



PARIS PROCESS
ON **MOBILITY** AND **CLIMATE**



Partnership on Sustainable
Low Carbon Transport

EXPANDING EFFORTS ON CLIMATE CHANGE ADAPTATION AND RESILIENCE IN THE TRANSPORT SECTOR





PARIS PROCESS
ON MOBILITY AND CLIMATE



EXPANDING EFFORTS ON CLIMATE CHANGE ADAPTATION AND RESILIENCE IN THE TRANSPORT SECTOR

**CORNIE HUIZENGA
KARL PEET
ALICE YIU
SAMANTHA WONG**

Supported by:



Federal Ministry for the
Environment, Nature Conservation,
Building and Nuclear Safety



Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH



TRANSfer

Transfer climate-friendly transport technologies and measures

based on a decision of the German Bundestag

Table of Contents

List of Abbreviations	iii
I. Introduction	1
II. Establishing a Case for More Ambitious Action on Transport Adaptation and Resilience	2
A. Scientific Arguments for Accelerated Action on Adaptation	2
B. Policy Arguments for Adaptation	3
III. The Evolving Knowledge Base on Adaptation	5
A. General transport and sub-sector specific reports	5
B. Transport related Adaptation tools	6
IV. Policies and Programs Related to Transport and Adaptation in the Developing World	8
A. Policies	8
1. National-Level Adaptation Policies	8
2. Intended Nationally-Determined Contributions (INDCs)	8
B. Programs on Transport and Adaptation	9
C. Multi and Bilateral Development Banks (MDBs) as Accelerators of Action on Adaptation in Transport	11
Transport	11
1. Integration of Adaptation in MDB Policy Framework	11
2. MDB Climate Adaptation Projects	12
V. Climate Finance Funding for Adaptation in the Transport Sector in Developing Countries	13
A. Trends in Climate Finance for Transport Sector Adaptation	13
1. Adaptation Fund	13
2. Global Environment Facility (GEF)	13
3. Green Climate Fund (GCF)	14
4. Climate Investment Funds (CIF)	14
5. Transport Projects in Nationally-Appropriate Mitigation Actions	15
6. International Climate Initiative (IKI)	15
B. Trends in MDB funding for Adaptation in the Transport Sector	16
VI. Conclusions and Recommendations	18

List of Abbreviations

100RC	100 Resilient Cities
ADB	Asian Development Bank
ADP	Ad Hoc Working Group on the Durban Platform for Enhanced Action
AF	Adaptation Fund
AfDB	African Development Bank
BMUB	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
CAF	Cancun Adaptation Framework
CCAITN	Climate Change Adaptation for International Transport Networks
CEDR	Conference of European Directors of Roads
CIF	Clean Investment Fund
COP	Conference of the Parties
CRGE	Climate Resilient Green Economy
EBRD	European Bank for Reconstruction and Development
ECA	Europe and Central Asia
EIB	European Investment Bank
EST	Environmentally Sustainable Transport
GCF	Green Climate Fund
GEF	Global Environmental Facility
IDB	Inter-American Development Bank
IDFC	International Development Finance Club
IFC	International Finance Corporation
IFI	International Financing Institution
IISD	International Institute For Sustainable Development
IKI	International Climate Initiative
INDC	Intended Nationally-Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
IsDB	Islamic Development Bank
LAC	Latin America and Caribbean
LDC	Least Developed Countries
LDCF	Least-Developed Countries Fund
LRT	Light Rail Transit
MRV	Measurement, Reporting, and Verification
NAMA	Nationally-Appropriate Mitigation Action
NAPA	National Adaptation Programmes of Action
NDF	Nordic Development Fund
SCCF	Special Climate Change Fund
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SPA	Strategic Priority on Adaptation
TOD	Transit-Oriented Development
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank



I. Introduction

Adaptation to climate change is gaining importance in global policy discussions, and it is expected that an anticipated global climate agreement at the 21st Conference of the Parties (COP21) will have a substantive section on climate adaptation as well as mitigation. The importance of adaptation is reflected in a general manner in the Intended Nationally Determined Contributions (INDCs) that countries are submitting to the United Nations Framework Convention on Climate Change (UNFCCC) to record their climate change related policy commitments; in particular, developing countries (or non-Annex I Parties) have called for greater emphasis on adaptation.

Adaptation in the transport sector is necessary for both developed and developing countries, as transport systems worldwide are vulnerable to the increasing impacts of extreme weather, and rapid motorization increase the potential for catastrophic impacts. Crucially, sustainable transport systems must adapt to climate change to maintain reliability to enable transport's role in economic and social development. Many sustainable transport solutions can combine increased mitigation potential and resilience as mutual benefits (e.g. during the Great East Japan Earthquake in 2011, high-speed rail proved to be more resilient than conventional rail transport infrastructure).¹

Yet despite rising interest in climate adaptation, relatively little comprehensive work has been done to organize the growing knowledge base on adaptation to climate change, and the same applies to documenting in a systematic manner potential measures on adaptation in the transport sector, as well national and global policy commitments on adaptation in the transport sector. Also, while much work has been accomplished on climate finance in the transport sector, the majority is on mitigation and only a small fraction relates to adaptation.

It is encouraging, however, that building blocks for greater action on adaptation in the transport sector are being developed, with substantive work on the development of a knowledge base, guidelines and toolkits in process, and initial steps are being taken to increase the profile of climate adaptation in national climate policies and in the transport portfolios of international financing institutions (IFIs) and climate finance instruments. Importantly, such climate adaptation initiatives for transport can simultaneously contribute substantially to achieving the recently adopted sustainable development goals (SDGs), as consistent with long-term strategies of inclusive growth in developing countries².

¹ Eighth Regional Environmentally Sustainable Transport (EST) Forum in Asia, Colombo, Sri Lanka, November 19-21, 2014
² This summary report is accompanied by a full report, which can be accessed at <http://bit.ly/1MACnmm>.



II. Establishing a Case for More Ambitious Action on Transport Adaptation and Resilience

The field of transport sector adaptation may still be in its infancy, but it is on the verge of growing up fast. This section establishes a case for accelerated action on adaptation in the transport sector by presenting scientific and policy arguments for acceleration adaptation through the lens of the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC).

A. Scientific Arguments for Accelerated Action on Adaptation

For the past two decades, the IPCC has developed assessments of climate-change impacts, adaptation, and vulnerability.³ IPCC's Working Group II has identified a number of climate impacts that pose particular risks to urban areas (i.e. heat stress, extreme precipitation, inland and coastal flooding, landslides, air pollution, drought and water scarcity), and notes that these risks will be amplified in areas lacking

essential infrastructure and services. Therefore, reducing basic service deficits, improving housing and building resilient infrastructure can significantly reduce vulnerability and improve livelihoods in urban areas. Adopting existing technologies from other geographical and climatic conditions may reduce the cost of adapting new infrastructure as well as the cost of retrofitting existing pipelines and grids.⁴

It is important to note that even if mitigation efforts are greatly accelerated and countries successfully achieve a two-degree Celsius scenario (2DS), efforts on adaptation will still be necessary to address the adverse impacts of climate change. Adaptation in the transport sector is necessary for both developed and developing countries, as transport systems worldwide are already vulnerable to the increasing impacts of extreme weather, and rapid motorization increases the potential for catastrophic impacts. Sustainable transport infrastructure and services alike must adapt to climate change to maintain reliability to enable transport's role in economic and social development (Box 1):

⁴ IPCC: Organization. <http://www.ipcc.ch/organization/organization.shtml>.

⁵ IPCC. 2014. Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

Box 1: Climate Change Impacts in the Transport Sector

The daily functioning of transport systems is sensitive to fluctuations in precipitation, temperature, winds, and visibility (and for coastal cities, rising sea levels with the associated risks of flooding and damages). In road transport, paved roads are particularly vulnerable to temperature extremes, while unpaved roads and bridges are vulnerable to precipitation extremes. Rail system failures are often related to high temperatures, icing, and storms. Urban public transport systems have shown to be vulnerable to flooding as was demonstrated in the case of Super-storm Sandy in the New York region in 2012.

Less-developed countries located in Asia, Africa and Latin American and the Caribbean (LAC) are already suffering climate impacts due to their relatively higher vulnerability. Various regions in the developed world would have slightly different impacts for the transport sector to adapt to climate change; for example, in North America, significant climate impacts for transport systems are projected due to flooding of coastal roads, railways, transit systems, and runways due to rising sea levels. In Europe, sea level rise, storm surges and waves are likely to induce major impacts, including flooding of airports, roads, rail lines and tunnels. Similarly, flooding from intensifying rainfall, as well as other associated extreme events (e.g. landslides), will increase the risks of disruptions and delays in air, rail and road transport.

