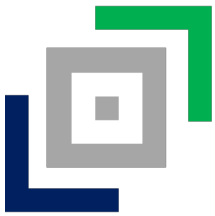

ICED

Infrastructure & Cities for Economic Development

Delivering Disability Inclusive Infrastructure in Low Income Countries

June 2019

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1. Introduction and Purpose of this document

"Disability inclusive infrastructure means infrastructure and services that are fit for purpose and removing barriers to people with disabilities; including but not limited to physical, mental, intellectual or sensory impairments."[1]

United Nations Committee on the Rights of Persons with Disabilities

""*Accessible environments are an essential enabler for people with disabilities to access economic opportunities… Providing equal access also requires strengthening [the] focus on disability inclusive infrastructure, and working with partners and the private sector to collectively enable inclusive environments and the resources needed to do so*".[2]

UK Department for International Development

Physical Infrastructure, infrastructure services and systems, if designed and implemented correctly, can empower people with disabilities to be part of societal change and development. However, much of the world's infrastructure is not designed to be inclusive. This creates unnecessary barriers to mobility, access and economic opportunity for people with disabilities, and limits nations' abilities to foster inclusive economic growth. This document forms part of the Department for International Development's (DFID) focus to highlight the need and routes to disability inclusion in low income countries.

The UN Agenda 2030 for sustainable development (its action plan for inclusive prosperity) notes that more than 80 per cent of people with disabilities live in poverty, which puts people with disabilities at the centre of poverty eradication throughout the development agenda.[3] International commitment to delivering on this agenda is enacted via national commitments to the UN Convention on the Rights of Persons with Disabilities, adopted in 2006 and now ratified by 161 signatories.

In July 2018 the UK Department for International Development (DFID), Government of Kenya and International Disability Alliance co-hosted International the Global Disability Summit, in which inclusive infrastructure was one of the six spotlight issues used to bring together global leaders, civil society and the private sector. Leading international development bodies such as CDC (the UK's development finance institution), Private Infrastructure Development Group (PIDG) and World Bank Group made global commitments to improve their approach and delivery of disability inclusive infrastructure; demonstrating the need for improvement in how the world delivers infrastructure.

At the Global Disability Summit, the then Secretary of State for DFID, Penny Mordaunt, committed to the launch of DFID's pioneering Disability Inclusion Strategy which was published on 3rd December 2018. The Disability Strategy sets out DFID's committed approach to improvement in disability inclusion, including the role of infrastructure:

[1] The Committee on the Rights of Persons with Disabilities (CRPD), 11th session, March 31 to April 11, 2014, in its General Comment No. 2 (May 22, 2014) on Article 9: Accessibility.
[2] DFID's Strategy for Disability Inclusive Development 2018-23, Department for International Development, 2018
[3] WHO & World Bank. (2011). World report on disability. Geneva: WHO.

"*To promote accessibility and usability we will invest in and strengthen our approach to accessible infrastructure (including transport) by providing greater guidance and support for disability-inclusive infrastructure."*[4]

This document has been developed in response to DFID's commitment to provide guidance and support on disability inclusive infrastructure. It sets out key enabling features to deliver infrastructure as part of a journey to leave no-one behind.

The document sets out key challenges and opportunities in legislating for, designing and financing Disability inclusive infrastructure (DII), and also provides guidance on how to achieve the cultural changes that will be needed to effectively empower people with disabilities. Opportunities include:

1. **Policy and legislative frameworks:** Adoption and incorporation into local standards, policies and procedures.
2. **Policy enforcement:** The role of civil society, professionals and cultural adoption.
3. **Inclusive design:** Universal design, the infrastructure lifecycle and co-creation.
4. **Information and data:** Understanding disability inclusive infrastructure needs and monitoring DII implementation.
5. **Cultural and behavioural factors:** Influencing social norms improves DII roll-out.
6. **Finance:** The economic case for DII, and the role of budgeting and procurement.

This guidance is intended for use by donors, NGOs, governments, civil society and private sector stakeholders involved in the delivery of disability inclusive infrastructure and committed to ensuring that infrastructure is made accessible and inclusive for persons with disabilities. Each section sets out key issues to consider, presents detailed case studies demonstrating effective implementation of DII principles, and cites key reference materials. It provides insights into what has worked and what lessons have been learned from a range of programmes and initiatives that aim to deliver inclusive infrastructure.

2. The Challenges and Opportunities for Disability inclusive infrastructure

Disability inclusion is not consistently and effectively embedded within the infrastructure sector and as a concept is still not comprehensively understood in many low income countries. Globally we are yet to define what 'good' infrastructure could be for people living with disabilities, including those with reduced mobility, hearing or vision, or people who are neuro-diverse. The manner in which infrastructure, both in urban and rural contexts, is designed, constructed and maintained has generally failed to consider the unique ways that physical and social barriers limit the participation of people with disabilities in public life.[5] This is particularly true in lower income and developing country contexts where lack of project finance, technical expertise and awareness of the importance of inclusive infrastructure often results in a failure to design in disability. Much of the global knowledge on disability inclusion exists in developed countries, in part driven by a need to prepare for late impairment on-set common in ageing populations.

[4] DFID's Strategy for Disability Inclusive Development 2018-23, Department for International Development, 2018
[5] DIAUD, CBM and World Enabled (2016) The Inclusion Imperative: Towards Disability-inclusive and Accessible Urban Development: Key Recommendations for an Inclusive Urban Agenda.

An estimated one billion people globally have a disability – approximately 15% of the world's population, with 80% living in developing countries.[6] However, disability inclusion remains a neglected and under-prioritised issue in international development, despite the evidence that investments in disability inclusion could enhance national economic growth through increased work-place participation, productivity and well-being. For example, studies from Pakistan found that supporting people with visual impairments to participate in economic activity led to an estimated US$71.8 million of gross aggregate gains in household earning per year. Further benefits include reduced stigma and discrimination in the workplace as well as a reduced welfare burden[7]. Further information on value for money of disability inclusive infrastructure delivery is discussed in section 8 on finance.

Disability inclusive infrastructure can create environments for people with disabilities to have civil, cultural, political, social, and economic rights and entitlements. Making infrastructure inclusive and accessible not only benefits people with disabilities but has the potential to be good design for all: examples include improved acoustics, increased natural lighting and clearer layouts. Key beneficiary groups include pregnant mothers, young children and the elderly, as well as inhabitants who may be temporarily impaired by injury or illness. In contrast, if infrastructure is inaccessible to any degree, it can exclude individuals or groups from society, degrading quality of life and eroding human rights.

What is disability?

The widely adopted UN Convention on the Rights of Persons with Disabilities (CRPD), examined in further detail in section 3, moves disability away from a primary focus on physical deficits (impairments) to an approach that encompasses the attitudinal, environmental and institutional barriers that limit or exclude people with impairments. An impairment is disabling when individuals with that impairment are prevented from participating fully in society because of social, political, economic, environmental or cultural factors. For example, individuals with impairments can be denied access to employment because of inaccessible transport and poor urban design. This means that disability is best understood as:

Disability = Impairment + Barriers

Poor design and delivery of infrastructure and services can indirectly or directly reinforce three key barriers:

1. **Behavioural and attitudinal barriers:** People with disabilities can face a range of attitudinal barriers and intersecting inequalities which can result in exclusion from, or marginalised access to, infrastructure services. Discriminatory processes and practices can be deeply embedded in institutions – and take place both in public institutions (such as transport services) and social institutions (including the household and communities). As such, discrimination operates at different levels and is multidimensional – working across the political, social, economic and cultural aspects of people's lives. Tackling stigma and discrimination is critical to ensuring all communities respect the rights, dignity, capabilities

[6] WHO (2011) World Report on Disability
[7] Awan H, Malik SM, Khan NU. The economic burden of blindness in Pakistan: A socio-economic and policy imperative for poverty reduction strategies. Indian Journal of Ophthalmology. 2012;60(5):358-364. doi:10.4103/0301-4738.100527

and contributions of all people with disabilities, and support the delivery of disability inclusive infrastructure.

2. **Informational barriers:** The use of infrastructure is often constrained for people with disabilities by a lack of access to information on services that can prevent users engaging with or trialling a service. People with mobility impairments may experience additional challenges when using public transport unassisted if there is no accessible information on routes, timetables or service access facilities. Whilst people with hearing and visual impairments, or intellectual disabilities may have no or limited access to information on service schedules, utility tariffs or bills, or may be unable to interpret information. Well-designed information on the access and use of infrastructure can reduce barriers to use for everyone.
3. **Physical barriers:** Urban environments and physical infrastructure commonly present a wide range of physical barriers, such as steps, steep slopes, narrow gaps, high curbs, cluttered pavements, a lack of safe and accessible road crossing points and a lack of safety barriers. Wide gaps prevent the safe entry onto public transport, while noisy acoustics, poorly lit spaces and difficult to reach buttons can present barriers for people with visual, auditory or intellectual impairments. It is therefore vital that each link in an infrastructure access chain (ie the components of a journey from e.g. bed to desk) is accessible for point-to-point journeys, for example, between home and school, and from payment to delivery of water or telecoms services.

The UNCRPD Article 9 on 'Accessibility'[8] requires countries to identify and eliminate obstacles and barriers and ensure that people with disabilities can access their environment, transportation, public facilities and services, as well as information and communications technologies. The word 'infrastructure' is not mentioned in the CRPD but is represented through reference to the 'physical environment', 'transportation', 'facilities and services open or provided to the public' and 'information and communications'.

The following sections explore 'what works' for making infrastructure disability inclusive, drawing on insights and lessons learned from a range of programmes and other examples.

