technologies that provide direct, practical, and low-barrier solutions for rural areas. Their preferences highlight a strong demand for tools that are easy to adopt, cost-effective, and capable of addressing everyday mobility challenges faced by rural residents. The emphasis here is less on futuristic or complex systems and more on innovations that can be deployed immediately to improve rural accessibility.

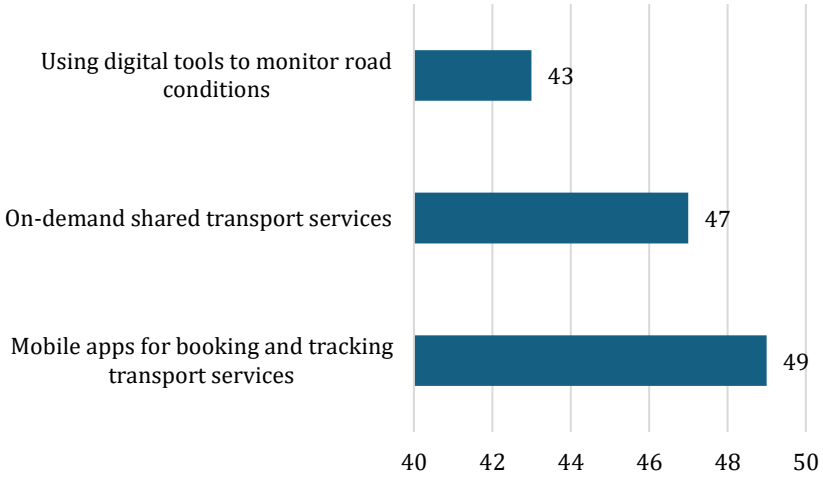



**Figure 4.27: Most promising technologies for rural mobility**

The three most frequently selected technologies were mobile applications for booking and tracking transport services (49 selections), on-demand shared transport services (47), and digital tools to monitor road conditions (43). These choices reflect a recognition that rural accessibility problems often stem from unpredictability, limited availability, and safety concerns. Mobile applications can significantly improve coordination and reduce waiting times, while on-demand services address the lack of regular public transport in sparsely populated areas. Meanwhile, monitoring road conditions is seen as essential for improving safety and planning maintenance, especially in regions exposed to climatic disruptions. Taken together, these findings show that respondents prioritize technologies that can increase efficiency, strengthen reliability, and reduce the daily burdens of rural travel.

As illustrated in Figure 4.28, other technologies received very limited support, pointing to the perception that certain solutions are less relevant or harder to apply in rural contexts. Respondents appeared skeptical of measures that are often designed for urban or inter-city transport systems rather than local, village-to-village connectivity.

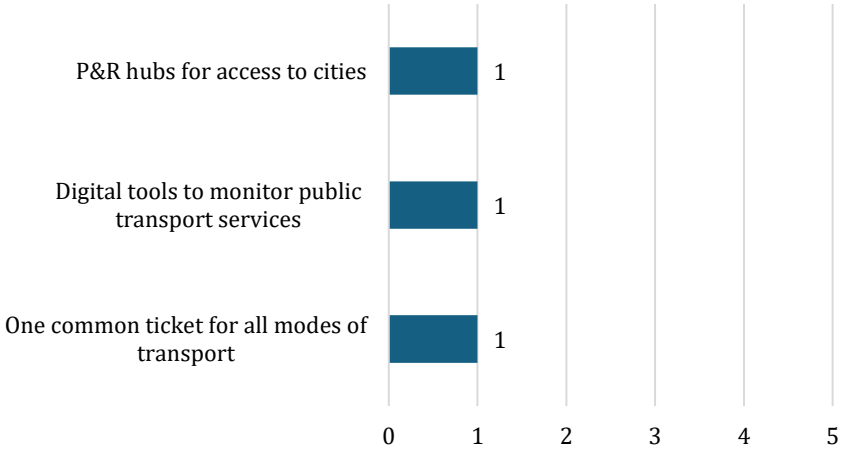



**Figure 4.28: Least-supported technologies for rural mobility**

The least supported options were connecting rural public transport to a national ticketing system (1 selection), digital tools to monitor public transport services (1), and Park & Ride hubs for access to cities (1). Their extremely low ranking suggests that while these measures may be valuable in urban or metropolitan contexts, they do not directly respond to the most pressing challenges of rural mobility. For example, a national ticketing system has limited relevance in areas where formal public transport is already scarce, and Park & Ride hubs are perceived as serving urban commuters rather than rural residents. These results indicate that stakeholders view such options as secondary or context-specific, with little immediate benefit for rural communities.

Overall, the analysis reveals that respondents are strongly oriented toward practical and user-centered innovations that directly benefit rural residents. Solutions that require high levels of infrastructure, institutional integration, or urban-oriented planning attract far less support. For policymakers, this highlights the need to focus on scalable, low-cost, and demand-driven technologies in rural areas, while recognizing that more advanced measures may become relevant only once fundamental accessibility challenges are addressed.

### Practical measures for enhancing accessibility

As shown in Figure 4.29, respondents highlighted practices that combine infrastructure improvements with strong community involvement and service integration. The findings underline that practical, locally adapted actions are perceived as the most effective way to address rural accessibility challenges.

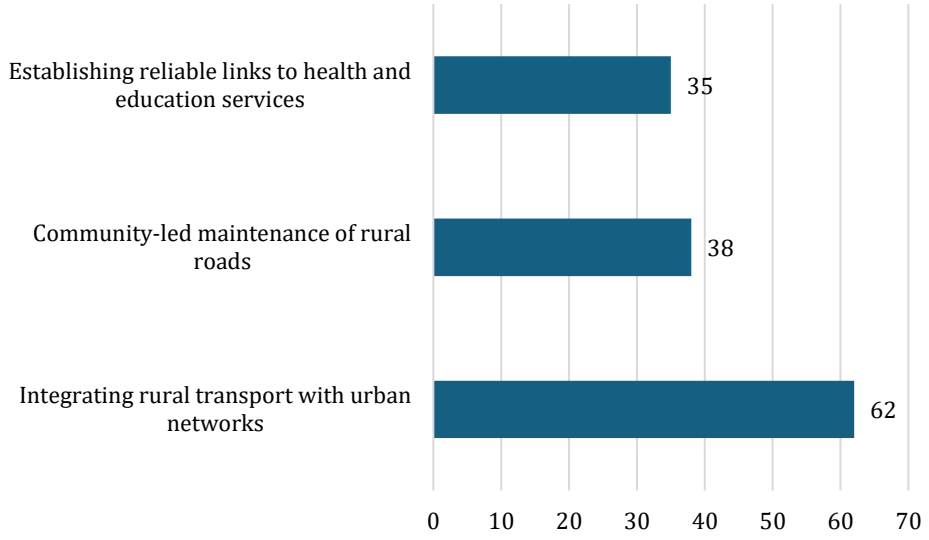



**Figure 4.29: Most effective practices and actions to improve rural accessibility**

The three most frequently selected practices were integrating rural transport with urban networks (62 selections), community-led maintenance of rural roads (38), and establishing reliable links to health and education services (35). These results reveal that stakeholders view connectivity beyond rural areas as crucial for economic and social inclusion, while also recognizing the importance of grassroots participation in maintaining infrastructure. The prioritization of links to health and education further confirms that rural accessibility is understood as a vital enabler of human development, not just mobility. Together, these findings demonstrate that effective practices must be both technically sound and socially embedded, ensuring that improvements are sustainable over time.

As illustrated in Figure 4.30, other practices received considerably less support, reflecting either their limited applicability in rural contexts or their perception as secondary priorities. These measures tended to emphasize environmental or digital aspects, which, while important, are not seen as the most immediate needs for rural communities.

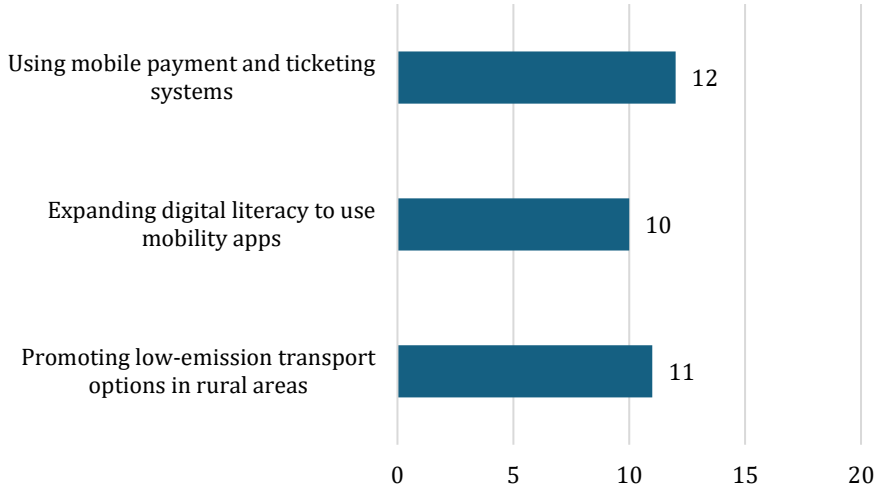



**Figure 4.30: Practices and actions considered least effective by respondents**

The least selected practices were using mobile payment and ticketing systems options (12 selections), promoting low-emission transport options in rural areas (11 selections), and expanding digital literacy to enable the use of mobility apps (10). The very low support for these practices suggests that stakeholders believe environmental goals and digital readiness, although desirable, cannot be prioritized until basic connectivity and service access are secured. In particular, digital literacy initiatives may be constrained by low internet coverage in many rural regions, limiting their practical relevance at this stage.