In the Fifth Assessment Report (AR5), IPCC Working Group II pointed out that the number of scientific publications available for assessing climate-change impacts, adaptation, and vulnerability more than doubled between 2005 and 2010, with especially rapid increases in publications related to adaptation. In addition, studies from developing countries on these topics are on the rise but still represent a small fraction of the total.

B. Policy Arguments for Adaptation

On the policy side, negotiating processes of the United Nations Framework Convention on Climate Change (UNFCCC) contain a growing emphasis on adaptation, to balance out an initial focus on mitigation in the process. Climate change adaptation was solidly established in the UNFCCC dialogue through the Least Developed Countries (LDC) Work Programme at the Seventh Conference of the Parties (COP7) in Marrakesh, and has increased in stature through the Cancun Adaptation Framework at COP16.

At last year's COP20 in Lima, Parties made a concerted effort to raise the profile of adaptation within a forthcoming agreement. The preamble to the Lima outcome draft negotiating text emphasizes that "adaptation is a global challenge and a common responsibility...that must be addressed with the same urgency as, and in political / legal parity with, mitigation".

In a separate section on adaptation and loss and damage, numerous options highlight the evolving dynamic between developed and developing countries (and in particular LDCs and Small Island Developing States (SIDS)) and the need for directing limited climate finance resources toward adaptation efforts.

At the conclusion of the recent September 2015 UNFCCC negotiating session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) 2-10, the Co-Facilitators issued a working document which identified points of convergence, including the need for national adaptation actions to be nationally-determined and country-driven; the potential to harness co-benefits and mitigation-adaptation synergies; and the requirement for a flexible country-driven system of measurement, reporting, and verification (MRV). During the session, adaptation finance emerged as a strategic, crosscutting issue, spanning discussions in both the finance and adaptation areas.

While this measured progress on adaptation in recent negotiations bodes well for greater action on adaptation in general, the transport sector (like other specific sectors) has received little attention in the UNFCCC process. As a key example, the COP21 input report from the UNFCCC Adaptation Committee gives little detail on sectorial approaches to adaptation, and associated references make only superficial reference to transport; thus, this mechanism could benefit from further detail on sectorial approaches, including transport.

5 IPCC. 2014. Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

6 Bipartisan Policy Center and Cambridge Systematics, Inc. No date. Transportation Adaptation to Global Climate Change. White Paper. <http://www.camsys.com/pubs/TransportationAdaptation.pdf>

7 UNECE. 2014. Climate Change Impacts and Adaptation for International Transport Networks.

8 IPCC. 2014. Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

9 IPCC. 2014. Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

10 UNFCCC. Focus: Adaptation. <http://unfccc.int/focus/adaptation/items/6999.php>

11 UNFCCC. 2015. Ad Hoc Working Group on the Durban Platform for Enhanced Action Working Document. Version of 8 September 2015 at 18:00. <http://bit.ly/1FAMbe7>

12 International Institute For Sustainable Development (IISD). 2015. Summary of the Bonn Climate Change Conference: 31 August-4 September 2015. <http://www.iisd.ca/download/pdf/enb12644e.pdf>

13 UNFCCC. 2015. Report of the Adaptation Committee. <http://unfccc.int/resource/docs/2015/sb/eng/02.pdf>

Therefore, it is critical that ongoing efforts to increase the sustainability of transport infrastructure and services focus not only on mitigation strategies but also include a significant adaptation component to complement mitigation efforts. The

SDG process offers a solid platform from which to advance policy arguments to increase the sustainability of transport infrastructure and services through a number of targets both directly and indirectly related to the transport sector (Box 2):

Box 2: Linkage of climate change adaptation in the transport sector to transport related targets under SDGs

A global expansion of sustainable transport infrastructure and services is fundamental to the realization of sustainable development goals as described in the Post-2015 Development Agenda, which was finalized with the adoption of 17 SDGs in September 2015, and which sets out quantified targets and indicators to guide sustainable development in the next 15 years,¹⁴ and which will complement climate change mitigation and adaptation efforts underway through the UNFCCC.

The transport sector is not represented by a single, standalone goal within the SDG framework, but rather is distributed across a number of separate goals related to health, energy, infrastructure, urban issues, and climate change, among others. A SLoCaT Partnership analysis has determined that the SDG framework includes at least five targets that are directly impacted by transport, and at least seven targets that are indirectly impacted by transport.

A number of these targets can be seen as directly supporting climate change adaptation (CCA) actions in the transport sector, including targets on road safety, energy efficiency, resilient infrastructure, and urban transport, in addition to a general target on climate adaptation on an economy-wide scale.¹⁵

- Target 3.6. By 2020, halve the number of global deaths and injuries from road traffic accidents. CCA components reduce the vulnerability of roads in climate change-exposed areas to damage from extreme climatic events (e.g. floods, avalanches, earth and rock slides, desertification), and in this way can also contribute toward improved road traffic safety.
- Target 7.3. By 2030, double the global rate of improvement in energy efficiency. CCA measures can help improve road traffic fuel efficiency by providing for reduced down time of roads due to climate impacts such as floods, avalanches, and rock slides. In this way the CCA actions can prevent long detours and difficult temporary passages due to rough road surfaces, which lead to increased fuel consumption and shorter vehicle life expectancies.
- Target 9.1. Develop quality, reliable, sustainable, and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well being, with a focus on affordable and equitable access for all. Climate-adaptive road investments in rural areas can help secure year-round, all-weather access to essential services, and prevent isolation of fragile communities, thus contributing to economic development and well-being.
- Target 11.2. By 2030, provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities, and older persons. Urban transport systems also require strategic investment and design to increase resilience to climate change impacts, which in turn can increase personal mobility, reduce public expenditures, and improve air quality and public health.

In addition, improved resilience of roads to provide year-round access to remote and vulnerable communities is a critical enabler of achieving a broad set of sectorial targets, including agricultural productivity (Target 2.1), air pollution (Target 3.9), access to safe drinking water (Target 6.1), urban sustainability (Target 11.6), and reduction of food waste (Target 12.3), and climate change adaptation and mitigation beyond the scope of the transport sector (Target 13.1)¹⁶

¹⁴ SLoCaT Partnership. 2015. 2015 Transport Commitment Report: Contribution of Transport Commitments to Global Goals on Sustainable Development. <http://bit.ly/1MACLSW>

¹⁵ Hansen, Stein. (2015). How Climate Change Adaptation Support can contribute in a SLoCaT Context: The NDF Approach and Experience. Unpublished.

¹⁶ Hansen, Stein. (2015). How Climate Change Adaptation Support can contribute in a SLoCaT Context: The NDF Approach and Experience. Unpublished.



III. The Evolving Knowledge Base on Adaptation

A. General transport and sub-sector specific reports

A limited knowledge base on adaptation in the transport sector has hampered global and national adaptation actions in recent decades, despite increasing vulnerability and damages of transport systems due to extreme weather events. Recent efforts have helped to expand the knowledge base on adaptation among transport sub-sectors, which is an essential step toward clarifying key concepts and definitions, developing consensus on catalogues of measures, and agreeing on relevant metrics for monitoring progress over time.

Numerous efforts are being made to expand the knowledge base on climate change adaptation among various subsectors (e.g. roadways, railways, maritime and public transport) through a sample of adaptation summary reports and tool development. In conclusion, although there have been limited recent efforts to document and organize work on transport and adaptation in a comprehensive manner, the current compilation of materials shows that activity appears to be accelerating in this area, with a number of key studies emerging in the past five years.

Box 3: Transport Adaptation relevant knowledge products

- **Adaptation To Climate Change In The Transport Sector: A Review, Potsdam Institute For Climate Impact Research, 2009.** This paper compiles literature dealing with adaptation to climate change in the transport sector and presents a systematic review of references available at the time of publication.¹⁷
- **Adapting to Climate Change in Europe and Central Asia, World Bank, 2009.** This report presents an overview of what adaptation to climate change might mean for the ECA region by discussing emerging best practice adaptation planning and possible actions to improve resilience in the region, and concluding with transport-specific recommendations.¹⁸
- **Railways: Adaptation of Railway Infrastructure to Climate Change, International Union of Railways and Partners, 2009-2011 (First Phase).** The report assesses effects of climate change on railway infrastructure and analyzes how the railway industry can improve performance and minimize damages of climate-related natural hazards to railway infrastructure assets.¹⁹

¹⁷ Eisenack, Klaus et al, 2009. Adaptation To Climate Change In The Transport Sector: A Review. Potsdam Institute For Climate Impact Research. <https://www.pik-potsdam.de/research/publications/pikreports/files/pr122.pdf>

¹⁸ Baettig, M. B., Wild, M., and Imboden D. M., (2007). A climate change index: Where climate change may be most prominent in the 21st century. Geophysical Research Letters vol. 34.

