

Thematic Session 2-B

**Focus on
refurbishment and
replacement of
existing
Infrastructure**

14:45 – 16:30

Tuesday, 19th March 2019

Taj Mahal Hotel, New Delhi

IWDRI 2019

The Panel

Chair

- Luke Brown, Emergency Management Australia.

Moderator

- To be announced

Speakers

- Alice Hill, Hoover Institution, Stanford University
- Prof. Mauro Dolce, Dipartimento della Protezione Civile, Italy
- Phil Rizcallah, National Research Council, Canada
- Japan

Discussants

- UK
- Michael Mullan, Global Commission on Adaptation

Session Format

This is a breakout session as part of Thematic Session 2.

It will have presentation from the speakers of 10 minutes each followed by a joint moderated discussion.

Overview

Infrastructure has the power to enable smooth functioning of economies. This session addresses economies where there is a heavy focus on refurbishment and replacement of existing infrastructure stock and relatively lower low levels of new investment. The focus in these contexts is on the challenge of reinforcing, protecting and upgrading existing infrastructure, and putting in place risk financing measures.

This session will present the big picture of the policy discourse and governance mechanisms that are aiding and ailing decision making for key infrastructure sectors, mainstreaming disaster risk management and harmonization of related policies. The session will advance thinking on these issues for a specific typologies of economies with particular geographical and socioeconomic characteristics. The joint panel discussion will reflect on gaps and opportunities for knowledge exchange between the groups.

The session will address the following questions:

1. What are good examples where leadership of the national or regional government is providing a coherent basis for decision-making to inform investment in risk informed investments in developing and maintaining infrastructure?
2. How is resilience to infrastructure approached in difference economic and geographical contexts? What are the critical issues in governance systems that drive this decision?
3. What are the potential areas of partnerships between countries that may be forged under the CDRI to address these issues and improve practices?

Background and Context

The need to address ageing and degraded infrastructure is emerging as a critical issue facing many advanced economies and developed nations. Large infrastructure is built on the basis of forecasts of carrying capacity, design loads, and design life. For infrastructure built in advanced economies, all these three factors are being pushed to their limits. These countries experienced an infrastructure construction boom after World War II and put in place most of their transport, energy and water infrastructure in this period. The design life of infrastructure built in the post WWII era, which is usually about 50 years, is ending.

This outdated infrastructure is costing both the government and private industry millions in repairs, business interruption and supply chain risks. The American Society of Civil Engineers estimates that by 2020, “aging and unreliable” infrastructure will cost American businesses \$1.2 trillion annually. Infrastructure maintenance requires consistent, significant investment from the public and private sectors, but re-development or re-construction requires large upfront capital expenditure. Some challenges and opportunities in addressing these issues have been identified below.

Challenges and opportunities in addressing ageing infrastructure:

1. Climate change and changing risk profiles:

Changing climate patterns around the globe are increasing the intensity, frequency and uncertainty of extreme weather events. Road, rail, energy and water systems built more than 50 years ago are not designed to handle the current hazard profiles. This means that outdated infrastructure built on the basis of past risk assessments will need a reassessment of risks and upgrades to match the current level of risk. The constantly changing nature of these risks, the high volume of initial investment required, and the long life-cycles of infrastructure projects necessitate the continuous monitoring of risks and the development of adaptation strategies that are responsive to the changes in the risk profile.

2. Urbanisation and changes in settlement patterns

The densification of urban areas over the last 50 years is putting an increasing load on support infrastructure like transport, energy and water-supply.

Urbanisation has also led to changes in the vulnerability and exposure patterns. Studies will be required to understand the changed context so as to inform appropriate reconstruction and renewal plans.

3. High cost of re-construction

While the increasing costs of repair and maintenance of ageing infrastructure components is a constant drain on a country's economy, the reconstruction of these systems is doubly expensive. Upgrading infrastructure attracts a two-fold cost, the direct cost of the demolition/deconstruction of existing infrastructure followed by its reconstruction to higher standards, and the indirect costs in terms of disruption of lifeline services and economic activities. Attempts should be made to absorb these costs and disruptions in a planned and phased manner rather than have them forced by the sudden and catastrophic failure of the ageing infrastructure.

4. Technological evolution

The rapid evolution of material sciences, building technologies, and energy sources requires the planners of infrastructure to avoid getting locked into specific technologies or materials. There is a need to move from prescriptive standards that specify designs and material specifications to standards that define only the performance required from the infrastructure and allow for the designs and material selection to evolve and innovate.

Technological solutions that integrate robotics and machine learning can also be leveraged to minimise the human resource requirements and costs of operating and maintaining large infrastructure. Further research is required on the use of emerging technologies, new materials, building designs, and energy sources and their effect on the resilience infrastructure systems.

5. The public policy challenge

The complexity of the issues described above leads to a reluctance of political actors to address them head-on. Policy makers face the challenge of making a case for the above actions in the face competing issues that are relatively easier to define, and hence more immediately actionable. The issue of ageing infrastructure needs to be addressed in a timely and systematic manner so as to avoid the unnecessary costs and suffering imposed by the catastrophic failure of large infrastructure.