### Barriers and challenges to policy implementation

As presented in Figure 4.31, respondents identified financial, institutional, and infrastructural barriers as the most pressing challenges in rural transport. Their responses confirm that the limitations of resources and governance capacity remain central obstacles to improving accessibility in rural areas.

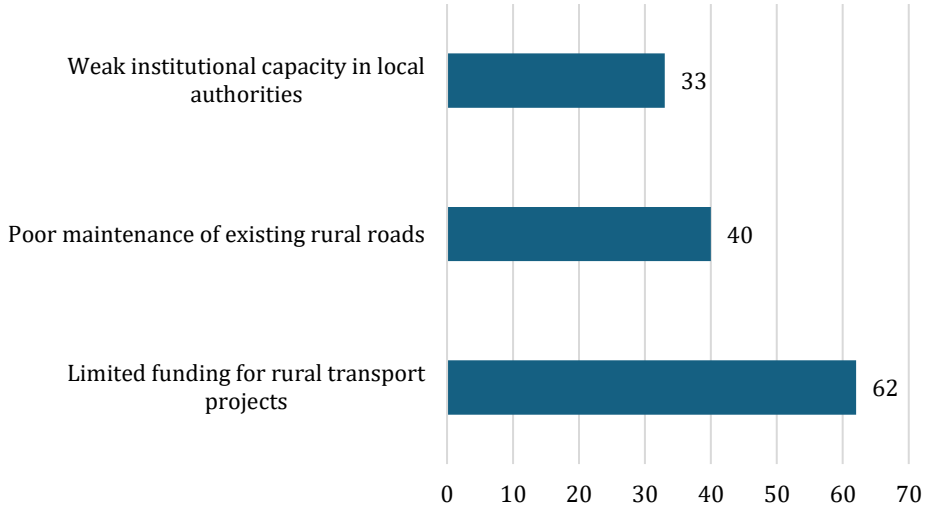



**Figure 4.31: Top challenges identified for implementing rural transport policies**

The most frequently mentioned challenge was limited funding for rural transport projects (62 selections), followed by poor maintenance of existing rural roads (40) and weak institutional capacity in local authorities (33). Respondents highlighted that rural transport systems suffer not only from underinvestment but also from insufficient upkeep and administrative capacity, as depicted in Figure 4.31. In particular, the prominence of funding and maintenance challenges indicates that stakeholders view financial and institutional weaknesses as mutually reinforcing, leading to persistent service gaps.

Financial issues were not the only concerns raised. This pattern is reflected in Figure 4.32, where respondents also pointed to secondary but noteworthy challenges, suggesting that while important, they are not perceived as the most immediate barriers.

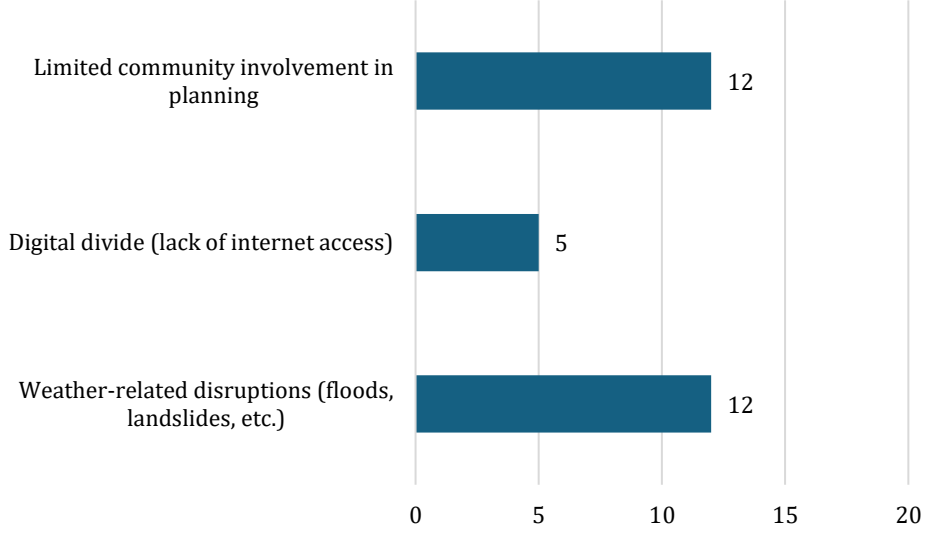



**Figure 4.32: Challenges viewed as less significant for rural transport policies**

The least frequently selected challenges were weather-related disruptions such as floods, landslides, and snow (12 selections), limited community involvement in planning (12), and the digital divide caused by insufficient internet access (5). Stakeholders acknowledged that climate disruptions and participation gaps matter, yet these concerns were overshadowed by funding and maintenance issues, as indicated in Figure 4.32. The very low selection of the digital divide suggests that technological barriers, while real, are not as pressing when compared to systemic infrastructure and governance deficits.

Overall, the analysis reveals that stakeholders see rural transport challenges as primarily rooted in systemic weaknesses, funding shortfalls, poor maintenance, and limited institutional capacity. Geographic and climatic conditions add further complexity, while the digital divide and community participation are recognized but viewed as secondary. Policymakers should therefore prioritize addressing financing and governance gaps in the short term, while gradually incorporating resilience and inclusiveness measures, a conclusion that can also be observed in Figure 4.32.

### 4.6.5. Open-ended recommendations and best practices

Respondents provided more than one hundred project examples, representing both OIC and non-OIC experiences. This diversity illustrates that rural accessibility is being addressed through a broad spectrum of interventions, ranging from large-scale road programs to localized community initiatives and technology pilots.

As depicted in Figure 4.33, project examples come from a wide range of countries, with the largest concentrations in Indonesia (18 projects), Uganda (17; consolidated from two entries) and Morocco (14). India (9) follows, while Türkiye (6), Germany (5) and Jordan (4) form the next tier. A cluster of countries contributes three projects each (Canada, Egypt, Italy, Japan, Maldives, Mozambique, Netherlands, Oman, the UK), two projects each (Malaysia, Niger), and several single-entry cases (Australia, Belgium, Cambodia, China, Cote d'Ivoire, France, Ghana, Haiti, Nepal, Rwanda, Saudi Arabia, Singapore, South Korea, Sri Lanka, Switzerland, USA, Zimbabwe). In total, the dataset contains 121 project entries.

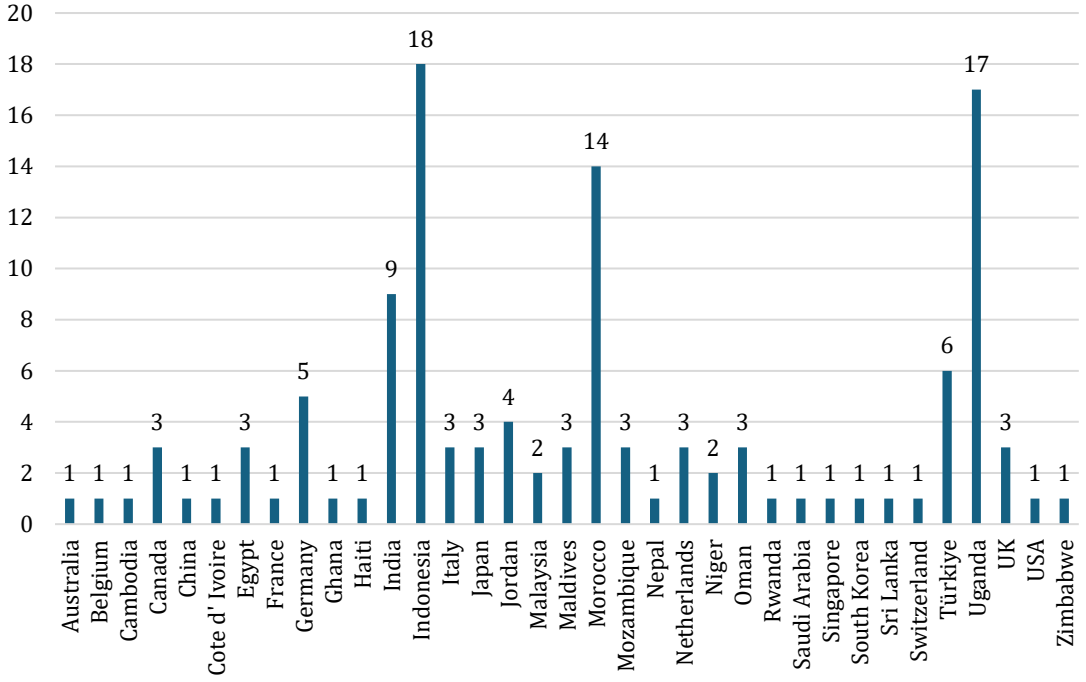



**Figure 4.33: Number of best-practice projects reported by country**

The geographical distribution suggests that countries with extensive rural territories and active public investment, such as Indonesia, Uganda, Morocco, and India, report a high volume of infrastructure and programmatic initiatives, whereas several high-income contexts (e.g., Germany, Netherlands, the UK) contribute integration- and innovation-oriented examples. Notably, the higher number of best-practice cases identified in Indonesia and Morocco is partly attributable to the in-depth field studies and site visits conducted in these countries, which enabled more comprehensive documentation of ongoing initiatives. This mix of OIC and non-OIC cases enriches the evidence base and broadens the transferability of lessons learned.