DFID is committed to highlighting the need to provide inclusive infrastructure with respect to all types of disability. Very little data on infrastructure design exists for psycho-social and intellectual disabilities, not least in developing countries. DFID recognises the need for global collaboration to increase learning around what works in disability inclusive infrastructure, and to increase activity on improving infrastructure accessibility and usability for people with impairments in low-income countries. DFID also promotes city wide designs, rather than addressing issues of inclusivity in infrastructure silos; looking at whole access chain (or "door to desk") approaches. Given that much of the long-term infrastructure in developing countries is yet to be built getting it as good as possible first time around is of paramount importance.[9]

3. Policies and Legislative Framework

A key step towards ensuring national and sub-national delivery of disability inclusive infrastructure is creating a recognised, agreed upon, policy and legislative framework. This chapter highlights the three key international frameworks which guide disability inclusion and

[8] https://www.ohchr.org/EN/HRBodies/CRPD/Pages/ConventionRightsPersonsWithDisabilities.aspx#9
[9] https://www.did4all.com.au/ResourceTheme.aspx?aee3e0fb-ccd2-437e-9597-9f4118da75af

discusses the policy and legislative frameworks and standards which are needed to support implementation of the United Nations Convention on the Rights of Persons with Disabilities.

The United Nations Convention on the Rights of Persons with Disabilities (CRPD) and its Optional Protocol[10], aim to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all people with disabilities. Ratified by 177 countries; the CRPD demonstrates the high level of global commitment on the importance of inclusion and accessibility for people with disabilities. The CRPD requires signatories to promote 'reasonable accommodation' of people with disabilities, and promotes 'universal design' of goods, services, equipment and facilities including infrastructure. The CRPD requires signatories to ensure persons with disabilities live independently, and have equal access to the physical environment, personal mobility, transportation, housing, workplaces and public facilities (including buildings, roads, schools and medical facilities). In addition, the CRPD requires that information and communications providing information of physical infrastructure and services be made accessible.

The New Urban Agenda[11] sets out a shared vision for more sustainable and inclusive urbanisation in response to estimates that 66% of the world's population will be living in cities by 2050 - of which 90% will be found in low and middle income countries[12]. The New Urban Agenda was developed by a global taskforce of local and regional governments and over 58,000 networks. Organisations representing people with disabilities and advocates for disability inclusion were actively involved, ensuring the importance of disability inclusive infrastructure and urban design was recognised.[13]

The Sustainable Development Goals (SDGs) have an overarching principle of 'leaving no one behind' and include eleven explicit references to people with disabilities under five of the seventeen goals (education, growth and employment, inequality, safe and inclusive human settlements, and data collection and monitoring). Goal 11 focuses on urban development with accessibility explicitly mentioned as an indicator for success. Other goals include broader inclusion references which imply the need to ensure disability inclusion.

Sustainable Development Goals which promote disability inclusive infrastructure
SDG 4 – by 2030, ensure equal access to all levels of education for the vulnerable, including persons with disabilities.
SDG 10 – by 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.
SDG 11 – by 2030, provide women, children, persons with disabilities and older persons with access to safe, affordable, accessible and sustainable transport systems and green and public spaces.
SDG 11.7 requires "universal access to safe, inclusive and accessible green and public spaces, adequate and affordable housing, urban and peri-urban transport and basic services for all urban dwellers, whether or not they live with a disability".

[10] A side agreement to the UN CPRD, adopted in 2006, which establishes a formal complaints mechanism in support of the Convention
[11] http://habitat3.org/the-new-urban-agenda/
[12] DIAUD, CBM and World Enabled (2016) The Inclusion Imperative: Towards Disability-inclusive and Accessible Urban Development: Key Recommendations for an Inclusive Urban Agenda.
[13] Articles on DIAUD's engagement

SDG 17 – by 2020, enhance capacity-building support to developing countries, to increase significantly the availability of high-quality, timely and reliable data disaggregated by disability and other characteristics.

Promoting disability inclusion through policy and planning

The effectiveness of the three key international frameworks lies in their interpretation and translation by national governments. Countries with mature disability inclusion policy environments typically embed minimum disability inclusion or accessibility requirements within the following policy and legislation:

- National policies which relate to human rights and the rights of individuals;
- National policies relating to communication and information accessibility;
- National transport and mobility policies;
- National housing, construction and built environment policies; and,
- Sub-national policy (e.g. city policies and masterplans) that commits local authorities to making the built environment and locally provided infrastructure accessible over time

Many countries around the world, including Zambia, India, Nepal and Ethiopia have updated their legislative frameworks on disability to match the principles and rights enshrined in the CRPD. Localisation of the CRPD, for example in the Zambia Case study below, has created a legal basis for people with disabilities to seek remedies for rights violations. In turn, this has led to more inclusive infrastructure and improved social dynamics, enabling more independent mobility as well as civic and economic participation for people with disabilities[14] (See case study below).

The SDGs are increasingly being adopted as Key Performance Indicators (KPIs) by sub-national governments, and are being built into project planning and delivery standards. With clear 2030 targets, they provide a robust framework against which governments can measure progress. A Local Government Forum was held alongside July 2018's UN High Level Forum, allowing mayors, local government officials and their partners to share updates and insights from SDG programmes. Strategic dialogue between the disability community and mayors at the session led to the launch of the Campaign on Inclusive and Accessible Cities (CoIAC) on the 3rd December 2018. The campaign will work with cities around the world to "*create an inclusive access implementation framework that will promote best practices and provide clear guidelines and technical support for city leaders and urban development actors*"[15].

Individual cities are also making concrete progress on localising legislation, with New York becoming the first city to submit a Voluntary National Report on its implementation of SDG Goal 11[16]. The report included the announcement of a $150m investment to make the city's homes more accessible for people with disabilities.[17]

The importance of standards

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[14] See Case Study below: Infrastructure for Inclusive Democracy: Sela Brotherton v. the Electoral Commission of Zambia

[15] http://globalaccessibilitynews.com/2018/12/03/berlin-celebrates-the-international-day-of-persons-with-disabilities-by-launching-the-cities-for-all-compact-and-campaign/

[16] News of HLPF, and Local Government Forum

[17] https://www1.nyc.gov/assets/international/downloads/pdf/NYC_VLR_2018_FINAL.pdf p38

Many countries with robust disability legislation also develop or adopt legally binding standards to support policy implementation,. These dictate minimum accessibility standards for buildings (including built infrastructure), the built environment (including roads and public spaces), and access to information and communications that are critical for users of infrastructure and the built environment. They also provide best practice guidance to planners, engineers, architects and those involved in construction of the built environment.

In the absence of local codes or standards, the following globally recognised international standards and guidance notes can be used to inform development of national standards, or infrastructure project delivery:

- ISO 21542: 2011 (Building construction – Accessibility and usability of the built environment) available here
- The International Building Code (Chapter 11: Accessibility), available here
- Steinfeld, E. and Maisel, J. (2012) Universal Design: Creating Inclusive Environments
- Handicap International (2014) Practical Guide: Conduct an accessibility audit in low- and middle-income countries. Technical Resources Division.
- 'Compendium of accessible WASH technologies'[18] designed by the Water, Engineering and Development Centre (WEDC) and Water Aid
- IFRC, Handicap International and CBM (2014) All Under One Roof: Disability-inclusive shelter and settlements in emergencies. Available here.
- Disability inclusive infrastructure guides published by the World Bank.

Case studies

Infrastructure for Inclusive Democracy: Sela Brotherton v. the Electoral Commission of Zambia

Understanding the context: Zambia ratified the Convention on the Rights of Persons with Disabilities (CRPD) in 2012, and aligned its national legislation on people with disabilities in the same year with the passing of the Persons with Disabilities Act No.6 of 2012. Zambia also legally recognised the umbrella organisation, Zambian Federation of Disabled Persons (ZAFOD), as the representative body for people with disabilities (DPOs).[19]

Intervention & Impact: Article 33 of the CRPD calls for people with disabilities to be involved in monitoring the process of localisation and implementation of the CRPD. In 2011, ZAFOD undertook an audit of polling station accessibility. The resulting report was presented to the Electoral Commission, and highlighted poor accessibility of the polling stations and made recommendations for improving access.

The Electoral Commission did not implement the proposed recommendations during its 2011 poll preparation, resulting in poor accessibility at the poll station for people with disabilities. In response, ZAFOD, as the nationally recognised Disabled Person's

[18] Jones, H. & Wilbur, J. (2014), Compendium of Accessible WASH Technologies.
[19] http://www.safod.net/library/files/m88559.pdf p4

Organisation (DPO), brought a complaint before the High Court of Zambia on behalf of civil society.

The High Court of Zambia found the Electoral Commission in breach of the national law. The Court decided not to delay the 2011 elections for fear of political instability that would result, but required the Commission to take steps to ensure accessibility at the poll stations in future elections.
Following the High Court's decision the Electoral Process Act of 2016 was enacted, which is directly aligned with the CRPD[20] and explicitly forbids discrimination of people with disabilities in voter education, materials, polling stations and campaigns. In addition to the 2016 Act, the Electoral Commission, in collaboration with ZAFOD and Disability Rights Watch, took budgetary and social measures to ensure accessibility at the 2016 polls. The resulting report following the election found that;

- 72% of the polling stations were accessible for people with disabilities;
- informational material had been made accessible e.g. braille on ballots;
- training of people with disabilities to provide election-day training and outreach to other members of the disability community has been undertaken;
- construction of permanent ramps in some of the polling stations (particularly those in schools) was complete; and,
- people with disabilities were engaged as electoral observers.

This has the potential to set an important precedent on localisation and implementation of a comprehensive legal framework.

Case Study Limitations
Limitations were seen in the inadequate distribution of these services across the whole country, reportedly due to inadequate funding to mainstream provision. Another limitation noted in implementation was the travel distance to polling stations, discrimination and perceptions of the community on disability as well as fear of violence at the polling stations.