¹⁹ Adaptation of Railway Infrastructure to Climate Change (ARISCC). <http://ariscc.org/index.php?id=37>

- **Maritime and Inland Navigation: A Review of Climate Change Drivers, Impacts, Responses and Mitigation, World Association for Waterborne Transport Infrastructure, 2010.** This report reviews the impacts of climate change on maritime and inland navigation, including sea level rise, wind, waves, and tidal conditions, storms, sea chemistry, and other extreme hydrological events.²⁰
- **Flooded Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation, US Federal Transit Administration, 2011.** The report provides public transit professionals with information and analysis relevant to adapting US public transport assets and services to climate change impacts.²¹
- **Integrating Extreme Weather Risk into Transportation Asset Management, American Association of State Highway and Transportation Officials (AASHTO), 2012.** This report investigates the potential of transportation asset management as a mechanism for integrating extreme weather risk into transport agency decision-making.²²
- **Adaptation of Transport to Climate Change in Europe, European Environment Agency, 2014.** This report concludes that the dominant approach to reducing the vulnerability of transport systems to date has been to make incremental changes, which will be insufficient to deal with disruptive changes in climate, and argues that transport systems will thus need to adopt more comprehensive adaptation strategies.²³
- **Roads: Climate Change Adaptation Framework, World Road Association, 2015.** This report provides a framework to guide road authorities in developing relevant climatic variables for identifying risks, developing robust adaptation responses, and integrating assessments into decision-making processes.²⁴
- **Roads: ROADAPT, Conference of European Directors of Roads (CEDR), 2015.** These guidelines provide methodologies and tools to facilitate consistent climate data information collection, and efficient communication between climate researchers and road authorities, and provide a preliminary scan for estimating climate change-related risks for roads.²⁵
- **Transport Adaptation to Global Climate Change, Cambridge Systematics/Rockefeller Foundation, not dated.** This white paper identifies policy options to support proactive federal-level transport adaptation measures in the United States.²⁶

It is important to note that the knowledge base is to some extent common for transport sub-sectors (e.g. based around vulnerability assessments, risk analysis, and action planning), but also differs in certain respects (e.g. relative focus on infrastructure vs. operations; specific focus on asset management). Furthermore, it is noted that adaptation efforts are focused on a growing set of transport sub-sectors including roadway, railway, public transport, and maritime, and that tools and methodologies are being developed to support both urban and rural transport projects; however,

B. Transport Related Adaptation Tools

Progress is also being made on the development of tools in support of accelerated action on transport. Detailed information on their use is not available; it appears though

a challenge remains in compiling statistical data to support indicators to measure progress in this area.

While rapid progress is being made on adaptation in the transport sector, much of the work described here was only recently started and in several cases is ongoing; therefore, many of these studies are still early in the development curve. But in general, the developed world (e.g. Europe, United States) appears to be several steps ahead of the developing world in terms of building a knowledge base on adaptation in the transport sector.

that these are more rapidly being introduced and used in the developed world where there is a greater institutional and organizational capacity for their use.

20 PIANC EnviCom Task Group 3. No date. Waterborne, ports and waterways: A Review of Climate Change Drivers, Impacts, Responses and Mitigation. <http://bit.ly/1MrTbIQ>

21 FTA. 2011. Flooded Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation. http://www.fta.dot.gov/documents/FTA_0001_-_Flooded_Bus_Barns_and_Buckled_Rails.pdf

22 AASHTO. 2012. Integrating Extreme Weather Risk into Transportation Asset Management. http://climatechange.transportation.org/pdf/extrweathertamwhitepaper_final.pdf

23 European Environment Agency. 2014. Adaptation of Transport to Climate Change in Europe. <http://bit.ly/16GHwrr>

24 Kidnie, Murray et al. 2015. International climate change adaptation framework for road infrastructure. World Road Association-PAIRC. <http://bit.ly/1LXuUP8>

25 CEDR. 2015. ROADAPT: Roads for Today, Adapted for Tomorrow Guidelines. <http://bit.ly/1LND4M1>

26 Bipartisan Policy Center and National Transportation Policy Project. No date. Transportation Adaptation to Global Climate Change. <http://www.camsys.com/pubs/TransportationAdaptation.pdf>

Box 4: Selected Transport-Relevant Climate Adaptation Tools and Methodologies

General Transport Adaptation Tools

- **Climate Change Project Screening Criteria, Nordic Development Fund (NDF), 2011.** NDF's detailed CCA screening of projects has helped identify areas where weaknesses could cause cost overruns, delays and costly conflicts between funders and clients.²⁷
- **Tracking Research on Adaptation to Climate Change Consortium, TRAC3, 2014.** This tool aims to facilitate new collaborations that address conceptual, methodological, and practical issues and challenges associated with tracking progress on climate adaptation as related to public health, urban development, and other areas.²⁸
- **Urban Adaptation Support Tool, Covenant of Mayors, 2015.** This tool consists of more than 40 questions for self-assessment, a database of 70 country case studies, and an adaptation measures database covering a wide number of climate impacts in various sectors.²⁹
- **Making Cities Resilient Campaign, United Nations Office for Disaster Risk Reduction, not dated.** The Local Government Self-Assessment Tool (LGSAT) helps cities and other local actors to set baselines, identify gaps and collect comparable data to measure resilience advancement over time.³⁰

Multilateral Development Banks (MDB): Transport Adaptation Tools

- **The Asian Development Bank (ADB)** has developed (i) risk screening tools that enable rapid risk assessment at the project preparation stage; (ii) sector briefings on adaptation (iii) technical guidelines for the assessment of climate impacts evaluation of risks, identification and prioritization of adaptation options, and monitoring and evaluation of adaptation measures;³¹ and (iv) a technology evaluation scoring method³²
- **The European Bank for Reconstruction and Development (EBRD)** has developed an adaptation toolkit (2010) for identifying and managing climate change risks to investments.³³
- **The World Bank (WB)** has developed Climate and Disaster Risk Screening Tools,³⁴ Outcome-based results framework³⁵, and an Operational Risk Assessment Framework (ORAF)³⁶

While some tools are more generic in character and do not specifically incorporate transport into their scope of investigation, a number of tools are transport-specific and are focused on a growing set of transport sub-sectors, including roadway, railway, public transport, and maritime. In addition, tools and methodologies are being developed to support both urban and rural transport projects; however, challenges remain in compiling statistical data to support indicators to measure progress in this area.

While rapid progress is being made on adaptation in the transport sector, much of the work described here was only recently started and in several cases is ongoing; therefore, many of these studies are still early in the development curve. However, the tools and methodologies developed can play a crucial role in building bridges between sustainable development and climate change adaptation.

27 Hansen, Stein. 2015. How Climate Change Adaptation Support can contribute in a SLoCaT Context: The NDF Approach and Experience. Unpublished.

28 Tracking Research in Adaptation to Climate Change Consortium (TRAC3). <http://trac3.ca/>

29 Mayors Adapt. 2015. Tailored Support for Cities: The Urban Adaptation Support Tool. <http://bit.ly/1P3Ut5s>

30 UNISDR. Local Government Self-Assessment Tool (LGSAT). <http://bit.ly/1WhMJNk>

31 ADB. 2014. Climate Proofing ADB Investment in the Transport Sector. <http://bit.ly/1LkUIZb>

32 ADB. Technologies To Support Climate Change Adaptation In Developing Asia. <http://bit.ly/1RXUfwq>

33 EIB. 2014. Climate risk & vulnerability assessment: Poznan case study. <http://bit.ly/1hYYtH7>

34 WB. 2015. Climate & Disaster Risk Screening Tools – Road Projects. <http://bit.ly/1GOgPH8>

WB. 2015. Climate & Disaster Risk Screening Tools – General Projects. <http://bit.ly/1ky52IE>

35 WB. 2013. Adapting to Climate Change: Assessing World Bank Group Experience Phase III of the World Bank Group and Climate Change. http://ieg.worldbankgroup.org/Data/reports/chapters/cc3_full_eval.pdf

36 WB. 2013. Adapting to Climate Change: Assessing World Bank Group Experience Phase III of the World Bank Group and Climate Change. http://ieg.worldbankgroup.org/Data/reports/chapters/cc3_full_eval.pdf



IV. Policies and Programs Related to Transport and Adaptation in the Developing World

A. Policies on Transport and Adaptation

1. National-Level Adaptation Policies

At COP7, the Global Environmental Facility (GEF)'s Least-Developed Countries Fund (LDCF) was established to fund preparation and implementation of National Adaptation Programmes of Actions (NAPAs),³⁷ which are intended to identify priority activities that respond to immediate national needs for climate change adaptation.³⁸ To date, 50 least-developed countries (LDCs) have submitted NAPAs to the UNFCCC Secretariat (some of which have subsequently graduated from the LDC group),³⁹ out of which 14 countries have listed infrastructure (including transport infrastructure such as dams, roads and bridges) among their priority adaptation areas.^{40, 41}

Building upon the development of NAPAs, the NAP process was established in 2011 under the UNFCCC's Cancun Adaptation Framework (CAF) to help countries conduct comprehensive

medium- and long-term climate adaptation planning.⁴² A UNFCCC expert group has published a set of detailed guidelines focusing on the planning process itself so as to allow some flexibility for each country's existing adaptation activities.⁴³ However, the corresponding UNFCCC Adaptation Committee has made no significant references to adaptation in the transport sector to date.