Beyond geography, the projects can also be categorized thematically. As summarized in Table 4.1, the majority of examples fall under Roads & Maintenance (33 projects), underscoring the continued primacy of road construction and upkeep for rural connectivity. National Programs & Policy (19) and Technology & Innovation (14) form the next largest groups, while Public Transport & Integration (12) highlights efforts to expand rural–urban linkages. Bridges & Access (3), though smaller in number, include highly transformative cases for communities in geographically isolated areas (e.g., Rwanda Trail Bridge). A sizeable group (40) fell into the "Other" category, reflecting highly specific or context-driven initiatives that do not align neatly with predefined themes.

**Table 4.1: Classification of best-practice projects by theme**

| Theme | Count |
|---|---|
| Roads & Maintenance | 33 |
| National Programs & Policy | 19 |
| Technology & Innovation | 14 |
| Public Transport & Integration | 12 |
| Bridges & Access | 3 |
| Other | 40 |
| **Total** | **121** |

Taken together, these results demonstrate that best practices in rural accessibility continue to focus on infrastructure-first approaches, particularly in lower- and middle-income settings, while also integrating policy frameworks, technological innovation, and service-based models. For policymakers, the key lesson is that successful projects tend to combine basic connectivity improvements with complementary strategies, from smart mobility and governance reforms to climate-resilient infrastructure, ensuring that rural transport systems are both sustainable and responsive to community needs.

## 4.7. Summary of Key Findings

### 4.7.1. Key Discussion Topics

#### Electric vehicles and charging equity in rural areas

Electric vehicles (EVs) are central to global decarbonization, yet rural adoption lags significantly due to infrastructural and socioeconomic barriers. Studies show public chargers remain highly concentrated in urban areas, leaving rural drivers underserved (Jonas et al., 2025). A U.S. analysis found rural EV uptake 40% lower than in cities, primarily because chargers are clustered in dense corridors (USDOT Toolkit, 2025). Similar disparities are noted in developing countries: Kenya and Pakistan report minimal rural EV use where charging facilities and electricity grids are unreliable (Shamsuddoha & Nasir, 2025). These findings highlight a growing concern, without deliberate intervention, the electrification transition could deepen the urban–rural divide.

The Survey on Enhancing Rural Accessibility underscores this tension. When asked if *"electric vehicles and charging infrastructure should be prioritized in rural transportation policies,"* only 37% of experts agreed, 25% disagreed, and the rest were neutral. Open-ended responses revealed cautious optimism: some proposed pilot EV fleets or solar-powered rural chargers, while others argued immediate needs like road maintenance outweigh EV investment. Interestingly, about 37% also agreed that *"more fossil fuel vehicles can be used to improve rural accessibility,"* reflecting pragmatic recognition that combustion vehicles remain essential until alternatives are viable. These results show experts see EVs as part of the future, but not the sole near-term solution.

Global evidence suggests rural EV adoption is possible when policies address equity. Germany provides a strong example: 63% of rural regions recorded above-average BEV registration shares in 2023 (compared to 56% of urban regions), demonstrating that rural areas can

outperform urban ones in EV adoption (Dubey et al., 2025). By contrast, rural counties in New York State showed no above-average adoption without such support. These contrasts underline that *policy design*, not geography alone, determines rural outcomes.

Beyond infrastructure, affordability is a barrier. Rural households often have lower incomes and higher dependence on vehicles, making the high upfront cost of EVs prohibitive. Our survey analysis showed limited enthusiasm for technology-based solutions in rural transport unless paired with subsidies: nearly 80% agreed that *"lack of funding"* is the greatest challenge. Experts also stressed that without adequate infrastructure, including reliable charging facilities and supporting systems, EV adoption in rural areas will remain constrained. This aligns with literature emphasizing that closing infrastructure gaps is essential to make EVs feasible beyond urban centers (Martínez-Gómez & Espinoza, 2024).

### Applicability of autonomous vehicles in rural settings

The AVs are frequently promoted as a transformative solution for mobility, but their applicability in rural settings remains contested. Literature highlights several technical barriers: rural roads often lack lane markings, are unpaved, and present diverse conditions that current AV sensing systems struggle to interpret (Ansarinejad et al., 2025). Connectivity is another challenge. AVs depend on high-quality digital infrastructure, yet rural areas often experience patchy broadband and limited Global Positioning System (GPS) accuracy, undermining vehicle-to-infrastructure communication. As (Tan et al., 2024) emphasize, technical feasibility alone does not guarantee adoption; user trust and perceived safety are equally decisive. Without confidence that AVs can navigate unpredictable rural roads safely, rural residents may be reluctant to embrace them.

The Survey on Enhancing Rural Accessibility reflects this cautious perspective. A significant majority (76%) of respondents agreed with the statement that *"rural roads and conditions are often unsuitable for current autonomous driving technologies."* Yet, at the same time, about 53% agreed that autonomous systems, including drones, could improve last-mile logistics in rural areas. This duality suggests that while respondents doubt the immediate viability of AVs for general travel, they recognize niche opportunities where automation could add value. In open-ended responses, several experts pointed to drone delivery of medical supplies to remote villages or pilot projects using autonomous shuttles on fixed rural routes. Such targeted applications are less constrained by infrastructure gaps and directly address rural mobility and service delivery challenges.

Global evidence reinforces these insights. Pilot projects in the United States, such as the autonomous driving systems for Rural America program, have tested AV shuttles in small towns and reported that once residents experienced the service, acceptance improved significantly (Li et al., 2023). Similarly, autonomous electric shuttles deployed in U.S. national parks demonstrated that rural or semi-rural areas can host limited AV operations effectively (Carney et al., 2023). Importantly, community exposure often shifts attitudes: a 2023 survey in Texas found that 76% of rural residents expressed enthusiasm for AVs when they understood potential benefits, much higher than national averages (Li et al., 2023). This aligns with the survey findings that about half of respondents viewed rural communities as open to adopting new technologies, though 39% remained neutral, reflecting cautious optimism.

Economic feasibility remains a central concern. Deploying AVs in low-density regions may not attract private investment due to small markets and high costs. Many survey participants ranked limited funding and weak institutional capacity among the top barriers to rural transport policy

implementation. This implies that any rural AV initiative will require substantial public support, both financial and institutional. Policymakers must therefore weigh the trade-off: should scarce resources be allocated to emerging AV solutions, or to more immediate needs like road maintenance and conventional transport services?

In conclusion, the applicability of AVs in rural settings lies not in broad, near-term deployment but in carefully designed niche applications. Targeted pilots in last-mile logistics, healthcare delivery, and shuttle services could demonstrate value and build trust. However, fundamental investments in road quality, digital connectivity, and institutional readiness must come first. The key policy message is clear: rural AV adoption should be phased, evidence-driven, and aligned with community needs, ensuring that advanced technologies complement rather than replace core accessibility improvements.

### Effectiveness of ITS in low-density rural regions

ITS have become a cornerstone of urban mobility strategies, but their effectiveness in low-density rural regions is more nuanced. Many ITS applications, such as adaptive traffic signals or congestion management, are designed for city environments with heavy traffic flows. Rural settings, by contrast, are characterized by sparse populations, long travel distances, and limited infrastructure. Research indicates that demand-responsive transport models (e.g., flexible routing and scheduling) offer considerable potential to enhance rural public transport systems, even where more advanced ITS may be less suitable (Velaga, Nelson, et al., 2012). Safety is a particularly critical area: rural roads account for a disproportionate share of traffic fatalities, and ITS tools like automated crash notification or smart warning systems for icy roads can be lifesaving.

The Survey highlights both opportunities and constraints. A striking 80% of respondents agreed that *"lack of internet access limits technology-based rural transport solutions."* Similarly, 80% agreed that *"limited skills and resources hinder the use of technology in rural maintenance."* These results confirm that digital and institutional divides are significant barriers to rural ITS deployment. Yet optimism remains: 70% agreed that *"smart mobility technologies can improve the efficiency of rural transportation systems,"* and over two-thirds believed advanced technologies could support infrastructure maintenance. These findings suggest that while experts recognize the constraints, they also see ITS as a potential enabler, if adapted to rural realities.

Global experiences show both promise and caution. In the United States, small rural transit providers using automatic vehicle location and dispatch systems reported improved service reliability and reduced costs (GAO, 2016). NREL research shows that in some rural, low-density areas, replacing fixed-route bus systems with on-demand transit resulted in ridership increases of up to 40%, provided that users could access booking tools via phone or smartphone (Breitenbach, 2024). However, such systems depend heavily on digital readiness. Our survey data revealed that only about half of experts believed rural communities are open to adopting new technologies, with many respondents neutral, reflecting uncertainty about digital literacy and public trust. This aligns with OECD findings that rural broadband gaps persist, particularly in OIC member countries, where large rural populations still lack reliable connectivity (OECD, 2025).

Cost-effectiveness remains another concern. In the survey, 44% of respondents agreed that technology-based transport solutions are not cost-effective or scalable in rural contexts. This reflects the reality that high fixed costs of advanced ITS (e.g., sensor networks, data platforms) are hard to justify for small populations. Yet simple, affordable tools, such as SMS alert systems for weather disruptions or solar-powered beacons at dangerous intersections, were often mentioned in open-ended survey responses as practical solutions. Such low-cost ITS applications can deliver meaningful improvements without requiring extensive infrastructure.