Accessibility for Safe Public Spaces Rajive Raturi v. Union of India

Understanding the context: India ratified the CRPD in 2007[21] and enacted a national Act on the Rights of Persons with Disabilities in 2016[22]. The 2016 Act adopts provisions from the CRPD and calls for accessibility in public buildings and services, such as justice and education. Additionally, the Act identifies the roles of the local and national authorities in ensuring the implementation of the rights enshrined in the document.

[20] Article 29 "Participation in Political and Public Life"
[21] https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=IV-15&chapter=4&lang=_en&clang=_en
[22] http://www.newindianexpress.com/opinions/2018/jan/01/disability-rights-get-a-judicial-boost-1741367.html

The ratification of the CRPD and the national Act in India represents a shift in how the rights of people with disabilities are recognised and provides a complaints mechanism for violations of individuals' rights. India currently has an estimated 60-70 million people who identify with a disability[23], and in 2016 the results of an accessibility audit report showed that none of India's public buildings were accessible.[24]

Intervention & Impact: People with visual impairments account for half of all people with disabilities in India[25]. In the Rajive Raturi v. Union of India case the petitioner, a person with a visual impairment working with a National Human Rights Institution in Delhi, filed a formal complaint to the Supreme Court of India focused on inadequate access to public spaces for people with disabilities. The petitioner highlighted the concerns of safe accessibility, particularly in pedestrian pathways, transportation and roads and called for improved accessibility with a focus on safety, affordability and ease of navigation.

The petitioner detailed ten issues to be addressed that directly related to India's Rights of Persons with Disabilities Act, 2016 and included implementation of accessibility standards in airports, transportation, public buildings and information. The outputs of the case were a detailed timeline of actions required to remedy accessibility issues, including retrofitting of buildings to be audited against established guidelines and the requirement that all government websites be made accessible, with regular reporting on implementation of efforts in line with the judgment[26]. Further research is required to understand the detailed outcomes of accessibility interventions on use and accessibility of public spaces for persons with disabilities.

Concluding Remarks

The international CRPD, New Urban Agenda and SDG frameworks all provide robust guidance on how infrastructure and the built environment must be made accessible to people with disabilities. The legal recognition and mandated implementation of both reasonable accommodations in the built environment and access to information, along with detailed timeline for implementation, is critical towards realising disability inclusive infrastructure.

Without national policies and standards that mandate minimum accessibility standards for people with disabilities, it is impractical and unrealistic to expect that international frameworks will be followed. This is particularly true for infrastructure delivery as decisions which impact accessibility are made over long timeframes, involve significant finance, and complex multi-stakeholder delivery mechanisms – which makes having legally binding policy, legislation and standards to guide delivery at every stage vital. Inclusive infrastructure policies and standards are also important in helping build awareness and buy-in from project sponsors (such as ministers and agencies), and in building capacity of project delivery partners.

Without effective enactment of national and sub-national policies, processes and standards; underlying and persistent structural barriers, including societal attitudes, capacity of design, construction and infrastructure operation professionals and interpretation of the law may continue to limit the extent to which disability inclusion is designed into infrastructure. These challenges are discussed in the following sections.

[23] https://indiankanoon.org/doc/149818296/
[24] https://economictimes.indiatimes.com/news/politics-and-nation/countrys-first-accessibility-audit-fails-to-find-a-single-disabled-friendly-building/articleshow/53106243.cms
[25] https://indiankanoon.org/doc/149818296/
[26] https://indiankanoon.org/doc/149818296/

Key reference material

- CRPD available here
- New Urban Agenda available here
- Sustainable Development Goal 11 available here

4. Designing Disability Inclusive Infrastructure

Meeting international frameworks' goals for inclusive cities and infrastructure requires the implementation of appropriate technical standards and design principles, enhanced by robust accessibility audits. It is also important to consider entry points for disability inclusion throughout the life cycle of an infrastructure project.

Universal design – An approach to inclusive design

The CRPD promotes Universal Design approaches which prompt consideration of the diverse needs and abilities of all persons affected by a project or programme throughout the design process, in order that projects and programmes create infrastructure, products, services and environments that benefit everyone. Universal Design evolved from accessible design, a design process that addresses the needs of people with disabilities. Universal Design goes further by recognising that there is a wide spectrum of human abilities.[27]

The Universal Design approach is embodied in seven key principles set out below. By following key principles planners, architects, engineers and those involved in construction and maintenance can ensure a human-centred approach to design. However, this approach needs to be embedded throughout the project life-cycle, considered along all links of the access chain, and requires a high degree of professional and civil society capacity to adopt. The principles should be a useful, complementary approach to the adoption of the accessibility and inclusion policies and standards noted above, and improvements in professional inclusive design capacity set out in following sections.

***Box 1:* The 7 Universal Design Principles**

Principle 1: Equitable Use: Design that is useful and marketable to persons with diverse abilities.

Principle 2: Flexibility in use: Design that accommodates a wide range of individual preferences and abilities.

Principle 3: Simple and intuitive use: Design that is easy to understand, regardless of the user's experience, knowledge, language skills, or concentration level.

Principle 4: Perceptible information: Design that communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Principle 5: Tolerance for error: Design that minimises hazards and the adverse consequences of accidental or unintended actions.

Principle 6: Low physical effort: Design that can be used efficiently and comfortably and with a minimum of fatigue.

[27] Source: http://www.universaldesign.com

Principle 7: Size and space for approach and use: Design that provides appropriate size and space for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.

Embedding disability inclusive design through the full infrastructure project cycle

For project owners and built environment professionals it is important to consider how disability inclusion can be achieved at each stage of a project, from scoping, design, construction and handover to management and monitoring. This section provides a summary of action points at each stage of infrastructure design.

Project Scoping

- Research and define users; understanding who needs to use the infrastructure and the context in which they are currently living and wish to live;
- Build relationships and consult with DPOs to understand requirements;
- Define standards to be used (local or global);
- Define the design responsibilities of different parties.

Infrastructure Design

- Design to appropriate accessible infrastructure principles and standards (international or local);
- Where relevant, and possible, consider the use of digital technologies and data to inform inclusive design;
- Review infrastructure design and service delivery solutions for improving accessibility at every project design stage;
- Consult user groups, including people with disabilities, at every design stage;
- The design approvals process should involve evaluation against access and inclusion standards and metrics, informed by the consultation.

Procurement

- Ensure procurement and contracting models used provide the right incentives (e.g. through compliance and financial mechanisms) to ensure inclusive infrastructure delivery;
- Ensure procurement materials clearly set out inclusive access performance requirements, and reference to local or international accessibility standards where possible;
- Use the procurement process to ensure that sufficient disability inclusive design and delivery expertise is available from suppliers.

Construction

- Monitor progress against technical standards and project objectives;
- User-test prototypes, often by carrying out accessibility audits;
- Make improvements based on feedback.

Commissioning and Handover (if applicable)

- Test accessibility during commissioning via DPO-engaged testing or accessibility audits;
- Provide handover information on the access and inclusion elements of the infrastructure, to ensure disability inclusion features aren't inadvertently 'managed out';
- Consultation with user groups to identify gaps which were not possible to address during design and create management strategies to mitigate gaps;
- Communicate inclusive design features more broadly to people with disabilities and the wider community.

Management and maintenance

- Incorporate access and inclusion into maintenance requirements;
- Ensure continued involvement of user groups in the use, management, and any proposed changes to the project.

Consider each link in the access chain

When thinking about inclusive infrastructure design, it is also useful to consider the access or travel chain; all elements that make up a journey, from starting point to destination (bed to desk). If any link is inaccessible, the entire trip becomes difficult.[28] For example, a bus station may have a low level ticket counter and audio and visual information, but the gap between the bus stop and the bus floor may be too wide for a wheelchair user to confidently navigate. Or when reaching their destination, users may find the building has no access ramps, so they are unable to enter their final destination, be it an office, classroom or clinic.

Having to rely on assistance from other passengers or staff may discourage people with disabilities from travelling altogether. Affordability of travel is another dimension of the access chain. This is sometimes addressed through subsidised public transport for people with disabilities. When delivering disability inclusive infrastructure, it is important that all stakeholders consider the end-to-end access chain, working collaboratively to make adaptations to any part of the infrastructure service design needed to enable door-to-desk barrier-free journeys and use.

Importance of accessible information in infrastructure service design

Designing in accessibility and disability inclusion goes beyond architecture and the physical environment and also applies to access to information, communication and learning. The use of infrastructure is often constrained for people with disabilities by a) a lack of access to information on services that can prevent users engaging with or trialing a service and b) poor accessibility of information provided. People with reduced mobility may experience additional challenges when using public transport unassisted if there is no accessible information on routes, timetables or service access facilities. Whilst people with reduced hearing and vision, or neurodiverse people, may have no or limited access to information on service schedules, utility tariffs or bills, or may be unable to interpret information in the given format. Well-designed information on the access and use of infrastructure can reduce barriers to use for everyone.

Enhancing disability inclusive design through accessibility audits

Accessibility audits identify accessibility barriers that might be addressed within infrastructure, urban development or construction projects, and test accessibility solutions once implemented. Accessibility audits can occur during the design, commissioning and maintenance phases of infrastructure delivery to review the accessibility of proposed infrastructure design, and identify ways to improve disability inclusion. Accessibility audits should be instigated by the project owners and involve Disabled Persons Organisations, project designers, owners and those responsible for delivery and maintenance.

Audits conducted by people with disabilities representing a range of impairments can lead to more robust assessment. Often a DPO can coordinate an appropriate approach to conducting an

[28] Maynard, A. (2009). 'Can measuring the benefits of accessible transport enable a seamless journey?' Journal of Transport and Land Use, 2 (2)

audit for a specific infrastructure project. The Accessibility Audit guidelines produced by Humanity & Inclusion[29] provide a practical basis for conducting accessibility audits in low and middle-income countries. A range of case studies below set out the value of, and potential approaches to, conducting accessibility audits in LIC contexts.