2. Intended Nationally-Determined Contributions (INDCs)

INDCs communicate to the UNFCCC secretariat country-level commitments and strategies to reduce carbon emissions and increase resilience for the post-2020 period.⁴⁴ Climate adaptation has generally received less attention than mitigation in INDCs, although being mentioned in an economy-wide scope in 109 of 129 INDCs submitted (as of November 5, 2015).

Table 1: Mitigation and Adaptation Measures in INDCs (as of November 5, 2015)

General	Mitigation in INDCs			Adaptation in INDCs		
<i>Number of INDCs Submitted</i>	<i>INDCs that Specify General Mitigation Measures</i>	<i>INDCs Prioritizing Transport Sector for Mitigation⁴⁵</i>	<i>INDCs that Specify Transport Mitigation Measures</i>	<i>INDCs that Specify General Adaptation Measures</i>	<i>INDCs Prioritizing Transport Sector for Adaptation⁴⁶</i>	<i>INDCs that Specify Transport Adaptation Measures</i>
129	129	96	81	109	21	6

37 GEF. Adaptation to Climate Change The Least Developed Countries Fund: Review of the Implementation of NAPAs. 2014. <http://bit.ly/1H3Ss2o>

38 GEF. Adaptation to Climate Change The Least Developed Countries Fund: Review of the Implementation of NAPAs. 2014. <http://bit.ly/1H3Ss2o>

39 UNFCCC. 2015. NAPA Priorities Database. <http://bit.ly/1NDBrmu>

40 The 14 countries are: Bangladesh, Cambodia, Chad, Comoros, Djibouti, Ethiopia, Guinea, Madagascar, Maldives, Samoa, Sao Tome e Principe, Sierra Leone, Solomon Islands, and Timor-Leste. <http://bit.ly/15CCzH9>

41 UNFCCC. 2013. National Adaptation Programmes of Action: Index of NAPA Projects by Country. <http://bit.ly/1Qd2g2y>

42 UNFCCC. 2015. National Adaptation Plans. <http://bit.ly/1G8pZxK>

43 WRI. 2014. Clarifying the UNFCCC National Adaptation Plan Process. <http://bit.ly/1HBPAu8>

44 UNFCCC. 2015. Intended Nationally Determined Contributions. http://unfccc.int/focus/indc_portal/items/8766.php

45 This number refers to INDCs, which directly mention the transport sector as a priority sector for mitigation action. If we include INDCs which consider transport either directly or indirectly (e.g. as part of the energy sector), the total is 122.

46 INDCs for countries prioritizing adaptation in the transport sector include Algeria, Bangladesh, Belize, Bhutan, Burkina Faso, Cambodia, Central Africa Republic, Colombia, Côte d'Ivoire, Dominican Republic, Gambia, Kenya, Lao PDR, Maldives, Madagascar, Malawi, Mexico, Republic of Moldova, Singapore, Tajikistan, and Uruguay.

Most countries have included adaptation in a broad sense as part of their INDCs, yet the number of countries that have specified transport specific adaptation measures is relatively small compared to corresponding mitigation measures.

In addition, six countries identify transport-specific adaptation strategies, which focus mainly on vulnerability assessments and infrastructure resilience planning.

Table 2: Examples of Transport-Specific Adaptation Measures in INDCs

Country	Transport-Specific Adaptation Measures
Bangladesh	General adaptation priorities include climate resilient infrastructure, and improvement of drainage systems to address urban flooding, with specific transport projects underway through the Bangladesh Inland Water Transport Authority and the Ministry of Road Transport and Bridges.
Belize	Vulnerability assessment of transport infrastructure, particularly in urban areas and areas critical to sustaining the country's productive sectors (tourism, agriculture and ports).
Gambia	Improved resilience of road networks under changing climate conditions.
Madagascar	Effective application of existing or newly established sectorial policies, including flood-resistant terrestrial transport infrastructure standards.
Maldives	Coastal protection measures to protect the shoreline of Hulhule, the island, which contains Ibrahim Nasir International Airport, as well as for other air and seaports.
Republic of Moldova	Analyzing adaptation options, including altering assumptions about infrastructure design and operations, and incorporating uncertainty into long-range decision making.

Raising the profile of transport adaptation measures in the elaboration of current INDCs as well as future iterations of INDCs can help to ensure that investments in mitigation measures are well-protected, which can be achieved by incorporating in INDCs a growing number of transport adaptation and resilience efforts currently underway at national and regional levels.

In conclusion, a growing number of developing countries are creating National Adaptation Plans. The coverage of transport in these plans is quite mixed, with a significant number of NAPs,

making no mention of transport at all, or treating transport only superficially, and often in a mitigation-focused context. While country-level examples from the developed world shows that comprehensive transport-relevant adaptation policies are feasible at a national level, in general, there is still much progress to be made in this area among countries in the developing world. On the other hand, proposed transport sector adaptation measures in INDCs are heavily skewed toward the developing world, underscoring their higher levels of vulnerability relative to the developed world.

B. Programs on Transport and Adaptation

Transport relevant adaptation programs are often part of larger economy wide or city specific programs. In some cases they also combine work on mitigation and adaptation. In this context, efforts are being made to advance adaptation broadly (as well as more specifically within the transport sector), which includes work by foundations, academic institutions, and regional commissions.

100 Resilient Cities (100RC) - Rockefeller Foundation

This program⁴⁷ is dedicated to helping cities around the world become more resilient to physical, social and economic challenges. 100RC supports a view that includes not just resilience to discrete shocks (e.g. earthquakes, fires, floods) but also to daily or cyclical stresses that can weaken a city's fabric (e.g. high unemployment; inefficient transport; protracted violence, food and water shortages). By addressing both shocks and stresses, cities can become more able to respond to adverse events.

One of the four dimensions of urban resilience under 100RC's

City Resilience Framework is the Infrastructure & Environment dimension, which contains the driver "Provide Reliable Communication and Mobility," which focuses a free flow of people, information, and goods, including Information and Communications Technology (ICT) networks, as well as physical movement through multimodal transport systems.⁴⁸

CLIMATRANS - Coping with Climate: Assessing Policies for Climate Change Adaptation and Transport Sector Mitigation in Indian Cities – Institute of Transport Economics/Norwegian Centre for Transport Research

This project will assess climate change and environmental impacts related to the urban transport sector in India with an aim to develop strategies for climate change mitigation and adaptation.⁴⁹

CLIMATRANS is a collaboration among two Norwegian and four Indian research institutes, and India's three largest cities, Delhi, Mumbai and Bangalore have been selected as case study cities, with the aim to reduce negative impacts such as congestion,

47 100 Resilient Cities. <http://www.100resilientcities.org/>

48 100 Resilient Cities. <http://www.100resilientcities.org/resilience#/-/>.

49 Institute of Transport Economics/Norwegian Centre for Transport Research. <https://www.toi.no/background/category1493.html>.

noise, local and global emissions and traffic accidents. The project will focus on the transport sector's potential to increase economic competitiveness and social equity, as well as environmental sustainability. The project also aims to provide knowledge to increase institutional capacities in climate-related decision-making strategies.

Climate Change Adaptation for International Transport Networks (CCAITN)

In late 2013, the United Nations Economic Commission for

Europe (UNECE) released the expert group report, *Climate Change Impacts and Adaptation for International Transport Networks (CCAITN)*,⁵⁰ which recommends developing adaptation-relevant datasets, integrating adaptation and mitigation strategies, and addressing key data gaps. In February 2015, the Inland Transport Committee of UNECE decided to extend the CCAITN commitment until 2017, with the second phase to focus on establishing inventories of transport networks in the UNECE region that are vulnerable to climate impacts.