In conclusion, the effectiveness of ITS in rural regions depends on selecting context-appropriate solutions and addressing foundational gaps. Policymakers in OIC countries should prioritize expanding broadband connectivity and building institutional capacity, as these are prerequisites for successful ITS deployment. Rather than replicating urban "smart city" models, rural ITS strategies should focus on critical needs: safety, reliability, and basic service information. By integrating affordable, resilient, and user-friendly technologies, ITS can become a powerful tool to enhance rural accessibility, but only when rooted in the realities of rural environments.

### Vehicle ownership vs. sustainable rural transport

In rural areas, private vehicle ownership is often not a choice but a necessity. Distances are long, land use patterns are dispersed, and public transport is either limited or absent. Literature describes this as "forced car dependency", residents must rely on private cars or motorcycles to access jobs, schools, and healthcare (Corr et al., 2023). A UK survey similarly found that 70% of rural drivers report no feasible alternatives to driving, compared to 40% nationwide (RAC, 2023). These findings reflect the deep structural reliance on private vehicles in rural life.

The Survey strongly echoes this reality. Over 80% of respondents agreed that *"the lack of public transportation in rural areas increases the use of private vehicles."* Similarly, 82% agreed that private vehicles are often essential due to poor public transport coverage. These results underscore that for most rural residents, vehicle ownership is a matter of accessibility rather than preference. Interestingly, when asked about sustainability trade-offs, 60% of experts agreed that *"rural transport needs should take priority over sustainability goals when they conflict."* This pragmatic stance indicates that while sustainability is valued, immediate access to mobility is often viewed as the higher priority in rural contexts.

High dependence on cars carries sustainability and equity implications. Rural transport emissions are significant; studies estimate that rural mobility accounts for nearly one-third of transport-related $CO_2$ in some countries (Rural Climate Partnership, 2023). Cars are also expensive to own and maintain, imposing disproportionate financial burdens on low-income rural households. Survey responses reinforced these concerns: *"affordability of rural transport services"* ranked among the most pressing issues, and respondents frequently cited fuel costs as a key barrier. Social exclusion is another dimension, those without access to a car, such as the elderly or youth, face major mobility challenges. This aligns with findings in Ireland where older residents identified loss of driving ability as a primary cause of isolation (Corr et al., 2023).

Alternatives to private cars in rural areas are difficult but not impossible. Open-ended survey responses highlighted practices such as demand-responsive shuttles, community transport programs, and car-sharing schemes as potential solutions. Experts ranked *"community-based practices and innovative transport models"* among the top three most effective actions for improving rural accessibility. Likewise, several respondents suggested that integrating rural-urban corridors with multimodal transport, linking buses, rail, and cycling, could reduce

dependence on private cars. Micromobility options like e-bikes are gaining traction, with pilot programs showing that users predominantly choose them for trips under approximately 6 km (1–4 miles), a promising range for rural settings (Headland, 2023). However, survey respondents also stressed digital divides: app-based ride-hailing may not be viable in areas with poor connectivity or low digital literacy, highlighting the need for inclusive design.

In conclusion, private vehicles will remain central to rural mobility for the foreseeable future, but policies can reduce the downsides of forced car dependency. For OIC countries, this means a dual approach: making car use cleaner and safer (through incentives for EVs or hybrids, better road safety measures, and support for shared mobility), while gradually expanding alternatives where feasible. Policymakers should avoid punitive measures that disproportionately burden rural drivers and instead focus on creating options, public transport links, shared transport services, and affordable cleaner vehicles, that allow rural residents to voluntarily shift toward more sustainable mobility. In this way, rural accessibility and sustainability goals can be balanced rather than pitted against each other.

### Climate action and emissions policy differentiation

Achieving climate targets requires rapid emissions reduction in transport, but uniform policies often risk disproportionately affecting rural populations. Rural residents typically drive longer distances in older vehicles and have fewer public transport alternatives, meaning that measures such as fuel taxes or strict emissions standards can feel punitive. The "Yellow Vests" protests in France are a cautionary example: higher fuel taxes designed for climate action sparked rural backlash, as commuters with no alternative saw the policy as unfair. More recently, Mittenzwei et al. (2023) showed that rural respondents are significantly more resistant to carbon reduction policies than urban ones, emphasizing the need for differentiation in policy design (Mittenzwei et al., 2023)..

The Survey underscores this dilemma. When asked whether *"emissions policies should allow flexibility for rural areas,"* 62% of experts agreed, with only 18% disagreeing. Likewise, 60% agreed that *"rural transport needs should take priority over sustainability goals when they conflict."* These findings reveal strong support for tailoring climate policies to rural realities, rather than applying uniform measures. Open-ended responses echoed this sentiment: experts suggested phased vehicle transition timelines, subsidies for clean rural buses, and compensatory funds for rural drivers if fuel prices rise. Importantly, many stressed that climate action should not undermine rural accessibility, but instead improve it through investment in sustainable alternatives.

Recent policy developments illustrate possible solutions. The EU's Social Climate Fund (2023) was explicitly designed to cushion rural and low-income households from higher energy and fuel prices, channeling resources into rural public transport and EV incentives (European Commission, 2023). In the USA, the Bipartisan Infrastructure Law includes substantial funding for EV charging infrastructure, prioritizing rural corridors through NEVI grants, and supports deployment of zero-emission buses across urban, suburban, and rural areas, acknowledging mobility challenges in underserved regions (USDOE, 2022; USDOT, 2022a, 2022b). Similarly, Slocat's Global Status Report (SLOCAT, 2021) argued for "differentiated yet coordinated" strategies: urban areas carry more of the immediate decarbonization burden, while rural areas receive transitional support and extended timelines. These examples align with our survey's implication that OIC countries should design emissions policies with flexibility and targeted aid.

At the same time, differentiation should not mean delaying rural decarbonization indefinitely. Rural transport accounts for a significant share of national emissions, up to one-third in some contexts (Rural Climate Partnership, 2023), so ignoring it would jeopardize overall climate goals. The challenge is sequencing: rural communities need time, support, and affordable alternatives before they can comply with strict standards. Our survey shows that many experts see electrification of rural minibuses, incentives for EV purchases in villages, and local renewable energy solutions as promising pathways. Such measures not only cut emissions but also enhance rural accessibility, aligning climate and development goals.

In conclusion, climate action must be both ambitious and fair. Policies that impose equal obligations without considering rural contexts risk fueling opposition and undermining both climate and accessibility objectives. For OIC countries, the policy message is clear: adopt differentiated strategies that provide rural residents with transitional flexibility, targeted financial support, and co-benefits such as better mobility and cleaner air. This balanced approach ensures that rural communities are not left behind, but rather become active participants in the journey to sustainable transport.

### 4.7.2. Policy Implications

#### Strengthening infrastructure and maintenance

The survey results leave no doubt that road construction and maintenance remain the backbone of rural accessibility. Respondents repeatedly cited the inadequacy of existing infrastructure and the poor state of maintenance as key barriers. Policy makers should therefore prioritize predictable and sustainable funding mechanisms, such as road maintenance funds or area-based maintenance systems, and ensure that responsibilities for upkeep are clearly defined. Investing in maintenance not only protects existing assets but also reduces long-term costs and enhances reliability.

#### Enhancing access to basic services

Accessibility to health and education facilities emerged as one of the strongest themes across both ranking questions and project examples. Policies should therefore integrate rural transport planning with essential service delivery, ensuring that education and healthcare policies explicitly account for mobility needs. Targeted measures that address the needs of disadvantaged groups, elderly, women, and persons with disabilities, should also be mainstreamed into rural accessibility strategies, reinforcing inclusiveness as a central principle.

#### Expanding affordable and inclusive public transport

The expansion of rural public transport services ranked second among policy priorities, reflecting a widespread demand for affordable and reliable alternatives to private vehicles. Governments should develop rural–urban integration models, such as feeder bus systems or multimodal connections, to reduce isolation. Targeted subsidies for rural routes, coupled with inclusive design that considers vulnerable users, can significantly increase ridership and improve equity in access.

### Leveraging technology responsibly

Respondents valued practical digital tools, such as mobile applications, on-demand transport platforms, and road monitoring systems, while expressing skepticism about high-cost or complex technologies. Policy makers should adopt a phased approach, first focusing on low-cost, user-friendly solutions that address immediate needs, while gradually preparing the ecosystem for more advanced innovations such as EVs, autonomous systems, and integrated ticketing. This approach ensures that technology adoption is both realistic and impactful in rural contexts.

### Addressing governance and financing gaps

Weak institutional capacity at the local level and limited financial autonomy were highlighted as systemic challenges. To overcome these barriers, rural transport strategies should strengthen the role of local governments and communities in planning and oversight, while ensuring that central governments provide adequate subsidies and coordination frameworks. Transparent financing mechanisms, performance-based incentives for operators, and multi-level coordination are key to building effective and accountable governance structures.

### Balancing sustainability with accessibility

Respondents affirmed the importance of aligning rural transport with sustainability goals, yet insisted on flexibility when environmental targets conflict with accessibility needs. Policy makers should therefore pursue context-sensitive approaches, for instance, investing in climate-resilient infrastructure and promoting low-emission technologies where feasible, while allowing adaptable emissions policies for rural contexts where alternatives are limited. This balance ensures that global climate objectives are advanced without undermining rural inclusion.