Case Studies

Achieving accessible access on Dar Es Salaam's Bus Rapid Transit System

Understanding the context: Dar es Salaam's Bus Rapid Transit (BRT) System provides an example of a proactive approach to integrating universal design within urban transport service provision. The project actively engaged representative groups to improve service delivery and drive an awareness raising campaign to inform people with disabilities about the new service.

The intervention and impact: During the initial design phase, Universal Design principles were adhered to, such that disability inclusion was mainstreamed through the design of the buses, platforms and access gates. Near to completion, a civil society group called the Comprehensive Community Based Rehabilitation in Tanzania (CCBRT) Advocacy Unit was engaged to understand the detailed needs of passengers with disabilities. This was much later in the project cycle than is advised, however accessibility audits even in later project stages can still identify significant and rectifiable barriers for mitigation. In early 2016, the unit partnered with DART to ensure the public bus system was safe and accessible for people with disabilities.[30] To assess this service, members of the advocacy team, including people with hearing and visual impairments and physical disabilities, tested the stations and rode on DART buses throughout the city.[31]

Their travel experience was positive overall and they shared important recommendations for improvements such as installing a lower ticket window for people in wheelchairs, adding disability awareness signs in Kiswahili, and including braille on tickets. After DART's launch in May 2016, the Advocacy Unit visited the project again to test improvements and help an awareness raising campaign to inform people with disabilities about the new service. The awareness raising campaign was disseminated through normal media channels as well as through the CCBRT communications to their disabled members, which helped reach those who may struggle to access television, radio, internet, newspapers and billboard posters.

As a result, the DART BRT provides people with disabilities much greater independence and mobility within the city, helping access jobs, education and services.

[29] Humanity & Inclusion (2014) Practical Guide: Conduct an Accessibility Audit in Low- and Middle-income Countries. Technical Resources Division of HI (Formerly Handicap International).
[30] Source: http://icedfacility.org/resource/case-study-disability-inclusive-design-dars-brt/
[31] Source: http://www.ccbrt.or.tz/news/detail/news/access-for-all-public-transport-disability/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=05f918b8c3c3b9a64e239d9a185e875c

Making public transport more inclusive in Kathmandu, Nepal

Understanding the context: Kathmandu, the capital of Nepal is a very difficult environment for people with disabilities. It is challenging for people with limited mobility to move independently around the city due to barriers such as obstructed pavements and high curbs, dangerous road crossing points and a lack of audio signals. Public transport is also not inclusive and often presents a hostile experience to people with disabilities – both due to access challenges, and discrimination faced in accessing transport. However, the recent work of The National Federation for the Disabled, Nepal (NFDN), an umbrella DPO in Nepal, has helped to address some of these challenges.

The intervention and impact: NFDN has worked with the Kathmandu Municipal Council (KMC) to advocate for and develop actions for universally inclusive road safety and urban mobility. Pilot projects have been implemented to improve busy road crossings, obstructed sidewalks and access to public infrastructure including schools and hospitals. Accessibility audits have also helped improve municipality staff's recognition of the need for inclusive infrastructure, and understanding of approaches to translating the policy into practice.

The National Federation for the Disabled, Nepal (NFDN) has also worked with private bus companies to secure discounted fares for passengers with disabilities. However, bus drivers and assistants are still unable to identify persons with a disability if they have a less visible impairment such as deafness or a cognitive impairment. Solutions implemented in other regions include introduction of a registered disability card, proving users' entitlement to discounts, and ensuring a smoother travel experience.

Partly as a result of the NFDN advocacy in Nepal, there has been a recent procurement by one bus company of large buses, with lower floors and accessible areas for wheelchairs, as well as priority seats for those with disabilities. These are being used on several bus routes and are reported to have made a vast improvement in the ability of those with physical impairments to travel, albeit only to areas close to those particular bus routes.

Accessibility Audits for the Delhi Metro, India

Understanding the context: Delhi Metro Rail Corporation (DMRC) covers 110 kilometres and 90 stations, and is a good example of accessible design of urban infrastructure. DMRC commissioned accessibility audits of a sample station and future station designs for the Delhi Metro. These were conducted by Samarthyam, India's National Centre for Accessible Environments, who were also responsible for subsequent monitoring of implementation.

The intervention and impact: Accessibility features were installed or constructed as a result of the audits. These included designated parking near the station for disabled passengers, guiding paths and warning strips, bright-coloured interiors, accessible automatic fare collection, escalators, lifts, and designated space for wheelchairs inside the coaches.

Further suggestions accepted and incorporated into the design for the new stations included improved signage, lower ticket counter heights, installing distinct sound beepers in order to orient vision-impaired persons, and installing transit ramps to be made easily available and to assist bridging of horizontal and vertical gaps between the coach and platform.

Accessible design is reported to have contributed to more passenger inflow, reduced travel time, and added revenue generation. The high level of accessibility and the DMRC focus on making journeys comfortable for 'differently-abled' passengers, including through the positive use of language, has led to increased access to education and employment for people with disabilities. The DMRC has become a positive disability inclusion example for the rest of India, with other cities now adopting the best practice achieved in Delhi.[32]

Concluding Remarks

Following international technical standards, context specific guidelines and including DPOs in the design process is imperative to designing and delivering inclusive infrastructure. By considering disability inclusion throughout the infrastructure design lifecycle and following the principles of universal design, implementers can help to ensure that infrastructure is accessible and inclusive and that disability inclusion considerations are not omitted at any stage of design.

The importance of conducting accessibility audits cannot be overstated. They are critical to understanding the barriers that people with disabilities face when accessing infrastructure. Audits should actively involve people with disabilities, representing a range of impairments, often coordinated by a DPO. The full access chain must must be considered from door-to-desk, including consideration of the accessibility of information and communications related to infrastructure services. If just one link in the access chain is broken, then the accessibility of infrastructure can be significantly reduced – decreasing the value for money of other interventions. It is therefore vital that inclusive access is designed in at every stage.

Key reference material

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- Handicap International (2014) Practical Guide: Conduct an accessibility audit in low- and middle-income countries. Technical Resources Division.
- The International Building Code, available here
- ISO 21542 available here

[32] Agarwal, A, and Steele, A. (2016) Disability Considerations for Infrastructure Programmes. Produced for DFID by the Evidence on Demand Helpdesk.

- Humanity & Inclusion (2014) Practical Guide: Conduct an Accessibility Audit in Low- and Middle-income Countries. Technical Resources Division of HI (Formerly Handicap International).
- Jones, H. & Wilbur, J. (2014), Compendium of Accessible WASH Technologies. Available here
- IFRC, Handicap International and CBM (2014) All Under One Roof: Disability-inclusive shelter and settlements in emergencies. Available here

5. Enforcement of Regulations

"We don't need more laws. We need to implement the laws we have. In the Philippines we have 99% policy and just 1% implementation. My desire for the cities of the future is that we, persons with disability, will no longer demand accessibility but rather that it is readily available."

Della Leonor, Resident, Roxas City, Philippines [33]

Section 3 covered disability inclusion policy, and legislative framework necessary to mandate its delivery, as demonstrated via the case study on Zambia's Electoral Commission. However even where policy and legislation exists, poor enforcement often results in poor implementation of disability inclusive infrastructure.

Common barriers to enforcement include weak rule of law, poor governance and transparency and high levels of corruption. There is also often a lack of capacity and resourcing to support enforcement activities, poor awareness within and between government departments on who is responsible for implementing and enforcing policy, and a paucity of incentives for those involved. This leads to poor implementation of policy and regulations, and ultimately missed opportunities in delivery of disability inclusive infrastructure.

Several strategies can be adopted to counter poor implementation of policy and regulations, which are discussed in this section.

Improving national and sub-national government capacity for enforcement

Improved government resourcing and capacity is vital for enforcement of the policies and standards promoting delivery of disability inclusive infrastructure. Clear lines of responsibility within and between government departments need to be delineated. Responsibility for enforcement processes needs to then be supported by clear lines of accountability, and anti-corruption measures taken. Making standards, regulations and the issuance of permits public via online resources and databases all contribute to increased transparency. These resources can in turn be used to monitor corruption and promote accountability. Finally, clear incentives for supporting enforcement need to be created for government officials at all levels. Be this through improved training, conditions, promotional opportunities or by creating disincentives for corrupt activity such as mandating fines or criminal prosecution for corrupt officials.

Such improvements can be supported through government change programmes, training, and improved resourcing to government departments responsible for enforcement.

[33] Quote by Diana Leonor, local resident. The Inclusion Imperative: Towards Disability-inclusive and Accessible Urban Development: Key Recommendations for an Inclusive Urban Agenda. 2016. p11

Informed and educated technical professionals can translate policy into practice

Translation of policy into practice is also highly dependent on the professionals working to implement infrastructure. Planners, architects, designers, engineers and construction professionals all have a responsibility to understand the needs of people with disabilities and to be aware of the standards and techniques that can make infrastructure inclusive.

However, the knowledge required is neglected in education and training curricula, which results in a general lack of awareness and ability in developing disability inclusive infrastructure. Improvements can be supported by working with universities and accreditation bodies in addition to professional and technical training to mandate the inclusion of accessibility training within professional guidelines.

This might include working with accreditation bodies for architectural, engineering, surveying, project management and planning professions to embed inclusive design training into university curricula, professional accreditation exams, and into continuing professional development training. Where governments take an active role in building the capacity of their in-house design professionals, government training providers may also play a role in building the capacity of its planners, surveyors and project managers to oversee delivery of disability inclusive infrastructure. Such interventions can be delivered as technical assistance components alongside infrastructure delivery programmes, or as part of wider economic development or governance development programmes.

Engaging Civil Society in Development, Enforcement and Monitoring of Regulations

The active participation of people with disabilities in the development, enforcement and monitoring of policy ensures that the aspirations of global frameworks and localised policy can actually be translated into action. Beyond shaping and calling for the enforcement of policy; DPOs can be effective in ensuring that construction projects and development programmes adopt principles and standards needed to deliver inclusive infrastructure, by leading disability audits and ongoing project monitoring. DPOs can also play a highly effective role in training other projects stakeholders within the community, including property owners and local businesses, on accessibility regulations and universal design to guarantee disability inclusion.