Box 5: Nordic Development Fund and MDB co-financing of adaptation transport projects

The Nordic Development Fund (NDF) and several MDBs are co-financing pilot adaptation transport projects in Asia, Africa, and Latin America, which include the following:

Cambodia (NDF/ADB)

NDF and ADB are co-financing two projects to address climate change adaptation in the transport sector through the Rural Roads Improvement Project in Cambodia⁵¹. The main activities of the first NDF Cambodia project (RRIP I) include improved planning for rural road infrastructure development (e.g. preparation of vulnerability maps, identification and prioritization of adaptation approaches, review of designs, standards and guidelines, training for MRV) and increased resilience of road infrastructure. The second Cambodia rural roads improvement project (RRIP II)⁵² comprises five components including improving about 1,200 km of rural roads to climate resilient paving and plantings; improving rural road asset management through a strong capacity-building program; increasing awareness and application of road safety and safeguards; strengthening the capacity of MRD to provide efficient project management support; and rehabilitating roads and jetties within a five-island cluster in the Mekong River in the context of a broader adaptation framework.

Vietnam (NDF/ADB)

In Vietnam,⁵³ NDF activities are designed to reduce vulnerability of ADB-financed project roads and enhance awareness of climate impacts through vulnerability mapping of the six mountainous provinces in the project area; prioritization of vulnerable road sections for rehabilitation; increase resilience of selected infrastructure through detailed design; capacity building of provincial staff; and strengthening of adaptation-supportive policies. The expected outcome of NDF funded actions in Vietnam are similar to those described for Cambodia, which include providing more reliable access to markets and social services for people in remote and climate-vulnerable mountain areas.⁵⁴

Zambia (NDF/WB)

The overall goal of a planned joint NDF/WB project in Zambia (the Strategic Program for Climate Resilience (SPCR))⁵⁵ is to mainstream climate adaptation in the most vulnerable sectors of the country's economy. The objective of the NDF component is to increase government capacity for a more climate resilient road transport sector. The major outcomes of NDF support will be ensuring that key stakeholders have necessary adaptive capacity to address climate variability. Furthermore, adaptation will be integrated into key policy documents, design standards, and technical guidelines.⁵⁶

In the projects described above, both NDF and co-financing partners are learning from cooperation experience over time. Thus, lessons learned from co-financing activities in the course of NDF's adaptation pilots may be useful in streamlining forthcoming cooperative processes among global institutions, which will be essential to address the growing demand for financing and expertise in transport adaptation projects⁵⁷.

50 UNECE. 2013. *Climate Change Impacts and Adaptation for International Transport Networks*. <http://bit.ly/1KFlaKM>

51 NDF. 2010. *Adaptation Approaches for the Transport Sector* [NDF C15]. <http://bit.ly/1OPGL7P>

52 NDF. 2014. *Rural Roads Improvement Project II (RRIP II)* [NDF C63]. <http://bit.ly/114rx1K>

53 NDF. 2011. *Integrating Climate Change Adaptation to Transport* [NDF C25]. <http://bit.ly/11j6MO9U>

54 Hansen, Stein. (2015). *How Climate Change Adaptation Support can contribute in a SLoCaT Context: The NDF Approach and Experience*. Unpublished.

55 NDF. 2013. *Strengthening Climate Resilience Project – Developing Climate Resilient Infrastructure Standards* [NDF C52]. <http://bit.ly/114rFhL>

56 Hansen, Stein. (2015). *How Climate Change Adaptation Support can contribute in a SLoCaT Context: The NDF Approach and Experience*. Unpublished.

57 Hansen, Stein. (2015). *How Climate Change Adaptation Support can contribute in a SLoCaT Context: The NDF Approach and Experience*. Unpublished.

The emergence of a number of general and specific adaptation programs with a transport sector component is indicative of growing momentum to better integrate transport among broader adaptation efforts. However, (as in the case of knowledge base described previously), there is no coordinated effort to date to document and disseminate lessons learned

from these various programs. Such efforts will be required to ensure that implementation of pilot projects on adaptation in the transport sector are further scaled up and accelerated, and to ensure that short-term strategies to increase transport sector resilience are incorporated and mainstreamed through long-term policy adoption.

C. Multi and Bilateral Development Banks (MDBs) as Accelerators of Action on Adaptation in Transport

MDBs have the potential to act as change agents in the area of adaptation in the transport sector, through their mandate and mission to place significant emphasis on environmental sustainability. Collectively (not counting bilateral efforts) the MDBs approve from \$20-25 billion each year in transport spending on infrastructure and transport services, and this level of investments offers considerable opportunities to assist developing countries in adapting their transport sectors to changing climate conditions.

In addition, MDBs are often at the forefront of transport sector policy dialogues based on their ongoing bilateral interaction with governments, thus development banks have a significant degree of leverage to advance the cause of adaptation in the

transport sector. This section reviews potential MDB levers to increase resilience in the transport sector through adaptation policies, investments, and tool development⁵⁸.

1. Integration of Adaptation in MDB Policy Framework

This section gives an overview of adaptation references in MDB policy documents pertaining to transport strategy and country strategies among EST member countries. While the majority of MDBs acknowledge adaptation as key issue, translation from broad organizational priorities to transport specific strategies varies widely by organization and is generally still very much an ongoing effort.

Table 3: Climate Change Adaptation References in MDB Transport Sector Policies

MDB	Climate Adaptation References in MDB Transport Sector Policies
AfDB	At the Center of Africa's Transformation Strategy for 2013–2022 (2013) ⁵⁹ <ul style="list-style-type: none"> • Linkages between climate resilient infrastructure and green growth • Strengthening resilience by increasing access to transport and other services • Building resilience by developing transport system compatible with environmental concerns
ADB	Sustainable Transport Initiative Operational Plan (2010) ⁶⁰ <ul style="list-style-type: none"> • Mainstreaming climate adaptation measures into transport operations • Conducting case studies and analytical tools for transport and adaptation
EBRD	Transport Sector Strategy (2013) ⁶¹ <ul style="list-style-type: none"> • Adaptation in coastal areas, including coastal roads and ports
EIB	EIB Transport Lending Policy (2011) ⁶² <ul style="list-style-type: none"> • Adaptation for all transport modes • Adaptation in designs and operating measures of ports in coastal area
IDB	Climate Change and IDB: Building Resilience and Reducing Emissions, Sector Study: Transport (2014) ⁶³ <ul style="list-style-type: none"> • Capacity building and studies development on sustainable urban passenger and freight transport • Tool, criteria, and guidelines development for mainstreaming mitigation and adaptation in transport • Risk identification
WB	Transport for Development: The World Bank Group's Transport Business Strategy 2008-2012 (2008) ⁶⁴ <ul style="list-style-type: none"> • Adaptation in terms of infrastructure sustainability to climate change effects in the transport sector • Adaptation of current technologies

58 See section on tools

59 AfDB. 2012. At the Center of Africa's Transformation: Strategy for 2013-2022. <http://bit.ly/1RXCRbb>

60 ADB. 2010. Sustainable Transport Initiative: Operation Plan. <http://bit.ly/1RXpVIH>

61 EBRD. 2013. Transport Sector Strategy. <http://bit.ly/1MadZ0U>

62 EBRD. 2013. Transport Sector Strategy. <http://bit.ly/1MadZ0U>

63 IDB. No date. Sustainable Transport. <http://bit.ly/1LYLLEr>

64 World Bank Group. 2008. Safe, Clean, and Affordable Transport for Development. <http://bit.ly/1QVDcuh>

Adaptation is making its way into transport sector strategies of the MDBs, as shown in a growing number of references resilience both in general terms (e.g. creating more resilient infrastructure (AfDB, WB) and minimizing (AfDB, IADB)) and in transport-specific terms (e.g. mainstreaming adaptation measures in transport operations (ADB), minimizing impacts to coastal transport infrastructure (EBRD, EIB), developing analytical tools (ADB, IADB) and conducting adaptation case studies (ADB, IADB).

Considerable differences also exist in whether and to what extent adaptation is covered in economy-wide and transport-specific sections of MDB country assistance strategies in the Asia region. Transport adaptation in country assistance strategies from a representative subset of Asian countries (representing varying sizes, locations and climatic characteristics) include flood prevention (Bangladesh), agricultural productivity (Bangladesh), and emergency preparedness (Bangladesh, Philippines). While some country assistance strategies make direct reference to transport subsectors (Vietnam: roadways and urban transport) or indirect reference to transport-enabled sectors (Nepal: infrastructure resilience, food security), others make no direct reference to adaptation in the transport sector (Cambodia, India, Indonesia, Mongolia).