### Fostering knowledge sharing and best practices

The collection of over 120 project examples demonstrates the richness of both OIC and non-OIC experiences in improving rural accessibility. Policy makers should seize this opportunity to establish regional and international platforms for knowledge exchange, enabling countries to learn from diverse practices ranging from large-scale national road programs to innovative mobility pilots. Such mechanisms would help accelerate the diffusion of effective solutions and strengthen collaboration among OIC member states and their partners.

The survey findings highlight not only the challenges but also the opportunities to strengthen rural accessibility through coordinated action. The policy implications outlined above provide a strategic framework that emphasizes infrastructure, inclusiveness, technology, governance, and sustainability. These insights serve as a bridge to the forthcoming Policy Recommendations chapter, where the evidence will be translated into concrete and actionable guidance for OIC member states, with broader lessons applicable to the global context.

## 4.8. Survey results

The survey results presented in this report provide a comprehensive picture of how rural accessibility is perceived and prioritized by diverse stakeholders across OIC and non-OIC countries. Respondents consistently highlighted the centrality of infrastructure and maintenance, while also pointing to the growing role of technology, governance, and sustainability considerations. These findings underscore that improving rural accessibility

requires a multi-dimensional approach, one that balances physical connectivity with inclusive governance, financial viability, and adaptability to local contexts.

Across all sections, the evidence reveals that funding shortages, inadequate maintenance, and weak institutional capacity remain the most pressing barriers. At the same time, stakeholders identified roads, public transport expansion, and access to health and education services as the most effective policies. Technology solutions such as mobile applications, on-demand services, and road monitoring tools were recognized for their practicality, but integration challenges and cost barriers limit their adoption. Respondents also stressed that sustainability goals must remain flexible in rural contexts, ensuring that accessibility needs of disadvantaged groups are not compromised.

The open-ended project examples further demonstrate that best practices are highly diverse and context-specific. While the majority focus on road construction and maintenance, innovative pilots in smart mobility, demand-responsive transport, and rural–urban integration highlight opportunities for broader transformation. The geographical spread of cases, from Indonesia and Uganda to Germany, Canada, and Japan, provides valuable comparative insights and reinforces the transferability of lessons across contexts.

Taken together, the survey findings serve as a robust evidence base for policy guidance. They highlight where immediate investment and reforms are most urgently needed, while also pointing to pathways for long-term innovation and sustainability.

In conclusion, rural accessibility remains a global priority that demands both urgent action and sustained commitment. The survey demonstrates that while contexts vary, the core principles of equitable service provision, reliable infrastructure, and inclusive governance resonate universally. These insights will directly inform policy recommendations for OIC member states, while also contributing to a wider international dialogue on how to ensure that no rural community is left behind in the pursuit of sustainable development.

## 4.9. Ethical Considerations

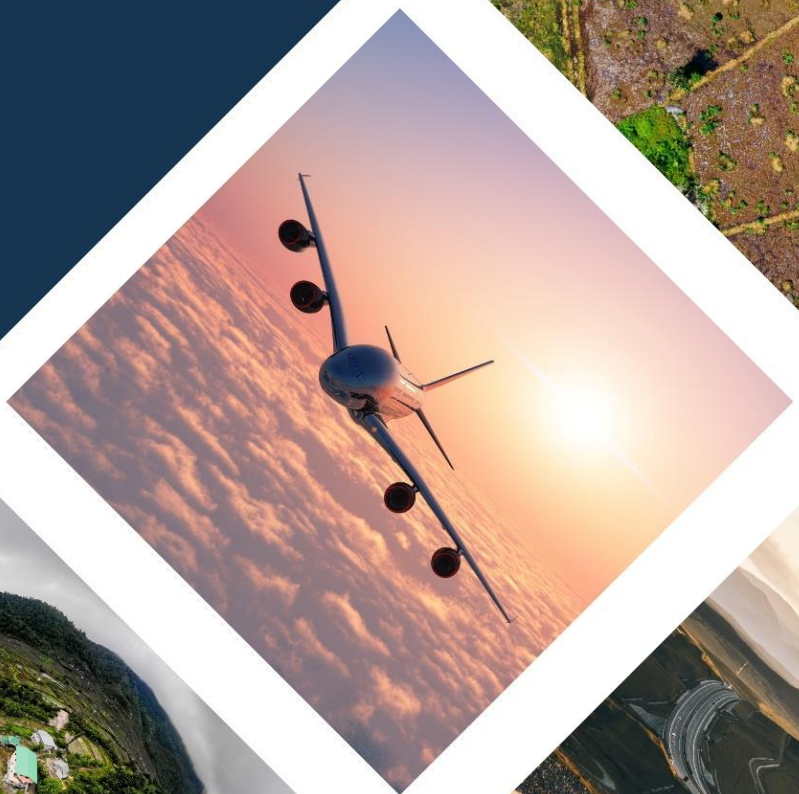
The survey was designed and conducted in line with established ethical research standards. Participation was voluntary, and respondents were informed about the purpose of the study and the intended use of the results. No personally identifiable information was collected, ensuring full anonymity and confidentiality. The survey focused on professional perspectives, and responses were treated with respect for cultural and institutional diversity across both OIC and non-OIC contexts. Ethical oversight was maintained through internal review, and all data were stored and processed securely.

## 4.10. Limitations

While the survey offers valuable insights, several limitations must be acknowledged. First, the sample is not statistically representative of all OIC or non-OIC countries; rather, it reflects the perspectives of those stakeholders who chose to participate. Second, the distribution of respondents was uneven across regions, with higher representation from some countries (e.g., Indonesia, Uganda, Morocco) and fewer from others. Third, the open-ended responses varied in detail and specificity, which limits comparability. Finally, the survey relied on self-reported perspectives, which may be influenced by personal experiences or institutional affiliations.

These limitations should be considered when interpreting the findings and translating them into policy guidance.

# CHAPTER 5: LESSONS LEARNED AND POLICY RECOMMENDATIONS



This chapter consolidates practical guidance for enhancing and sustaining rural accessibility, drawing on a comparative synthesis of country experiences, documented programs, and implementation lessons. Its aim is twofold: to translate evidence into actionable direction for policy and delivery, and to provide a structured reference that decision makers can adapt to their own institutional, fiscal, and geographic contexts. The focus is on measures that are demonstrably workable, scalable, and resilient so that access improvements are not only achieved, but also maintained over time.

The guidance is intended for senior policymakers, sector and planning ministries, regional and local authorities, regulators, finance and budgeting units, and delivery agencies, as well as development partners and oversight bodies. It is written to support policy decisions recognizing that rural accessibility is an enabler of wider social and economic outcomes (health, education, agriculture, markets, and digital inclusion).

The chapter is organized into two complementary parts. Guiding Principles and Recommended Practices articulate the core tenets that consistently underpin successful rural accessibility efforts and, under each principle, specify practical actions that institutions can take. These are not prescriptive blueprints; they serve as a menu of tested approaches that authorities can tailor to different terrains, settlement patterns, capacities, and fiscal realities. Policy Recommendations set out the strategic choices that require high-level endorsement and coordinated action. They translate the chapter's evidence into clear directions for government and partners, ensuring political commitment, institutional mandates, and financing are aligned with practical delivery on the ground. They guide budgeting, regulation, and program design, and signal where collective effort is needed to sustain rural accessibility.

In short, this chapter is a practical bridge between evidence and execution. It equips decision makers to adapt, and implement measures that expand and safeguard rural connectivity turning commitments into durable, inclusive access for people, services, and markets.

## 5.1. Guiding Principles and Recommended Practices

Guiding principles and recommended practices are the foundational tenets and actionable methods that emerge from the study's findings, distilled to assist policymakers in enhancing and sustaining rural accessibility. Guiding principles are overarching rules or values that should steer decision-making, while recommended practices are specific measures or approaches that exemplify how to implement those principles in real-world contexts. This section consolidates these insights, drawing directly from five country case studies; Indonesia, Morocco, Türkiye, Canada, and Australia. By grounding each principle in factual examples of national policies, programs, or projects, we ensure that the guidance is evidence-based and universally applicable, even as it cites country-specific experiences for illustration.

The section is structured according to three key phases of rural transport system development: Phase 1 (Planning and Development), Phase 2 (Implementation and Operationalization), and Phase 3 (Monitoring and Evaluation). Within each phase, a set of guiding principles is presented, each accompanied by recommended practices. The principles are phrased in general, non-country-specific terms, but under each we integrate concrete examples from the case studies to demonstrate how the principle has been applied or proven effective. This format serves a dual purpose: it provides a strategic framework for rural accessibility improvement and a practical toolkit of measures validated by field experiences.

Ultimately, the goal of this section in the overall study is to bridge high-level strategy with on-the-ground action – offering OIC member countries a clear roadmap of *what to do, why it matters, and how to do it*, informed by the successes and lessons learned from peer countries.

### 5.1.1. Phase 1: Planning and Development

Effective planning sets the stage for sustainable rural accessibility initiatives. In this phase, governments establish visions, policies, and frameworks that will guide later implementation. The guiding principles below emphasize integration, evidence-based decision-making, inclusivity, and foresight in the planning process. Each principle is supported by recommended practices drawn from national strategies and programs in our case study countries.