Case Studies

Improving poor enforcement of inclusive infrastructure regulations in Nepal

Understanding the context: Nepal became the 86th country to ratify the Convention on the Rights of Persons with Disabilities (CRPD) and the 53rd country to ratify the Optional Protocol in May 2010. It also developed a national directive in 2013 on mandatory provisions for accessibility of public places, which sets the standards for accessibility of built environment for persons with disabilities.[34]

However, even with a well-developed set of international and national policy and design standards on accessibility; urban infrastructure continued to be constructed with poor accessibility.

The intervention and impact: The National Federation for the Disabled Nepal (NFDN) have worked to improve the consultation process between the disability community and

[34] Available here: https://www.nfdn.org.np/national-policies/accessibility-guideline-eng.html

government for new projects in Kathmandu. Consultation for larger scale projects has started to be carried out informally by the NFDN, often resulting in very productive mutual learning sessions between designers and DPOs. These learning sessions enable effective accessibility solutions for infrastructure under design to be developed or refined.

In collaboration with the Kathmandu Municipal Council (KMC), the NFDN has also been working to institutionalise the use of accessibility audits, training KMC representatives to use them on a regular basis[35]. As part of a recent iNGO-supported NFDN programme, 150 audits were completed across 10 types of infrastructure, public space and buildings in Kathmandu which helped to identify access and safety problems for people with and without disabilities. As a result, several pilot projects have been implemented to improve project accessibility. These include redesign of busy road crossings, obstructed sidewalks and access to public infrastructure including schools and hospitals. Working with KMC has helped to build their awareness and capacity in how to improve the design of disability inclusive infrastructure.

In parallel, the Institute of Engineering at Tribhuvan University, Nepal, has set up an urban think tank which will promote issues such as inclusive mobility. The think tank helps the national and municipal governments consider and implement urban mobility and road safety solutions, as well as accessible design for infrastructure. It will also help build the capacity of students who will go on to become professionals responsible for the design and implementation of inclusive infrastructure.

Promoting Accessibility in Ethiopia (2009-2015)

Understanding the context: Ethiopia became the 88th country to ratify the CRPD in 2010.[36] Recognising the importance of enabling accessibility in the capital of the African Union; Addis Ababa City Council, the Ethiopian Centre for Disability and Development (ECDD) and Light for the World joined forces to ensure that disability inclusive design could be enforced in Ethiopia's capital.[37] The project aimed to build local authority awareness of disability inclusion and to influence policy makers to ensure that local policies addressed accessibility.

The intervention and impact: The project developed two accessible publications on accessibility, prepared from information gathered through surveys and accessibility audits of 12 districts across Addis Ababa. Twenty-four local residents with disabilities were trained and hired to conduct the surveys, providing professional training and recognition in the community. The skills learned from the professional training are transferable for income generating careers as technical experts in accessibility[38]. Local coordination with participants enabled effective and regular monitoring of accessibility standards implementation in their communities. A workshop for local architects, building owners and urban planners from the 12 districts also delivered training on the accessibility standards and approaches to implementing design standards.

[35] https://nfdn.org.np/publications/articles-collections/accessibility-audit-challenges-learning-and-good-practices.html

[36] http://usicd.org/index.cfm/news_ethiopia-ratifies-CRPD

[37] Appendix 7. Promoting Accessibility in Ethiopia. UN DESA Forum Disability and Development- Disability Inclusive Urban Development

[38] https://slideplayer.com/slide/7551121/

As a direct result of these initiatives, the government adopted directives - informed by the information collected by the surveyors - to further support the Ethiopian Building Proclamation No. 624, which requires that all buildings be accessible to people with mobility impairments[39]. Consequently, many building owners have made the necessary changes to ensure that their facilities comply with the accessibility standards. Along with changes to the built environment, some businesses have also introduced menus in braille at their restaurants and trained staff to use sign language.

Inclusive Post-Earthquake Reconstruction, Nepal (2016-2017)

Understanding the Context: ADRAD (Action on Disability Rights and Development) is a recognised DPO in Nepal that has been advocating for implementation of the Convention of the Rights of Persons with Disabilities (CRPD) as well as promoting universal design in education through accessible publishing and information and communication technologies (ICTs).[40] The 2015 Ghorka earthquake in Nepal caused the destruction of many public and private properties in districts across Kathmandu. As part of the response to 'build back better', ADRAD empowered the community to ensure that disability inclusive design was at the centre of the reconstruction process[41].

The intervention and impact: Close to 800 people with disabilities were trained on mapping and monitoring national accessibility standards. In addition to the training, 87 public buildings were retrofitted to improve accessibility particularly for people with mobility and visual impairments[42]. The 800 were also trained to engage more directly in planning, monitoring, and advocacy in order to ensure standards for accessibility were implemented.

In parallel to the civil society capacity development, ADRAD was also engaged in the development of the post disaster reform framework. Bringing a DPO to the decision making table ensured that inclusion and inclusive infrastructure design was built into regulations for post-emergency response.

ADRAD's direct engagement in the development of the post-disaster framework led to the government implementing new infrastructure accessibility standards in public schools and spaces, which are mandated in Nepal's most recent inclusive education policy adopted in 2017. As the project utilised international standards on accessibility, the national regulations developed are in harmony with those developed by the International Standardization Organization, and have been adopted at the local level across Nepal.

The project has elevated government recognition of DPOs, which have now been nationally appointed to support the planning and design of public space infrastructure through the formation of a Joint Monitoring and Coordination Committee and an identified district lead to monitor accessibility standards and inclusion of people with disabilities in public services[43] .

[39] See https://chilot.me/2011/01/ethiopian-building-proclamation-6242009/ & Ethiopia p.8 2012 Compilation of Legislative Measures Undertaken in the Implementation of the Convention on the Rights of Persons with Disabilities
[40] Inclusive Post- Earthquake Reconstruction. Innovative Practices 2018 Zero Project. https://www.youtube.com/watch?v=npeS-xvupm0
[41] https://zeroproject.org/practice/pra181243npl-factsheet/ 2018
[42] see guidelines here http://adradnepal.org/partnership-collaboration/
[43] Action on Disability Rights and Development Annual Report. P. 8-9 http://adradnepal.org/wp-content/uploads/2017/06/AnnualReport-ADRAD2073.pdf

This is a critical step to ensure that the design and updates of infrastructure regulations and guidelines have the direct input of persons with disabilities in their development and recognises persons with disabilities as experts and stakeholders in urban planning and development. The project has also led to increased awareness of accessibility standards, orienting the relevant authorities and construction workers with established indicators for accessible reconstruction.

Photograph courtesy of Zero Project

The Inclusive Post-Earthquake Reconstruction project improved the enforcement of policies by creating an evidence-based mechanism for engaging authorities around legislative commitments to disability inclusive infrastructure. The project has also built the capacity of people with disabilities to directly engage in the implementation and monitoring of national standards on accessibility. The project highlights the need for capacity building and adequate resources for DPOs to engage in the development and enforcement of regulations to change the narrative and perceptions on disability and the importance of "Nothing about us without us".[44]

Concluding Remarks

Enforcement of policy and regulatory standards remains a significant challenge for many low-income countries. Understanding the barriers and opportunities in the regulatory environment and governance structures at national, municipal and local level are vital if challenges are to be addressed. Corruption, a lack of incentives by decision makers to implement accessible design, and lack of resources to support project inspection and permit issuance all hamper enforcement. Responsibility for enforcement must be clarified, and clear lines of accountability created. This must be complemented by appropriate incentives and resourcing – all of which are areas which donors can meaningfully support.

Lack of awareness and training of accessibility standards in civil society and built environment professionals limits their ability to 'design in' accessibility. Improved training for built environment professionals is also vital for creating the local infrastructure design capacity needed if infrastructure is to become universally accessible. This should include awareness raising and capacity building for qualified professionals such as planners, architects and engineers through training in the rationale and techniques for implementing disability inclusive infrastructure and the need for regular engagement and consultation with the disability community as part of enforcing policy and standards. The capacity building of people with disabilities and DPOs can also offer an effective strategy to enable them to engage with government and other stakeholders to lobby for the development and implementation of disability inclusive infrastructure.

Improved enforcement of disability inclusive approaches therefore requires significant capacity building across all stakeholders. Whilst there are no comparative studies on the Value for Money of such approaches, if adopting a long-term view this approach has been shown in higher income countries to create a significant cultural shift towards disability inclusive design and delivery.

[44] Convention on the Rights of Persons with Disabilities. Article 33: National Implementation and Monitoring

6. Data and disability inclusion

Information and data play a significant part in disability inclusive physical and digital infrastructure. At present relatively little granular data exists on the socio-economic profiles of, and barriers to infrastructure access for people with disabilities. However, advances in technology are gradually increasing the quality and quantity of data on disability whilst improving understanding around accessibility standards.

Improved data collection will enable a better understanding of;

- The mobility and access barriers faced by people with disabilities
- The social and economic needs of people with disabilities – being aware that stigma often results in the perception that people with disabilities do not *need* access to infrastructure and mobility as they can be perceived as unable to work or participate in society
- How to design and deliver infrastructure that overcomes barriers and delivers to the needs of people with disabilities
- Collection of data can also be used as a method of community engagement and awareness raising, and as a way of building trust between programmes or providers and beneficiaries.

Collecting disability data

Key stakeholders in good data collection include national governments, DPOs, project and service owners and service users. People with disabilities are often less visible within their communities due to the cultural attitudes that disempower them. This requires proactive and context specific approaches to understanding prevalence of disability and enabling voices to be heard. It is important to raise awareness of programme staff involved in data collection and analysis about the sensitivities involved and how the positive actions described can help overcome stigma and inform better infrastructure programmes.