2. MDB Climate Adaptation Projects

MDBs are undertaking a growing number of projects specific to adaptation in transport, or incorporating adaptation components into existing transport projects. While progress is evident at the level of individual projects, funding trends for adaptation projects in the transport sector are currently insufficient to create transformational change in this area.

MDBs have shown initial success in funding standalone adaptation projects, as shown in examples in Latin America (IDB), Georgia (EBRD), and China (ADB).

*Support to the Transportation Sector in Nicaragua (IDB)*⁶⁵

IDB's adaptation measures in Nicaragua include three operations to improve road transport efficiency. The program documents the poor condition of the country's road infrastructure and its vulnerability to recurring natural phenomena. This program contains an intervention sequence to map hot spots in the network; finance feasibility studies of a national roadway; and to finance improvements to critical road access points at Nicaragua's border with Honduras. The project includes a results indicator to measure traffic disruptions lasting for more than 24 hours, as well as complementary indicators

regarding vulnerability to climate change. A project assessment describes a noticeable effort to link design of the adaptation-related components to impacts related to projected extreme weather events, rising sea levels and tropical storm intensity.

*Building climate resilience into port infrastructure in Georgia (EBRD)*⁶⁶

A pilot project in Georgia is being used to test an approach to integrating a climate change assessment into Environmental and Social Impact Assessments (ESIAs) that are performed on projects with potentially significant environmental and social impacts. This project involves investing in the expansion of a major port on the Black Sea coast, which is highly sensitive to climate change impacts such as sea level rises and changes in sedimentation. Recommendations on adaptation measures to cope with climate change risks will be developed as part of the ESIA and will then inform the detailed technical design of the project.

*People's Republic of China: Anhui Intermodal Sustainable Transport Project (ADB)*⁶⁷

This project, partly funded by ADB, includes elements such as transforming a river channel into a navigable waterway, developing two low-water rubber dams, and a new bridge and port. The project area is characterized by high variability in temperature and precipitation, which pose a continuous threat of downstream flooding. Furthermore, frequent severe floods cause erosion that endangers embankments, bridges, and roads, and pose a threat to river navigation.

As a result, a climate risk and vulnerability assessment (CRVA) is focused on modeling changes in precipitation and the ensuing changes in water discharges and floods. The project assessment concludes that existing design criteria will be sufficient to maintain a minimum navigable water level, and projections of flood volume can be compounded with hydrological models to optimize dam management procedures under different rainfall conditions, thus increasing the resilience of the waterway transport.

In conclusion, MDBs are in the process of scaling up action on adaptation and climate change on many fronts (MDB wide policies, sector strategies, tools and pilot projects), and there are clear efforts towards raising the profile of climate adaptation across a broad set of sectors, including the transport sector. Overall, attention to adaptation in the transport sector lags significantly behind corresponding mitigation efforts in the sector, and thus, there remains an opportunity to strike a more optimal balance among transport projects in the mitigation and adaptation areas.

65 IDB. 2014. Climate Change and IDB: Building Resilience and Reducing Emissions. Sector Study: Transport. <http://bit.ly/1M2Vnhq>

66 EBRD. 2011. The EBRD and adaptation to climate change. <http://bit.ly/1Pz8Tw5>

67 ADB. 2014. Climate Proofing ADB Investment in the Transport Sector: Initial Experience. <http://bit.ly/1LkUIZb>



V. Climate Finance Funding for Adaptation in the Transport Sector in Developing Countries

This section reviews funding for adaptation related programs and projects in the Transport sector as well as the use of International Climate Finance for this purpose.

A. Trends in Climate Finance for Transport Sector Adaptation

In addition to climate finance specifically originating from or leveraged by MDBs, several sources of international climate finance have the potential to advance measures on adaptation in the transport sector, which include the Adaptation Fund (AF), GEF, GCF, CIF, Nationally-Appropriate Mitigation Actions (NAMAs) and the International Climate Initiative (IKI). Relative attention to adaptation in the transport sector across these funding sources has been varied to date.

1. Adaptation Fund

The Adaptation Fund (AF)⁶⁸ was established in 2001 to finance climate adaptation projects and carry out readiness programs in developing countries that are particularly vulnerable to the adverse impacts of climate change. Since 2010, the AF has approved 51 projects under the categories of agriculture, coastal

zone management, disaster risk reduction, food security, rural development, water management, and multi-sectoral projects. While transport projects are included among the qualifying areas, the Fund currently does not indicate any dedicated projects in the transport sector.

2. Global Environment Facility (GEF)

The Global Environment Facility (GEF) is the first entity under the financial mechanism of the UNFCCC to finance concrete adaptation actions through three of its trust funds: the Least Developed Countries Funds (LDCF)⁶⁹, the Special Climate Change Fund (SCCF)⁷⁰, and the Strategic Priority on Adaptation (SPA)⁷¹ under the GEF Trust Fund. Together, the LDCF and SCCF now hold the largest adaptation portfolio among developing countries, with the expectation that GEF will program up to USD 1.4 billion to facilitate enhanced resilience, adaptation and disaster risk reduction under GEF-6.⁷²

Transport projects have been able to access GEF funds for adaptation, although they account for a small portion of the facility's transport portfolio. An example of a recent GEF transport adaptation project involves defining transport sector wide approaches to adaptation in Timor-Leste (Box 6):

68 UNFCCC. Adaptation Fund. <https://www.adaptation-fund.org/>

69 GEF. Least Developed Countries Funds (LDCF). <https://www.thegef.org/gef/lDCF>

70 GEF. Special Climate Change Fund (SCCF). <https://www.thegef.org/gef/SCCF>

71 GEF. Strategic Priority for Adaptation (SPA). <https://www.thegef.org/gef/SPA>

72 GEF. Climate Change. https://www.thegef.org/gef/climate_change

Box 6: Upscaling Climate-Proofing in the Transport Sector in Timor-Leste: Sector Wide Approaches

Timor-Leste completed its National Adaptation Program of Action (NAPA) in 2009. The NAPA analysis concludes that Timor-Leste's road infrastructure is highly vulnerable to disasters, and that this vulnerability will increase with projected climate change impacts. A proposed GEF project would provide USD 4.56 million in funding (of a total project cost of USD 123.31 million) to reduce the vulnerability of road infrastructure in Timor-Leste through the implementation of proposed measures in their NAPA.

The project has three focal areas, which include reducing vulnerability of road infrastructure; conducting risk and vulnerability assessments; and strengthening adaptive capacity of national and regional centers to respond rapidly to extreme weather events. Intended key outputs of the project include climate-proofing of the 90 km Manatuto-Natarbora link road; improvements to watershed management and road infrastructure in several strategic locations; development of road maintenance programs to increase climate resilience; and building capacity to plan and implement climate adaptation measures for road projects countrywide.

GEF has also contributed to several adaptation projects indirectly related to the transport sector, including a project to enhance the resilience of the port sector in Morocco,⁷³ a project to increase resilience of poor communities to urban flooding in Cameroon,⁷⁴ a project to increase resilience of urban development in Sri Lanka,⁷⁵ and a project to promote climate resilience in Vietnamese cities.⁷⁶

3. Green Climate Fund (GCF)

According to an analysis⁷⁷ by the GCF on the expected role and impact of the Fund, the investment priority for the transport sector in the Asia region has high potential, with Africa, Eastern Europe, and Latin America assessed as having medium investment priority and relatively limited investment prospects in the Small Island Development States. Currently, transport is listed as one of the key results area under GCF's priority for climate-compatible cities, with the targeted geographical regions including Asia, Africa, Latin America, and Eastern Europe.

Although investment in the transport sector traditionally has a heavy focus on climate mitigation, GCF specifically states that its investments can also support adaptation, "particularly by helping to strengthen the resilience of the livelihoods of urban people and communities and to increase the resilience of urban infrastructure (while also reducing associated emissions)."

In summary, GCF emphasizes that its priority areas are crosscutting in nature and can "create new and holistic entry points for realizing the balance across adaptation and mitigation." However the initial batch of 8 GCF approved projects did not include transport.⁷⁸

4. Climate Investment Funds (CIF)

The CIF was established in 2008 to provide country-led investments in clean technology, renewable energy, sustainable management of forests, and climate-resilient development. Under the Clean Technology Fund (CTF) by CIF, there are at least 13 projects dedicated to the transport sector (approximately 7% of CTF's portfolio) spanning nine developing countries. However, all transport projects presented so far are mitigation-oriented and do not make specific reference to climate resilience or adaptation.