#### Guiding Principle 1: Integrate rural accessibility into national and sectoral development plans

Rural accessibility should not be treated in isolation – it must be embedded in broader development planning to ensure coherence and high-level support. Integrating rural transport goals into national strategies and sectoral policies helps align resources and political will toward common objectives.

- *Anchor rural connectivity in national development frameworks.* For example, Indonesia's RPJMN explicitly emphasizes improving transport connectivity (roads, bridges, ports, airstrips) for rural and remote areas. This ensures that rural accessibility upgrades are prioritized as a central pillar of Indonesia's development strategy, alongside major initiatives like the Village Fund (Dana Desa) that directs substantial resources to local infrastructure for education, healthcare, and markets.
- *Align transport plans with sectoral and regional development strategies.* Morocco provides a model of cross-sector alignment, where the Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests's Generation Green 2020–2030 strategy is directly coupled with rural transport investment plans. In practice, this means rural roads are planned and prioritized to catalyze agricultural transformation. Complementarily, Morocco's PNRR1 and PNRR2 set a clear target of providing all-weather road access to over 80% of the rural population, focusing on high-potential agricultural zones to maximize development impact. By embedding rural accessibility targets within sectoral programs and regional plans, Morocco ensures transport investments directly support broader socio-economic objectives.
- *Ensure long-term vision and policy continuity.* Many case study countries established multi-decade or iterative strategies to continually improve rural access. Morocco's sustained investment of transport infrastructure including flagship programs like PNRRs reflects a long-term vision of transport as an enabler of balanced regional development. Such long-term commitment in planning provides stability and clear direction, allowing successive projects and budgets to build on past achievements.

#### Guiding Principle 2: Establish an enabling policy and institutional framework

A robust policy, legal, and institutional foundation is critical for effective planning. Governments should create clear mandates, regulations, and institutions that empower agencies at all levels to plan and manage rural transport. This principle ensures that from the outset, there is a coherent framework within which all stakeholders operate.

- *Enact clear laws and regulations to govern rural transport.* Indonesia's experience underscores the importance of a solid legal framework: the Law No. 22/2009 on Road Traffic and Transport provides the overarching basis for land transport, which is further operationalized by Government Regulation No. 74/2014. These establish the roles and standards for rural roads and services. Moreover, Indonesia introduced targeted regulations like PM No. 73/2019 on Subsidies for Pioneer Road Transport to finance routes that are socially essential but not commercially viable. This regulatory architecture has been key to enabling rural transport services (such as subsidized "pioneer" buses) to reach isolated, underdeveloped, and border areas. By defining public-service obligations and funding mechanisms in law, Indonesia ensures that remote communities' mobility is safeguarded as a matter of policy.
- *Define institutional roles and decentralize planning authority where appropriate.* Decentralization reforms can enhance rural infrastructure planning, as seen in Morocco and Indonesia. Morocco's 2011 Constitutional reform granted greater autonomy to regional and municipal authorities, enabling subnational entities to take an active role in planning and implementing rural infrastructure and services. This shift brought planning closer to the community level and allowed local governments to tailor solutions to local needs (e.g., provincial road plans, local public transport initiatives) within a national policy framework. Indonesia likewise empowered local governments after the early 2000s decentralization, making them key actors in rural road planning and implementation with support from the central government. Critically, however, both countries' experiences highlight that clear coordination mechanisms must accompany decentralization to avoid fragmentation.
- *Create dedicated programs or agencies for rural accessibility.* Governments often institute special programs or units to focus on rural connectivity. Türkiye's KÖYDES program is one such example: it provided a structured framework to improve village roads, water supply, and sanitation in villages. KÖYDES established a clear institutional mechanism – under the Ministry of Interior working with provincial administrations – to plan and fund rural infrastructure on an ongoing basis, illustrating how an initiative specifically targeting rural needs can institutionalize accessibility goals. Similarly, Australia's RDA initiative functions as a network of regional bodies that plan and advocate for infrastructure and services in rural areas, ensuring that rural accessibility is institutionally championed across government levels. These frameworks provide the governance structure needed for systematic planning and resource allocation for rural connectivity.

### Guiding Principle 3: Utilize data-driven planning and set clear targets

Sound planning for rural accessibility should be grounded in evidence and guided by explicit targets. By conducting rigorous needs assessments and leveraging analytical tools, governments can prioritize investments that yield the greatest benefit. Setting measurable targets (e.g. coverage of all-weather roads, service levels, accessibility indices) provides direction and a baseline for future evaluation.

- *Employ mapping, surveys, and indices to identify needs and gaps.* Morocco's planning process is exemplary in its analytical rigor. The Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests and relevant agencies apply advanced mapping and socio-economic analysis to rural transport planning: high-

value agricultural production zones are mapped alongside data on population density, poverty, and access to services. This data-driven approach allows Morocco to prioritize feeder road projects that will most effectively reduce costs, improve farmers' market access, and boost rural livelihoods. Similarly, Australia's ARIA+ index (Accessibility/Remoteness Index of Australia) is a GIS-based tool that measures remoteness by road distances to service centers, providing a consistent, objective way to classify areas by accessibility level. ARIA+ has been used for decades as an official planning reference, helping Australian policymakers direct resources to the most isolated regions. These examples show the value of quantitative tools in formulating targeted rural accessibility plans.

- *Define explicit coverage and service targets.* Setting clear goals helps rally efforts in the planning stage. For instance, Morocco's PNRR set out to expand all-weather road access to over 80% of the rural population, a target that guided project selection and resource distribution. This ambition was nearly realized through successive programs (PNRR1, PNRR2, and PRDTS), dramatically increasing rural connectivity. Likewise, Canada's national connectivity strategy sets phased milestones for universal broadband and transport access, explicitly aiming for 100% of households (including rural) to have high-speed internet by 2030 – a target that drives coordinated planning efforts across federal and provincial programs. In all cases, clear targets (whether for roads, mobility services, or digital access) provide a measurable planning objective and a yardstick for progress.
- *Prioritize investments based on socio-economic impact criteria.* Beyond physical connectivity, planning should consider which projects yield the highest social and economic returns. Morocco again provides a very good practice: proposed rural road projects are evaluated against multi-dimensional criteria before final selection. These criteria include expected contributions to agricultural GDP, reductions in post-harvest losses, improvements in access to education and healthcare (especially for youth and women), and environmental resilience factors. By comparing projects on such outcomes during the planning phase, Morocco ensures that limited funds go to initiatives with the strongest potential impact on rural development and poverty reduction. This practice, supported by evidence, helps planners to achieve a more objective, needs-based pipeline of investments.

### Guiding Principle 4: Ensure inclusive and participatory planning

Rural communities and stakeholders should have a voice in the planning process. Inclusive planning leads to solutions that are better tailored to local contexts and enjoy greater buy-in during implementation. This principle involves engaging a wide spectrum of stakeholders from local governments and private sector actors to community members early in the planning phase.

- *Engage local stakeholders and communities in needs assessment and design.* Morocco's participatory approach to rural road planning in agricultural areas illustrates this well. Planning for feeder roads is explicitly *"institutional and participatory"*, involving coordination across central, regional, and provincial levels. This bottom-up feedback ensures the planned projects reflect actual local priorities and conditions.

- *Foster ownership through transparency and communication.* As a practice, countries that openly share plans and data with the public tend to foster greater community ownership. Australia, for example, publishes accessibility statistics (like the ARIA+ remoteness categories for all regions) and involves local governments through the RDA network to communicate infrastructure priorities.

### Guiding Principle 5: Strengthen cross-sector coordination and multi-level governance

Rural accessibility is a multi-faceted challenge that cuts across sectors (transport, agriculture, health, education, etc.) and across different levels of government. Effective planning requires mechanisms to coordinate actions horizontally (between ministries/agencies) and vertically (national, regional, local authorities). This prevents siloed efforts and ensures resources and expertise are pooled for maximum impact.

- *Institutionalize inter-ministerial coordination in rural transport planning.* Morocco's governance model offers a clear blueprint: the government established high-level inter-ministerial committees and councils that jointly validate national rural road programs. For example, framework agreements are in place between the Moroccan Ministry of Agriculture, Maritime Fisheries, Rural Development, Water and Forests, the Ministry of Equipment and Water, and the Ministry of Interior to align infrastructure projects with agricultural and rural development priorities. This means when a rural road is planned, authorities simultaneously consider agricultural logistics needs, water management, and local governance issues, rather than each ministry working in isolation.
- *Coordinate across levels of government (national–regional–local).* Multi-level governance is essential for rural projects, which often span jurisdictional responsibilities. Morocco's PRDTS program was built on a tripartite governance structure (national, regional, operational) that ensured coherence *and* local tailoring. National authorities set overall policy and funding envelopes, regional councils helped prioritize and adapt interventions to regional contexts, and local (provincial) commissions planned specific projects in line with local needs.

### Guiding Principle 6: Plan for financial sustainability and partnerships

Rural accessibility improvements should be underpinned by realistic financial planning. Early consideration of how projects will be funded – both capital and maintenance – and exploration of partnerships (public-private, donor, community) are crucial. This principle calls for designing sustainable financing models and leveraging all available support in the planning stage, to ensure the plans are achievable and infrastructure can be maintained long-term.