There is no single method or tool that will provide all the data needed to inform an infrastructure programme on disability inclusive practices and to measure outcomes. A mix of both qualitative and quantitative methods can be used at the individual, household, community and city levels, depending on the context. Whichever method is chosen, it is vital to ensure that the screening or analysis of people with disabilities for project purposes does not cause any shame, stigma or potential harm and protects the privacy of sensitive data, particularly in cultural contexts where people with disabilities are at risk of stigma resulting in discrimination and possibly violence.

The Washington Group's Short Set of Questions on Disability, adopted in 2006[45], are designed to procure information on persons with disabilities, through six questions based on functionality in activities such as walking and cognition[46]. The WG questions are recognised as the standard for procurement of disaggregated data on disability and should be used in conjunction with wider qualitative and quantitative research methods to identify members of the community at greater risk of exclusion and to understand trends around their concerns and needs at all stages of

[45] https://unstats.un.org/unsd/demographic-social/meetings/2017/oman--disability-measurement-and-statistics/Session%204/WG.pdf
[46] http://www.washingtongroup-disability.com/washington-group-question-sets/short-set-of-disability-questions/

infrastructure design and delivery.[47]. DFID made a commitment in 2013 to advocate for the use of the WG questions in DFID supported surveys and censuses as well as encouraging other development partners to do the same.[48]

Role of Local Government and Civil Society in Inclusive Data Collection

Local Government and Civil Society have an important role in the procurement and assessment of data on disability. The CRPD states that governments are responsible for ensuring data collected is disaggregated.[49] The Washington Group has conducted workshops in many countries to train government statisticians on the effective use of the WG questions which has led to greater awareness and utilisation in data collection - with questions mainstreamed in national surveys and censuses.[50] Such disaggregated data can then be used by infrastructure project developers to understand the likely needs of target user groups.

Engaging civil society in data collection can lead to greater awareness on disability and the limited access that people with disabilities have to infrastructure , particularly in areas where persons with disabilities are not able to independently move around their environment. Programmes that require service providers to utilise the WG Questions have created improved awareness and engagement with disability; challenging negative attitudes and identifying low cost solutions to improve accessibility in the community[51].

DPOs also benefit from capacity building and training on how to collect disaggregated data. DPOs represent trusted allies for local community members with disabilities and, with knowledge and training of data collection, can facilitate more accurate and representative data using their expertise and knowledge of the local and low-income communities which they represent. However, DPOs interests, relationships to projects and stakeholders, and any conflicts of interest inherent in their involvement must be borne in mind during data collection design.

Beyond legislative requirements on data collection, development agencies, NGOs and other partners engaged in infrastructure development should leverage their influence to ensure infrastructure programmes are directly informed by disaggregated data along the lines of the WG questions. It is also vital to ensure that the data obtained is secure and does not place people with disabilities at greater risk within their communities.

Using digital solutions for data collection

Advances in technology are increasing the quality and quantity of data on disability whilst improving understanding around accessibility standards. Digital applications offer new ways to collect data to inform infrastructure planning whilst promoting citizen engagement and understanding. Short Message Service (SMS) or mobile text surveys can be used to collect baseline data. Satellite and other visual street mapping technologies can be used by communities to map barriers to accessibility and to make designers aware of existing barriers.

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[47] https://unstats.un.org/unsd/demographic-social/meetings/2017/oman--disability-measurement-and-statistics/Session%204/WG.pdf
[48] DFID (2014) Disability Framework: Leaving No One Behind. Whitehall, UK
[49] Article 31 CRPD
[50] Source:http://www.washingtongroup-disability.com/wp-content/uploads/2016/02/WG-Report-to-Disabled-Persons-Organizations-DPOs-Disability-Information-from-Censuses.pdf
[51] Source: http://www.washingtongroup-disability.com/learning-lessons-using-washington-group-questions-education-programming/

Solutions such as www.wheelmap.org enable users to map accessible infrastructure which in turn can be used by designers to understand opportunities for improved inclusive design.

Digital solutions can play a critical role in informing programmes on barriers that exist in the environment at an earlier stage, and also provide a model of engagement with the relevant authorities and civil society to increase awareness and understanding on disability inclusive infrastructure.

Case Studies

Please see case study in Section 7: Inclusive WASH in Uganda and Zambia: The Undoing Inequity project

Wheelmap: Open source mapping for accessibility

Understanding the context: On December 3rd 2015 the German NGO Sozialhelden launched a global campaign with World Health Organization (WHO) to map the wheelchair accessibility of places around the world.[52] Sozialhelden is a German non-profit organisation which creates tools to help mainstream disability in programme delivery by using evidence based data to support the inclusion of persons with disabilities through innovation, diversity promotion and good business practices.[53]

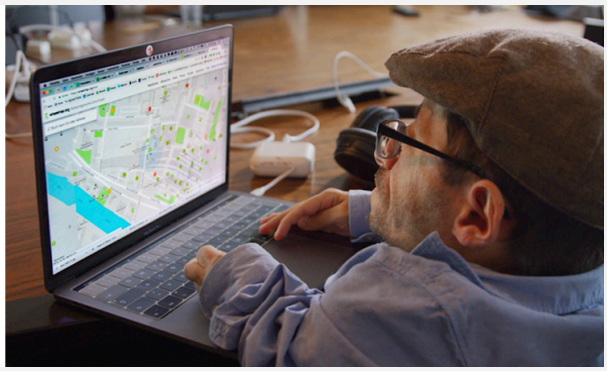
The intervention and impact: Sozialhelden created Wheelmap, a web app, used to procure participatory and qualitative information on the accessibility of public spaces. Wheelmap requires internet or mobile phone access and allows users to input data on accessibility made available in online maps at wheelmap.org.

Since the campaign launched, over 300,000 places have been mapped in low-, middle- and high-income countries around the world - with approximately 300 new places added to the map every day.[54] Through the development of Wheelmap, Sozialhelden found other applications that assess accessibility and created an Accessibility Cloud to allow for data exchange. The Accessibility Cloud merges the data sources from the other applications and has now broadened the digital map to include 150 other criteria on accessibility.

Wheelmap and the Accessibility Cloud are highly effective tools for accessibility data collection that could inform programmes on disability infrastructure and design in the initial phases of their development. Wheelmap can also be used for awareness raising and training; encouraging direct participation of both local government authorities and civil society. Prior campaigns of Wheelmap, also known as ‘mapathons’, involved civil society and have led to the rapid availability of crowdsourced data on accessibility of public spaces around the world.[55] The mapathon events effectively engage the community and raise awareness to the barriers that are caused by limited accessibility for persons with disabilities.

[52] Source: https://www.cbm.org/MapMyDay-kicks-off-on-December-3-498272.php
[53] Source: https://sozialhelden.de/wp-content/uploads/2018/12/Sozialhelden-projects-2018.pdf p 9
[54] Source: https://www.youtube.com/watch?v=7K892Ak5ahw
[55] Source: http://myaccessible.eu/mapmyday-mapping-accessibility-around-world/

There are some limitations to Wheelmap and similar applications due to their dependence on an internet connection and mobile access in cities. However, Sozialhelden is developing offline modes for areas with unreliable or no access to the internet. This is a strong example of a digital solution with the potential to inform disability inclusive infrastructure design.



Photograph courtesy of Sozialhelden

Concluding Remarks

Data collection is vital to improving the collective understanding of barriers and opportunities for disability inclusive infrastructure delivery in low income countries. By collecting data on localised barriers and the performance of accessibility solutions, continuous improvement of disability solutions can be supported.

The use of the Washington Group questions in collecting disaggregated data is vital if infrastructure programmes are to understand the needs of beneficiaries with disabilities and design suitable approaches accordingly. It is important that DPOs understand and promote effective measures in data collection, to ensure effective inclusion of people with disabilities throughout the design process. Inclusive data collection can be enforced at the national and local government level, and built into the project delivery processes as a contractual requirement. Finally, data collection can also support enforcement of standards and regulations by government agencies. Open source data collection, using well-designed technology, also represents a practical way of collecting the larger volumes of data needed to inform planning and design of disability inclusive infrastructure.

However, continuous improvement in disability inclusive design can only be achieved if data collection is undertaken in a structured and consistent manner across project lifecycles, and if the data is then used to ensure compliance with inclusive infrastructure accessibility standards.

Key reference material

- The Washington Group Questions are available here
- Wheelmap is available here
- Accessibility Cloud is available here

7. Cultural and Behavioural Factors

"*People with disabilities are part of the solution, not the problem to be solved*"[56].

Cultural and behavioural factors affect how persons with disabilities are viewed and treated in society and have significant impacts on the effectiveness of inclusive infrastructure service provision. Whilst intentions to promote inclusion can be strong; policy makers, project sponsors or designers' unwillingness to integrate DII can result in segregated access. Unwillingness of service staff to support the operation and implementation of adaptive interventions can limit their effectiveness.

The social model of disability is a central concept to understand and follow[57]. The social model asserts that negative cultural and attitudinal barriers, and exclusion by society (purposely or inadvertently) means that society is the main contributory factor in disabling people. It is important to position disability as a social diversity rather than purely a medical condition.[58]

The twin track approach, of raising awareness and reducing negative attitudes and behaviours is a vital part of effective programme design for inclusive infrastructure. The approach borrows from a similar concept in addressing gender challenges developed by ICED (DFID's Infrastructure and Cities for Economic Development programme) and refers to two mutually reinforcing pathways for action. The first promotes actions to empower people with disabilities through specific interventions, such as designing inclusive infrastructure. The second pathway promotes the reduction and elimination of societal and cultural barriers, such as poor awareness or stigmatisation of disability by infrastructure planners, designers, service staff and host communities. This includes mainstreaming disability inclusion across all aspects of policy and practice.