The CIF initiated the Pilot Program for Climate Resilience (PPCR) with a USD 1.2 billion fund to assist developing countries in integrating climate resilience into development planning, by building on NAPAs and other existing public and private sector solutions. The PPCR has so far allocated USD 1.1 billion for 75 projects and programs and it is active in nine pilot countries and two regional programs.⁷⁹

Transport is currently not listed as one of the key priorities for investment under the program. Nonetheless, according to the PPCR Country and Regional Portfolio,⁸⁰ there is currently a pilot project under implementation to enhance the climate resilience of the West Coast Road in Samoa. Moreover, increasing the resilience and climate-proofing capacity of roads, is an element in many crosscutting adaptation projects, such as the Coastal Town Infrastructure Improvement Project in Bangladesh, the Climate Resilience of Rural Infrastructure project in Kampong Cham, Cambodia, and Roads and Bridges Management and Maintenance Program (APL2) in Mozambique.

73 GEF. Enhancing the climate resilience of the Moroccan ports sector. <http://bit.ly/1H7R1pu>

74 GEF. Enhancing the Resilience of Poor Communities to Urban Flooding in Yaounde. <http://bit.ly/1HXv47b>

75 GEF. Resilient and Integrated Urban Development for Greater Colombo. <http://bit.ly/1QtzE5d>

76 GEF. Project Identification Form: Promoting Climate Resilience in Viet Nam Cities. <http://bit.ly/1YfPm5r>

77 GCF. 2015. Analysis of the Expected Role and Impact of the Green Climate Fund. <http://bit.ly/1FYnn06>

78 GCF. 2015. Green Climate Fund Approves First 8 Investments. <http://bit.ly/20yxZ1E>

79 Climate Investment Funds (CIF). <http://www-cif.climateinvestmentfunds.org/>

80 Climate Investment Funds. 2015. PPCR Country and Regional Portfolios (as of March 2015). <http://bit.ly/1HfX7OW>

5. Transport Projects in Nationally-Appropriate Mitigation Actions

As of October 2015, transport Nationally-Appropriate Mitigation Actions (t-NAMAs)⁸¹ are still heavily focused on mitigation actions, with few exceptions for adaptation action. Among those, Ethiopia has demonstrated a high degree of commitment with the approval for three adaptation projects in the rail sector under its Climate Resilient Green Economy (CRGE) Strategy (2011).⁸² Under this mandate, Ethiopia has developed a USD 8.9 million project to increase ridership of Light Rail Transit (LRT) and enhance Transit-Oriented Development (TOD) in Addis Ababa⁸³ and the construction of an interurban electric rail powered by renewable energy;⁸⁴ to complement these efforts, Ethiopia has developed a NAMA to assess the climate vulnerability of rail networks in the country, focused on adverse impacts to rail infrastructure (e.g. floods, high temperature, landslides). The project aims to develop a range of climate scenarios and integrate vulnerability into long-term investment decisions in the rail sector.

6. International Climate Initiative (IKI)

The International Climate Initiative (IKI)⁸⁵ was established by Germany's Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) in 2008 to finance climate projects, placing clear emphasis on mitigation adaptation, and protection of biological diversity. For its adaptation portfolio, IKI focuses on projects that are ecosystem-based, climate-related, and focused on the development and/

or implementation of national adaptation strategies.

As of October 2015, IKI had approved approximately 14 transport projects (4% of total IKI projects) spanning nine countries mostly in Asia and the LAC region; however, no clear adaptation elements have been identified in transport projects to date.

Primary challenges to scaling up adaptation remain on the funding front. Despite the goal to commit half of the \$100 billion GCF target to resilience, funding remains insufficient as extreme weather events around the world increase. As a result, it will be necessary to look beyond UNFCCC mechanisms for adaptation funding, and alternate financing sources (e.g. institutional investors, public-private partnership) may play a growing role.

In conclusion, while international climate finance instruments have the potential to boost a range of climate adaptation transport projects in developing countries, these instruments are still heavily skewed toward mitigation projects, and several have not registered a single adaptation project to date. Within the adaptation specific financing mechanisms transport sector is barely represented. Greater parity in funding of transport sector projects along adaptation and mitigation lines could also increase the co-benefits of investing in these areas. In addition, funding conditions requiring adaptation planning in mitigation projects could help to incorporate resiliency strategies across a wider range of projects.

81 Transport NAMA Database. <http://www.transport-namadatabase.org/>

82 Federal Democratic Republic of Ethiopia. No date. Ethiopia's Climate-Resilient Green Economy: Green economy strategy. <http://bit.ly/1Trdy5Z>

83 Transport NAMA Database. Addis Ababa Light Rail Transit Transit Oriented Development NAMA (Ethiopia). <http://bit.ly/1kDL4GI>

84 UNFCCC. NAMA Seeking Support for Preparation: Interurban Electric Rail NAMA. https://unfccc.int/files/cooperation_support/nama/application/pdf/nama_preparation-transport.ethiopia.pdf

85 International Climate Initiative (IKI). <http://www.international-climate-initiative.com/en/>

B. Trends in MDB funding for Adaptation in the Transport Sector

The 2014 Joint report on Multilateral Development Banks' Climate Finance⁸⁶ indicates that MDBs (including ADB, EBRD, EIB, IDB, and the WB Group) collectively provided over USD 28.3 billion to climate finance in 2014, of which sustainable transport accounted for 23% (USD 6.3 billion)⁸⁷ of the total portfolio. 91% of the portfolio came from the MDBs' own resources, while the remaining 9% came from external climate finance instruments such as bilateral or multilateral donors,

GEF, and the CIF.

The 2014 report, along with the previous reports from 2011, 2012, and 2013, shows that the share of sustainable transport in the MDBs' climate finance portfolio has increased from 17% in 2011 (USD 4 billion) to 23% in 2014 (USD 6.3 billion), as shown in Figure 1:

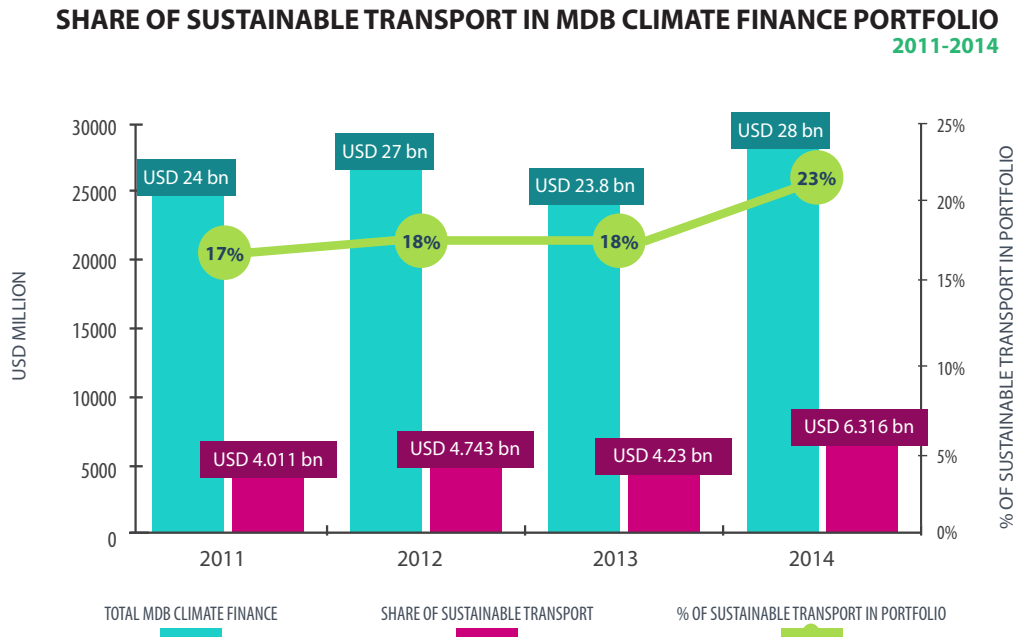


Figure 1: Share of Sustainable Transport in MCB Climate Finance Portfolio (2011-2014)⁸⁸

⁸⁶ MDB working Group. 2015. 2014 Joint report on Multilateral Development Banks' Climate Finance. <http://bit.ly/1SJWwYc>

⁸⁷ Amount of climate finance for sustainable transport used in the graph is provided under the MDBs' mitigation finance portfolio. Specific amounts for financing transport activities under the adaptation portfolio are not provided in the reports.

⁸⁸ MDB Joint Report on Climate Finance (2011, 2012, 2013, 2014)

Funding for adaptation as a whole still falls behind mitigation by a significant margin in the MDBs annual climate finance portfolio. In 2011, MDB finance to adaptation accounted for about USD 4.5 billion, which is approximately 19% of the total

climate finance portfolio. The share for adaptation increased to 22% (USD 6 billion) in 2012, but decreased to 20% (USD 4.8 billion) in 2013 and consequently 18% of the portfolio (USD 5.1 billion) in 2014 (Figure 2).