- *Establish dedicated funding streams and cost-sharing models.* Many countries use special financial arrangements to fund rural infrastructure. Morocco's PRDTS built in a sustainability mechanism by delegating routine road maintenance to regional and provincial authorities, paired with a cost-sharing formula: 60% of maintenance funding from regions, 30% from the central state, and 10% from provinces. This not only secured ongoing maintenance budgets for rural roads and tracks but also fostered local ownership of assets.

- *Leverage PPPs and community contributions.* Involving the private sector and communities in financing can stretch limited public budgets. During planning, Indonesia identifies opportunities for private sector engagement in rural transport – for instance, certain pioneer bus routes with sufficient demand are eventually operated on a commercial basis (e.g. cross-border routes to Malaysia/Brunei), freeing subsidy resources for more remote routes. Canada provides another model: its federal government created grant programs (e.g. RTSF, UBF) that require provincial or municipal co-investment in many cases. This cost-sharing spreads the financial burden and ensures local buy-in, but with federal support cushioning areas that lack fiscal capacity. In sum, the planning stage should map out a diverse financing plan – combining budget allocations, donor aid, private investment, and community efforts as appropriate – to secure the resources needed and ensure long-term financial viability.

#### Guiding Principle 7: Embrace innovation in planning

Modern rural accessibility challenges require innovative and sustainable solutions. Planners should proactively incorporate new technologies, flexible service models into the design of rural transport systems.

- *Include emerging technologies and service models in rural transport plans.* Canada and Australia have started to plan for smart mobility solutions in rural areas – for instance, Australia's strategy explores the use of autonomous vehicles and drones for delivering medical supplies to very remote communities. This was informed by practical trials like Canada's drone delivery pilot with Indigenous communities during COVID-19, which proved the feasibility of reaching isolated villages by air when roads were impassable. Planners should assess where such technologies (drones, electric 4x4 shuttles, ride-share apps for sparsely populated areas, etc.) could complement physical infrastructure. Early integration of these innovations into plans can vastly improve service delivery once implementation arrives.

### 5.1.2. Phase 2: Implementation and Operationalization

In Phase 2, plans are translated into action. This involves executing projects, deploying services, and operationalizing the frameworks established in Phase 1. The guiding principles in this phase ensure that investments are delivered on schedule, within budget, and with the intended quality, while also responding to real-world challenges that arise. Again, each principle is illustrated with concrete practices from the case study countries' implementation experiences.

#### Guiding Principle 1: Develop a phased and prioritized implementation roadmap

Having a detailed implementation plan – specifying the sequence of activities, timelines, and resource allocation – is crucial. Not everything can be built or rolled out at once, so a phased approach focusing on quick wins and high-impact projects first is often effective. This principle is about turning a broad strategy into a manageable pipeline of actions.

- *Sequence projects and programs for efficient rollout.* Indonesia provides a good example with its Pioneer Road Transport program implementation. After planning which remote routes to subsidize, Indonesia follows a structured process. This clear sequence – proposal → evaluation → tender → operation – repeated annually, allows new services to come online methodically and transparently each year. Morocco's PRDTS was implemented in phases as well, with a first tranche of projects executed and then mid-term evaluations used to adjust the second tranche.

- *Allocate resources and responsibilities clearly across implementing agencies.* Türkiye's approach with KÖYDES similarly delegated project execution to provincial special administrations (local government units), but with funding and oversight from the central government (Ministry of Interior) to keep things on track. This clear delineation allowed tens of thousands of small projects (village roads, wells, etc.) to be implemented simultaneously across the country with consistent standards. As a recommended practice, an implementation roadmap should come with a responsibility matrix – listing implementing entities for each action, timelines, and key performance milestones. When every agency knows its role and has the resources lined up, rural accessibility projects can be delivered more effectively and on schedule.

- *Start with high-impact or demonstration projects to build momentum.* In prioritizing what to implement first, many countries choose projects that quickly demonstrate benefits, thereby gaining public support and political buy-in for the broader program. For example, Canada's RTSF (launched in 2021) initially funded a set of "shovel-ready" bus and on-demand shuttle projects in communities that had lost bus services. By rapidly restoring mobility in those towns (after a major private coach line had closed), the government showed tangible results, which helped justify further funding for rural transit. A phased implementation that delivers an early "win" can generate positive feedback and learning that benefits later projects in the pipeline.

### Guiding Principle 2: Strengthen institutional capacity and project management

Successful implementation depends on the capabilities of the institutions and teams delivering the projects. This principle focuses on building strong project management structures, enhancing human capacity, and ensuring effective oversight during execution. It is about moving from planning on paper to *on-the-ground delivery* with professionalism and accountability.

- *Set up dedicated units or teams to manage rural accessibility projects.* Many countries have found it useful to establish project implementation units (PIUs) or similar bodies. Morocco, for instance, effectively managed PRDTS by empowering regional commissions and technical groups to oversee day-to-day implementation at the local level, while a national steering committee monitored overall progress.
- *Invest in training and capacity-building for local implementation.* In decentralized settings especially, local officials and contractors may need support to meet new standards or manage innovative solutions. Australia and Canada have knowledge-sharing initiatives whereby federal experts or external consultants assist remote communities in procurement and construction supervision.

- *Monitor implementation rigorously through effective project management tools.* Good implementation requires tracking progress, budgets, and quality in real time. Morocco's integrated monitoring systems (mentioned as part of its coordination mechanisms) allowed joint technical teams to use data dashboards to track how many kilometers of roads were completed, how many villages got electrified, etc., and compare against targets. Frequent progress reports and problem-solving meetings were held, which helped PRDTS achieve a high execution rate.

#### Guiding Principle 3: Promote sustainable operations and maintenance

Operationalization is not just about building infrastructure – it's about ensuring that once built or launched, the infrastructure and services continue to function effectively. This principle stresses the importance of establishing maintenance regimes, handover processes, and local capacities to keep the roads, vehicles, or services running in the long run.

- *Establish feedback for continuous improvement.* It's a good practice to include an "operational monitoring" period right after implementation. Indonesia, for example, monitors the load factors and user satisfaction on new pioneer transport routes closely in their initial year, allowing the ministry to recalibrate route frequency or engage with operators on service quality before issues become chronic. Morocco followed up its infrastructure investments with surveys and an Accessibility Index update to see how service levels actually changed in the communities. Implementers should plan for such feedback loops. By treating the operationalization as a phase that needs observation and fine-tuning, countries can ensure the longevity and effectiveness of the accessibility improvements delivered.

### 5.1.3. Phase 3: Monitoring and Evaluation

Monitoring and Evaluation is the phase where the impact of interventions is measured against the objectives, and where lessons are learned to inform future policy. The principles below, supported by our case studies, illustrate how countries track progress and use evidence to sustain rural accessibility initiatives over time.

#### Guiding Principle 1: Establish clear indicators and metrics for evaluation

From the outset, define what will be measured to gauge success. Good monitoring relies on clear, relevant indicators – both quantitative and qualitative – that reflect the goals of rural accessibility programs. This principle is about setting up a measurement system (indicators, baselines, targets, data collection methods) to evaluate performance effectively.

- *Track core outcome indicators aligned with program objectives.* Each program should identify a handful of key indicators linked to its specific goals. Indonesia, for instance, aligns many of its rural transport initiatives with measurable outcomes like reductions in rural poverty rate, increases in villages with public transport, or improved Village Development Index scores (which include infrastructure criteria). The regulatory framework in Indonesia even ties certain funding to performance on these indicators – e.g., presidential instructions on regional road improvement include targets that must be met and verified.

- *Include social inclusion and service delivery metrics, not just infrastructure.* Since the ultimate aim of rural accessibility is improved livelihoods and social development, monitoring frameworks should capture those ends, not only the means. Morocco's evaluation of PRDTS did this by measuring social indicators like school enrollment rates and health service quality improvements in communes.

### Guiding Principle 2: Monitor implementation progress and output quality continuously

Monitoring should occur *during* implementation as well as after. This principle emphasizes setting up systems to track the delivery of outputs and the quality of those outputs. By doing so, issues can be corrected promptly and the project stays on course to achieve its intended results.

- *Establish a robust Management Information System (MIS) for project tracking.* Morocco and Indonesia both utilized digital monitoring platforms to oversee their rural programs. In Morocco, an integrated monitoring system allowed authorities to track expenditures, contract progress, and physical works across thousands of PRDTS sub-projects. The recommended practice is to deploy an MIS or at least a structured reporting system where all implementing entities regularly input progress data. This facilitates timely and evidence-based management decisions and forms a basis for later evaluation.
- *Use mid-term reviews to improve ongoing programs.* Especially for multi-year programs, conducting an interim evaluation helps adjust course. Morocco's mid-term review of PRDTS was instrumental – by the mid-point, because they measured how many projects were completed and who benefited, they were able to fine-tune targeting (ensuring the most disadvantaged areas received attention in the later years) and reallocate funds from slower components to more successful ones.

### Guiding Principle 3: Ensure learning and adaptation of policies based on monitoring and evaluation

Monitoring and evaluation should feed back into the policy cycle. The insights gained must be used to refine strategies, scale up successful practices, or pivot away from less effective approaches.