Cultural factors affect access to infrastructure

Along with physical barriers to accessing infrastructure, and thereby participating in everyday life, there exist cultural or attitudinal barriers which limit local ability to deliver disability inclusive infrastructure, including:

- Stigma around people with disabilities, leading to social isolation;
- Negative attitudes held by government officials, policy makers, community members – and even family members who may be consulted during infrastructure design;
- Isolation leading to lack of 'voice' and the inability to convey needs for infrastructure;
- Lack of awareness and understanding of the needs of people with disabilities by planners, designers, engineers and those working in construction.

Implicit in these norms are assumptions about the extent to which people with disabilities require access to infrastructure and information regarding infrastructure services. This assumption or

[56] IFRC General Secretary July 2018 Global Disability Summit.

[57] The social model of disability is a way of viewing the world, developed by disabled people. The model says that people are disabled by barriers in society, not by their impairment or difference. Barriers can be physical, like buildings not having accessible toilets. Or they can be caused by people's attitudes to difference, like assuming disabled people can't do certain things.

[58] Al Ju'beh, K. (2015) Disability inclusive development toolkit. Bensheim: CBM.

explicit discrimination is often transferred into design and construction of infrastructure, which can result in the following impacts:

- Inaccessible infrastructure, infrastructure services and buildings due to direct and indirect discrimination;
- Exclusion of people with disabilities from public transport and use of other infrastructure and services;
- Reduced access to health and education services which in turn impacts an individual's ability to work and engage in civil society;
- Lack of provision of appropriate infrastructure for personal hygiene;
- Adults with disabilities are often vulnerable to a higher risk of violence;
- Women and girls with disabilities are at heightened risk of 'physical, psychological, sexual or financial violence, often due to social isolation and if they feel forced to use WASH or transport facilities at later times';[59]
- People with disabilities are often excluded from disaster management and risk reduction processes, including evacuation.

Negative attitudes can result in reduced likelihood of people with disabilities accessing employment, which can in turn create greater financial burden and more stretched resources for people with disabilities, and their families. Less available capital at household level can result in families in extreme poverty becoming less able to afford infrastructure services (transport to work, water and power), with working family members walking to work if possible, or skipping meals or taking children out of school in order to be able to afford other amenities[60]. This creates an imperative for governments and service providers to address affordability when considering service design.

Economic exclusion varies between those experiencing different physical, sensory and psychosocial impairments. A study in Nepal, Cambodia and Bangladesh found that people with physical impairments were less likely to find jobs than people with hearing and visual impairments, even when they had longer periods of schooling.[61] Furthermore, people with mental health conditions or multiple disabilities have been found to be less likely than people with other disabilities to access the labour market.[62] These nuances in attitudes and stigma could be important factors that determine the impact of inclusive infrastructure programmes and should be understood where possible.

Addressing cultural and societal barriers to inclusive infrastructure

Addressing cultural barriers to inclusion is part of the second track of the twin track approach. If the challenges faced by people with disabilities are more openly discussed and mitigated, this is likely to help realise wider cultural and behavioural change. The process of planning and

[59] UNICEF. (2013). The state of the world's children 2013: Children with disabilities. New York: UNICEF.
[60] Djesika D. Amendah,, Steven Buigut, Shukri Mohamed Coping Strategies among Urban Poor: Evidence from Nairobi, Kenya
[61] Lamicchane, K. (2015). Disability, education and employment in developing countries: From charity to investment. CUP.
[62] Groce, N., Kett, M., Lang, R. & Trani, J-F. (2011) Disability and Poverty: the need for a more nuanced understanding of implications for development policy and practice. Third World Quarterly, 32(8).

designing infrastructure for everyone can, in and of itself, have valuable social development side effects.

Several strategies have been found to work in reducing these barriers when implementing infrastructure programmes. These include:

- **Appropriate consultation:** Ensuring that the views of people with disabilities (often represented through Disabled People's Organisations) are taken into account through stakeholder consultation during infrastructure policy development, enforcement, infrastructure delivery and commissioning. This may involve a proactive approach to seeking out and encouraging people with disabilities to express their needs and ideas, sometime against cultural or attitudinal barriers, so sensitive approaches are required.
- **Awareness raising on rights to access:** Implementing partners should constantly affirm that people with disabilities have the same rights as those without disabilities and should be accommodated by programmes accordingly. Programmes can work with communities to raise awareness of the barriers faced by people with disabilities, providing examples of positive steps to enable inclusion. Techniques include participatory theatre to help members of the community understand the situation and needs of people with disabilities. The key objective in improving awareness is to ensure infrastructure remains inclusive well beyond the end of the programme, creating lasting changes to prevailing attitudes and stigmas around accommodating people with disabilities.
- **Building awareness of those who finance, design and construct infrastructure:** It is also important that people and organisations involved in financing, designing and constructing infrastructure are not directly or indirectly reflecting negative attitudes towards people with disabilities into their contributions towards infrastructure. Awareness-raising and training can build the capacity to apply appropriate consultation, standards and design principles to infrastructure development.

Case Studies

Inclusive WASH in Uganda and Zambia: The Undoing Inequity project

Understanding the context: The Undoing Inequity project was a recent collaboration between Water Aid, WEDC and LCD, with funding from SHARE. Working in Anuria and Pataki districts in Uganda, and Mwanza West in Zambia. The Undoing Inequity project aimed to understand the physical and attitudinal barriers that people with disabilities face in WASH development, to test an inclusive WASH approach, and understand the impact of this approach on the lives of the target beneficiaries.

The intervention and impact: Baseline surveys were carried out to identify the needs of disabled users. However, even this initial step revealed fundamental flaws in terms of data collection and understanding the problem. The views of vulnerable household members with disabilities were not being properly represented by the head of the household responding to survey.[63] Collecting data directly from people with disabilities was found to be vital and the approach was changed to ensure this, and to include focus group discussions. The survey

[63] Available at: http://www.watercentre.org/services/events/wash2014/conference-program/wash-posters/gosling-undoing-inequity-inclusive-water-sanitation-and-hygiene-programmes-for-all

data was disaggregated, using the Washington Group questions, to include information on type of impairment and severity of mobility challenge.[64]

It was found that people with disabilities, older people and people with a chronic illness often lack WASH services because of:

- **Environmental constraints:** Facilities are not inclusive. This includes long distance to toilets; lack of privacy for toilets of bathing areas; and unsafe and inaccessible toilets.
- **Attitudinal barriers:** Negative attitudes lead to exclusion: for example, people with disabilities are discouraged from touching or fetching water; are often teased and bullied about WASH-related problems; have limited social support; and often face isolation in the family and community.
- **Institutional barriers:** Lack of law, policies, strategies and guidelines on implementing inclusive WASH; lack of consultation or involvement in decision making on WASH policy or facilities; and a lack of information on inclusive technologies.

The programme focused on WASH infrastructure relating to access to toilet facilities, bathing, water collection and transporting water. In response to the detailed analysis of the needs of people with disabilities, innovative and low-cost interventions were designed. The programme resulted in a *Compendium of Accessible WASH Technologies* for use in low-income countries and FCAS,[65] which provides suggested infrastructure solutions that enable inclusive access to WASH facilities.

To address community awareness raising and behaviour change the programme built capacity of local WASH committees by facilitating a series of activities and discussions aimed at building understanding of people with disabilities and their rights. Activities allowed community members to talk openly about the challenges faced by people with disabilities and older people and also offered a very powerful tool to help build empathy and motivate community members to champion change that will empower disabled users.[66]

The benefits of the programme in addressing barriers to WASH facilities for people with disabilities included greater autonomy, productivity and civic engagement for people with disabilities, as well as a reduction in time, energy and resources for carers. The NGOs involved in the programme, particularly Water Aid, have made an effort to mainstream disability inclusion in all WASH interventions. The importance of stakeholder consultation is stressed and the resulting solutions can be achieved at very little additional cost.

[64] Wilbur, J., Hones, H., Gosling, L., Groce, N. & Challenfer, E. (2013). Undoing inequality: Inclusive water, sanitation and hygiene programmes that deliver for all in Uganda and Zambia. Paper presented at the 36th WEDC international Conference, Nakuru, Kenya.
[65] Available at: https://wedc-knowledge.lboro.ac.uk/resources/learning/EI_Compendium_of_accessible_WASH_Technologies.pdf
[66] WEDC (2014) Mainstreaming disability and ageing in water, sanitation and hygiene programmes: A mapping study carried out for Water Aid. Available at: http://nepal.wateraid.org/news/news/the-undoing-inequity-project

Improving disaster evacuation and access to shelters in Bangladesh

Understanding the context: Bangladesh is extremely vulnerable to natural disasters; particularly cyclones and excessive rainfall resulting in flooding. Due to the effects of climate change; disaster frequency is likely to increase. Dhaka, Chittagong, Khulna and Rajshahi are Bangladesh's four largest cities and together are home to 50% of the population. However, mobility is extremely challenging in these urban centers due to poor quality streetscape design, limited and inaccessible public transport infrastructure, and extreme congestion in some centres. Another challenge for persons with disabilities is access to shelters in the event of a disaster, as highlighted above.

People with disabilities are often excluded from disaster management and risk reduction processes. A survey of people with disabilities by the UN Office of Disaster Risk Reduction (UNISDR) found that 85.5% of respondents from 137 countries had not participated in community disaster management and risk reduction processes currently in place in their communities. Only 20 percent of respondents believed they could evacuate immediately without difficulty in the event of a sudden disaster event.[67]

The intervention and impact: Supported by Humanity & Inclusion in 2011, communities in Chittagong's Sitakunda sub-district came together with Disabled People's Organisations (DPOs) and key government actors and formed the Cyclone Shelter Management Committees (CSMC). DPOs selected representatives in these committees; at least 10% of CSMC members are persons with disabilities. The CSMC visited accessible cyclone shelters in other areas and explained the need for upgrading to the local government.