MDB CLIMATE FINANCE PORTFOLIO 2011-2014; USD BILLION

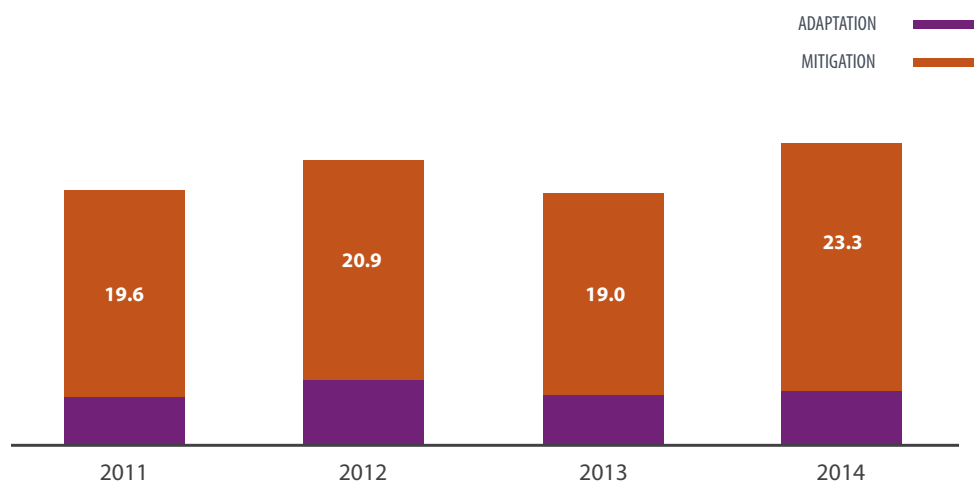


Figure 2: MDB Climate Finance Portfolio (2011-2014) in USD billion

Reporting on MDB climate finance for mitigation does not single out transport (as in the case of mitigation funding). In 2014 23% of the MDB's total adaptation finance portfolio was dedicated to the category designated "Energy, Transport and Other Built Environment and Infrastructure," accounting for approximately USD 1.15 billion, exceeding other categories such as agricultural and ecological resources, coastal and riverine infrastructure, and crop production.

The WB Group (including IFC) contributed 61% of adaptation finance in the 2014 MDB climate finance portfolio, with project approval of more than USD 2.3 billion. The effort was followed by AfDB and ADB, which accounted for 15% and 14% of adaptation finance respectively.

In an effort to harmonize reporting of adaptation finance, the MDB working group on climate finance (including AfDC, ADB, EBRD, EIB, IDB, and the WBG) announced jointly with the International Development Finance Club (IDFC) in March 2015 to work together to improve definitions and principles for climate change adaptation finance tracking. Since adaptation projects are crosscutting and interdisciplinary by nature, the group has agreed on a set of Common Principles for Climate

Change Adaptation Finance Tracking,⁸⁹ which include the following:⁹⁰

1. Adaptation must be "material" (not incidental) to the financed activities in question;
2. Adaptation finance can encompass stand-alone projects, multiple projects under larger programs, or project components, sub-components or elements;
3. For finance to be counted as adaptation finance, there must be a context of risks, vulnerabilities, and impacts related to climate change; and
4. Adaptation finance tracking should be applied to adaptation activities at the finest possible degree of project disaggregation.

The group is expected to continue to refine adaptation tracking processes and collect good practices on the subject as next steps of the harmonization effort. It is not clear how the proposed common principles would deal with reporting of adaptation efforts at the sector level including the transport sector.

89 World Bank. 2015. Development Banks Agree Common Approach on Measure Climate Finance. <http://bit.ly/1M4wbr6>
90 Rufo, Loreta. 4 Principles for better tracking climate finance for adaptation. Asian Development Blog. <http://bit.ly/1K3I40H>



VI. Conclusions and Recommendations

Considerable progress has been made in the last decade to promote mitigation of climate change in the transport sector, and it is encouraging to see that initial building blocks for greater action on adaptation in the transport sector are in the process of being developed. Substantive work on improving the knowledge base on adaptation to climate change in the transport sector is ongoing, which includes guidelines and toolkits for major modes of transport, including roads, railways, and waterways, and sector-wide summary reports capture comprehensive efforts to increase resilience for public transport, roadways, and the sector more broadly in the United States and Europe.

Furthermore, a number of bilateral and multilateral development organizations are implementing a first generation of pilot projects on adaptation in the transport sector, and are in the process of developing policies and screening tools to assess climate risks for projects, including those in the transport sectors. In particular, the Nordic Development Fund is drawing lessons from eight adaptation-oriented projects in developing countries it is in the process of funding through co-financing with regional MDBs in Asia, Africa, and Latin America.

Despite these encouraging steps toward broader transport adaptation measures, the attention of country delegations, subnational actors, and international funding institutions is still largely focused on climate change mitigation in the transport sector. This is reflected in the sizeable number of mitigation-oriented projects, and the large number of countries that have specified mitigation activities through INDCs submitted to the UNFCCC. In contrast, far fewer countries have included transport-specific adaptation measures specific in their INDCs. Similarly, NAPs in developing countries show little detail toward transport measures, and the portfolios of funding institutions and climate finance instruments are still largely skewed toward mitigation rather than adaptation projects, especially in the transport sector.

Based on these conclusions, it is clear that while climate adaptation strategies in the transport sector are taking shape and gaining steam, there is much need for more substantive and comprehensive approaches in the area of transport adaptation and resilience. Initial recommendations for advancing adaptation efforts in the transport sector include the following:

- Developing countries have much to learn from the developed world in transport sector adaptation planning. Studies such as the European Environment Agency's report on climate adaptation in Europe's transport sector (and counterparts on the United States transit and roadway subsectors) are highly relevant to the developing world and should be emulated in other regional contexts, especially in Asia, Africa, and Latin America. By the same token, developing countries have taken the lead in incorporating transport sector adaptation measures into their INDCs (likely due to their higher degree of vulnerability in this area), and this degree of foresight could be emulated by developed country parties.
- Adaptation in transport could be better integrated in global policy mechanisms on climate change and sustainable development. As previously noted, the COP21 input report from the UNFCCC Adaptation Committee gives little detail on sectorial approaches to adaptation, and associated references make only superficial reference to transport; thus, this mechanism could benefit from further detail on sectorial approaches, including transport. Likewise discussions on climate change under the Sustainable Development Goals are also mostly mitigation focused.
- National and local-level policies on climate change and sustainable development could more fully incorporate strategies on adaptation in the transport sector. NAPs, and notably those in developing countries in the EST region, could

include more detailed strategies for adaptation in the transport sector; this would allow countries to meet projected mobility demands, reduce life-cycle costs due to damage, and increase mitigation potential with efficient and reliable transport systems. Finally, successes at the project level increase the likelihood of national and local implementing agencies taking ownership and lift these to sectorial levels through mainstreaming in policy reforms.

- Transport should be more comprehensively represented in programs and projects on climate change adaptation. Specifically, climate adaptation principles could be more effectively incorporated into several areas relevant to transport projects, which include action planning, capacity building, development of tools, standards, guidelines, and funding for adaptation.

- Climate change financing facilities could increase coverage of adaptation activities in the transport sector. Climate finance instruments could raise the priority of climate adaptation in project selection criteria and policy frameworks, and outreach efforts to better address capacity building needs and make progress toward sustainable development goals. In addition, the global sustainable transport community could

work more closely with international financing institutions to increase the inclusion of adaptation strategies in sustainable transport projects through shared developments of project standards. Finally, since CFI funding is driven by recipient demand, the sustainable transport community should increase outreach to country representatives to submit robust transport adaptation project proposals based on past successes.

- Advancing adaptation in the transport sector requires consolidation of efforts and coordination of a broad set of stakeholders. The growing interest in adaptation to climate change offers an excellent opportunity to galvanize stakeholders into more ambitious action on adaptation in the transport sector. Stakeholders in such an initiative could include knowledge organizations on adaptation in transport sector (e.g. PIARC, PIANC, UIC, EEA); intermediaries to countries, cities and companies (e.g. MDB Working Group on Sustainable Transport; bilateral development agencies; 100RC, Global Partnership on Sustainable Mobility, International Road Union); and organizations providing funding for adaptation oriented activities (e.g. GEF's Least Developed Countries Fund and Special Climate and Development Fund, Adaptation Fund, GCF and NDF).



Paris Process on Mobility and Climate (PPMC) is supported by:

Partners:

Diamond Sponsors:

Platinum Sponsors:

Gold Sponsors:

Michelin Challenge Bibendum and SLoCaT Foundation Supporters of the PPMC