- *Institutionalize a feedback mechanism from evaluators to policymakers.* A recommended practice is to have formal requirements that monitoring and evaluation findings be presented to decision-making bodies (parliament committees, inter-ministerial commissions, etc.) and reflected in updated policy documents. For instance, Türkiye's National Rural Development Strategy IV (covering recent years) explicitly references outcomes from earlier strategies and incorporates lessons (like the need to boost rural public transport and digital access after seeing that roads alone aren't sufficient).
- *Share lessons and best practices nationally and internationally.* Türkiye and Indonesia, as part of the OIC and other international platforms, have shared their rural transport lessons in workshops and publications, helping other countries learn. Canada and Australia regularly publish evaluation reports and case studies, contributing to global knowledge on rural access. This continual learning culture ensures that rural

accessibility initiatives become progressively more effective, sustainable, and impactful over time, guided by real evidence and shared experience.

In conclusion, the guiding principles and recommended practices outlined for each phase – Planning & Development, Implementation & Operationalization, and Monitoring & Evaluation – provide a comprehensive framework for enhancing and sustaining rural accessibility. They are grounded in factual examples from Indonesia, Morocco, Türkiye, Canada, and Australia, demonstrating their validity across diverse contexts. Adhering to these principles means adopting an integrated, inclusive, and adaptive approach: planning with sound analysis and broad buy-in, executing with strong management and flexibility, and evaluating rigorously to inform continuous improvement. For OIC Member Countries, these guiding principles and practices collectively serve as a roadmap to achieve more equitable, effective, and sustainable rural transport systems, thereby advancing overall rural development goals in line with national priorities and global commitments. Each country's journey will be unique, but the lessons shared here offer widely applicable wisdom on how to move from challenges to lasting solutions in rural accessibility.

The practices above are drawn from detailed case studies of national policies and programs, including Indonesia's regulatory framework for rural transport, Morocco's coordinated rural roads and development programs, Türkiye's village infrastructure and service delivery initiatives, Canada's multi-modal connectivity and equity-focused strategies, and Australia's innovations in reaching remote populations, among others. These references, as cited throughout, substantiate the recommended guiding principles with concrete evidence from each country's experience.

## 5.2. Policy Recommendations

This section sets out concise, high-level policy directions to advance rural accessibility in a durable, inclusive, and cost-effective manner. Each recommendation is actionable and accompanied by a rationale that explains the policy problem it addresses, the institutional and financing implications, and the expected benefits for service delivery and territorial equity.

The recommendations synthesize the evidence and practices reflected in the chapter's guiding principles and recommended practices. They are designed for decision makers in central and local government, regulators, financing authorities, and delivery agencies, and can be adapted to different administrative and fiscal contexts.

They are not prescriptive blueprints. Rather, they provide a common framework for aligning mandates, budgets, and implementation tools across sectors and levels of government. Users are encouraged to tailor the recommendations to their own priorities and capacities, sequence actions over the short, medium, and long term, and pair adoption with clear monitoring and evaluation arrangements.

**Policy Recommendation I:** **Developing a long-term national strategy institutionalizing cross-sector coordination and multi-level governance for transport investments to increase rural accessibility with a view of socio-economic development.**

**Rationale:** A long-term strategy (spanning 10, 15, or 20 years) for enhancing rural accessibility provides a roadmap for sustained action that transcends political terms and annual budget cycles. This strategy would set out a clear vision, quantitative targets (e.g. increasing the Rural Access Index from its current level to a higher value by a certain year), and phased milestones for expanding and upgrading the rural transport network. By planning over a longer horizon, governments can sequence projects in logical order, focus on priority regions first, and ensure that connectivity improvements are incrementally built upon rather than one-off interventions. Crucially, a long-term strategy embodies political commitment over time – it signals that improving rural access is not a temporary campaign but a continuing national mission.

Rural connectivity is a multi-sectoral challenge that spans transportation, agriculture, local government, health, education, and finance. In this regard, the development of a long-term rural accessibility strategy should be an inclusive process with cross-sector coordination and multi-level governance – involving stakeholders from various ministries, local governments, and even civil society – to build broad ownership. Such coordination initiatives facilitate institutional alignment and sustained political commitment by making rural accessibility a shared responsibility rather than the domain of a single ministry. Ultimately, a coherent coordination framework reduces duplication and conflicts, delivering a unified rural access strategy in which various programs reinforce each other. This not only improves the effectiveness of attempts but also signals strong political will to tackle rural connectivity in an integrated way.

**Policy Recommendation II:** **Integrating rural connectivity targets (i.e all-weather road access, market access, public transport coverage) into national transport policies and sector plans by ensuring balanced infrastructure development, high-level commitment and fostering cross- sectoral support.**

**Rationale:** National transport policies and plans should explicitly include the expansion and upgrading of rural transport networks as a core component, alongside urban mobility and major highways. By embedding rural road development into transport sector plans, governments can allocate a fair share of resources and attention to rural areas. This integration means setting specific targets (for example, connecting all villages above a certain population to the main road network by 2030) and incorporating rural road projects into the sector's investment pipeline. Such an approach helps create a hierarchical network planning where primary highways feed into secondary and tertiary roads, ultimately reaching remote communities. It ensures that new national infrastructure – like highways or logistics centers – is complemented by last-mile links for rural producers and residents to actually access those facilities. Without deliberate inclusion in the transport plan without cross-sectoral perspective, rural roads risk being overlooked and left to under-resourced local authorities, resulting in persistent isolation of some regions and inefficient use of major transport assets.

Integrating rural accessibility in transport planning is also vital for spatial equity and national cohesion. Uncoordinated growth of transport infrastructure tends to favor already-developed

corridors, exacerbating rural-urban disparities. Government intervention through a balanced transport policy can counteract this by spreading transport investments more evenly. In fact, well-crafted rural transport policies are known to help balance spatial development, guiding a more equitable distribution of economic opportunities across a country. When rural connectivity is improved, it can reduce pressure on cities (by stemming rural-urban migration) and support regional development, thus contributing to national stability. Practically, reflecting rural connectivity in transport plans also means establishing design standards, maintenance regimes, and safety measures appropriate for rural roads under the auspices of the national transport ministry. It encourages the development of specialized units or programs within transport agencies focused on rural roads. The outcome is a more coherent transportation network where rural and urban components function together, and rural communities are not left as "last mile" blind spots but rather become active participants in the national economy.

**Policy Recommendation III: Utilizing data-driven mapping and decision-support tools to identify needs and gaps for evidence-based rural accessibility planning to prioritize investments based on socio-economic impact analysis.**

**Rationale:** Sound planning for rural accessibility should be grounded in evidence and guided by explicit targets. By conducting rigorous needs assessments and leveraging analytical tools, governments can prioritize investments that yield the greatest benefit. Setting measurable targets (e.g. coverage of all-weather roads, service levels, accessibility indices) provides direction and a baseline for future evaluation.

Contemporary planning approaches benefitting from Geographic Information Systems (GIS), network analysis and accessibility modeling provide a clear picture of current infrastructure, service coverage and travel pattern. Thereby, it can identify where populations face significant transport challenges and quantify the potential benefits of different investment options. By applying socio-economic impact criteria—such as improved access to schools, reduced travel time to health facilities, or increased connectivity to local markets, it paves the way for prioritizing projects maximizing social and economic returns.

Integration of decision-support systems with social-economic impact criteria also provides an opportunity to rank investments options objectively. It ensures the fair allocation of scarce resources with the highest potential for reducing inequalities and generating long-term benefits as well as improving transparency, accountability and institutional capacity through standardized processes.

**Policy Recommendation IV:** **Introducing dedicated funding streams and cost-sharing models through leveraging alternative mechanisms such as public-private partnerships or community contributions to enhance rural accessibility.**

**Rationale:** Rural accessibility improvements requires predictable and diversified financial planning. Early consideration of how projects will be funded – both capital and maintenance – and exploration of partnerships (public-private, donor, community) are crucial. The principles such as public private partnerships (PPPs), donor or community call for designing sustainable financing models and leveraging all available support in the planning stage, to ensure the plans are achievable and infrastructure can be maintained long-term.

Dedicated funding streams allow governments to safeguard resources for rural accessibility and reduce exposure to shifting budget priorities. PPPs or community contributions as cost-sharing mechanisms contributes the spread of financial responsibilities across actors while improving efficiency. Alongside spread of financial responsibilities, for instance, a well-structured PPP lead to mobilization of private capital and technical expertise for infrastructure process (i.e. design, construct, maintaining), provided they operate under clear contractual frameworks.

Embedding these financing modalities in the planning cycle often ensures the match of investments with long term maintenance funding. Furthermore, this created a resilient financial architecture for enhancing and sustaining rural accessibility.

**Policy Recommendation V:** **Promoting sustainable operational monitoring and maintenance by introducing effective feedback channels based on social inclusion and service delivery metrics, alongside infrastructure monitoring to support continuous rural development.**

**Rationale:** Operationalization is not just about building infrastructure – it's about ensuring that once built or launched, the infrastructure and services continue to function effectively. This principle stresses the importance of establishing maintenance regimes, handover processes, and local capacities to keep the roads, vehicles, or services running in the long run.

Long-term functionality requires monitoring systems integrating both technical of infrastructure and user-centered feedback mechanisms. Incorporating social inclusion and service delivery metrics ensures that the evaluation framework captures not only physical condition but also equity of access and quality of service. Community reporting channels, digital platforms, and performance-based maintenance contracts can strengthen transparency, encourage accountability, and support timely interventions. Embedding such practices within rural transport programs creates a cycle of continuous improvement, protects investments, and secures reliable, inclusive services for the future.

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