Humanity & Inclusion oversaw the renovation process, which included the construction of ramps, accessible toilets and water points. They trained CSMC members on disability inclusive disaster risk management, who have since met every month to coordinate awareness-raising and preparedness efforts. The reported impact is significant: people with disabilities were able to access the shelters and benefit from the accessible indoor toilets during the 2013 Mahasen cyclone. Aside from the better access, the process had another positive outcome: people with disabilities increasingly spoke for themselves, and the communities around the four upgraded cyclone shelters changed their attitudes towards people with disabilities, treating them with greater respect and accommodating their needs.[68]

Concluding Remarks

In many low and middle-income countries, it is not enough to simply provide accessible infrastructure and services. Stakeholders across government, project owners, designers, delivery professionals and investors must factor in how behavioural change can reduce negative attitudes and stigma to enable real and lasting inclusion and inclusive economic outcomes.

Implementing the process of consulting with people with disabilities and incorporating accessible design principles into infrastructure is likely to have a positive impact. However, a more comprehensive range of behaviour-change focused activities will also be needed to strengthen

[67] UNISDR. (2014). Living with disability and disasters: UNISDR 2013 survey on living with disabilities and disasters – Key findings. UNISDR

[68] Handicap International (2014) Empowerment and participation: Good practices from South & South-East Asia in disability inclusive disaster risk management. Prepared with the financial support of Aktion Deutschland Hilft - Germany's Relief Coalition.

and raise stakeholder awareness of the challenges faced by people with disabilities and to actively involve them in providing solutions. Thus, helping to change attitudes from being negative towards being inclusive and supportive.

8. Financial and Procurement Considerations

Financial resource or investment constraints are often perceived as common bottlenecks in achieving disability inclusion in infrastructure. However, the costs of ensuring that infrastructure is inclusive can be low if considered during early design phases and the impact transformational. Making infrastructure inclusive can result in macro-economic benefits for government as more citizens access work and services, can provide investors with a better return on investment, by increasing revenues and avoidance of often more expensive retrofitting costs.

With $1.3 trillion of investment needed in infrastructure in emerging market economies,[69] there is a significant opportunity to ensure the new infrastructure built in the coming decades is disability inclusive if governments, donors and investors act now. Procurement of services and contractors and management of contracts relating to infrastructure development provides important opportunities to ensure that disability inclusion measures that have been successfully planned for do not become deliberately or inadvertently 'managed out'.

Inclusive infrastructure has a compelling business case

DFID is increasingly focusing on disability inclusion as set out in its Disability Inclusion Strategy and many other donors and investors are showing similar signs of commitment. The UN Agenda 2030 for sustainable development (its action plan for inclusive prosperity) notes that more than 80% of people with disabilities live in poverty - strongly highlighting the role of people with disabilities in poverty eradication throughout the development agenda.[70]

Promoting disability inclusion within programme design and delivery represents an important opportunity for delivering future impact and demonstrating value for money. Making infrastructure and cities accessible and inclusive may not have to add large costs, if designed-in from during early design phases. For example, for new buildings, it is generally feasible to meet accessibility requirements at 1% of the total cost.[71] As such, disability inclusive design features can be designed-in efficiently if specified at the early procurement and design stages of the infrastructure life-cycle. Retrofitting for accessibility is far more expensive – by up to 20% of the original cost – than integrating accessible design.[72]

Evidence also shows that neglecting disability inclusion is a missed opportunity for economic growth; investments in infrastructure and services that enable people with disabilities to access education and employment enhances national economic growth through increased productivity and well-being[73]. Including people with disabilities in the labour market could increase a country's Gross Domestic Product by 3 to 7%.[74] Expanding the workforce to include people with disabilities also expands the potential tax base. For example, a study in Canada revealed that enabling just

[69] World Bank, Infrastructure Finance Brief, 2018. https://www.worldbank.org/en/topic/financialsector/brief/infrastructure-finance
[70] WHO & World Bank. (2011). World report on disability. Geneva: WHO.
[71] WHO and World Bank (2011) World report on disability. Geneva: WHO.
[72] WHO and World Bank (2011) World report on disability. Geneva: WHO.
[73] Buckup S., The price of exclusion: The economic consequences of excluding people with disabilities from the world of work, Employment Working Paper No. 43, (2009) International Labor Organization.
[74] International Labor Organization, Inclusion of people with disabilities in national employment policies (2015)

1% of people with disabilities to access employment (including making public transit accessible) would increase the annual national income by C$36m.[75]

Lack of accessible infrastructure for people with disabilities can also have a significant impact on their wider families and household financing. Economic loss, both at household and national level, is incurred through the inability of people with disabilities to access employment and further amplified by the lost productivity of family members with responsibilities to care for those with disabilities etc. In Bangladesh, a 2014 study found that reductions in wage earnings attributed to lower levels of education among disabled people and their child caregivers were estimated to cost the economy USD 4 million per year. In addition, the exclusion of people with disabilities from the labour market resulted in a total loss of USD 891 million/year; income losses among adult caregivers adds an additional loss of USD 234 million/year.[76]

From a programme design perspective, it is essential that making infrastructure inclusive is not seen as an optional extra; the positive social and economic impact it could generate will far outweigh any costs. Programme finance should be included from the outset for initial analysis and assessments to support appropriate design, consultation processes, data collection and monitoring is critical for facilitating inclusive infrastructure at each stage of design and delivery.

Using procurement and contracting processes to ensure delivery of Inclusive Infrastructure

Procurement and contracting for infrastructure can be used to define the design, construction, maintenance and operations standards and specifications for disability inclusive infrastructure. Incorporation of such criteria enables enforcement of disability inclusive design and that legally mandated policies or inclusive design standards are adhered to. Definition of inclusive features in infrastructure contracts is key to mitigating the risk of inclusive design being inadvertently managed out of the final infrastructure. Prior to contract negotiation, inclusion should be considered at the conceptual stage when donors or governments make a business case for infrastructure investment. It should then be incorporated in detailed design and accounted for in the detailed specifications accompanying a tender, with performance-based requirements providing flexibility for delivery partners.

In documenting what works and what lessons have been learned in disability inclusive infrastructure, it is important to note that unintended consequences can arise from contractual arrangements. It is important that programmes actively anticipate and mitigate these risks. For example, allocating budgets on a lump sum basis, rather than by payment by results, may lead to cost-cutting efforts to reduce the cost of providing a barrier-free environment.[77] Failing to understand the actual demands for the site, terrain requirements, and any additional costs of labour and construction materials, can lead to budgets that are insufficient to deliver access. Examples can include apparently benign cost-cutting decisions, such as anti-skid tiles replaced with cheaper but slippery glazed floor tiles.[78]

[75] Canadian Urban Transit Association (2013). Study based on research from Toronto, Vancouver, Montreal, Edmonton, Hamilton, Ottawa, Calgary, and Winnipeg.
[76] Morgon Banks, L. & Polack, S. (2014). The economic costs of exclusion and gains of inclusion of people with disabilities: Evidence from low and middle income countries. CBM, International Centre for Evidence in Disability, London School of Hygiene & Tropical Medicine.
[77] Samarthyam. (2013) Guidelines and Space Standards for Barrier Free Environment for Disabled and Elderly Persons. New Delhi: Central Public Works Department (CPWD), Ministry of Urban Development, Gov. of India.
[78] Agarwal, A, and Steele, A. (2016) Disability Considerations for Infrastructure Programmes. Produced for DFID by the Evidence on Demand Helpdesk.

It is also vital that projects are fully accessible and usable throughout their lifespan which includes planning and design, construction and then operational / management phases; these requirements must be built into contracting and procurement documents and processes. Ongoing inclusive access should be provided during construction works, so that this does not temporarily disadvantage the community. Sufficient thought must be applied to how infrastructure will remain operational and inclusive throughout its lifecycle and well beyond the initial programme support.

DFID and other development partners can also influence and hold governments and delivery partners to account via procurement, contracting, monitoring and evaluation mechanisms when jointly delivering infrastructure programmes to ensure that disability inclusion is receiving the necessary attention and funding.[79]

As the private sector is expected to contribute a far greater proportion of infrastructure investment than development institutions, advocating for change that can be realised through private sector investment, will be key to delivering disability inclusive infrastructure. It could also be effective for donors to support small businesses or entrepreneurs with disabilities as part of the procurement process or through programme approaches. Donors can also promote opportunities for the employment of persons with disabilities in infrastructure services.

Case Studies

Building in access for pupils with disability to schools infrastructure in Pakistan
Understanding the context: There are an estimated 27 million people with disabilities in Pakistan and, according to UNESCO, 1.4 million children with disabilities are not a part of the formal education system, mainly due to physical infrastructure barriers both inside and outside the schools. These include fragmented and unsafe pavements as well as a lack of specialised transport.[80] In 2015 only 5% of schools across the country had accessible infrastructure in the form of accessible toilets, ramps and other mobility assistive features.[81] Realising the importance of accessibility within 'school buildings for all', the DFID-funded Humqadam Schools Construction and Rehabilitation Programme has taken key steps in addressing and improving the situation in Punjab and Khyber Pukhtunkhwa (KP) provincial schools.

The intervention and impact: Between 2014 and 2020, the programme is constructing <5,800 additional classrooms and many missing facilities, such as toilets, examination halls, libraries and staffrooms. The programme will also rehabilitate 143 Higher Secondary Schools in KP. The local community is involved in the process of deciding the scope of the school through a Statement of Requirements.

All of the schools covered by the programme are benefitting from infrastructure to enable students with physical disabilities to attend classes. Ramps and disabled toilet cubicles have been installed in all newly constructed blocks, which has enabled access for students and teachers with disabilities. Many students with disabilities have reported that they are no longer embarrassed to go to school as they can enter classrooms and use the toilets without assistance.

[79] DFID (2014) Disability Framework: Leaving No One Behind. Whitehall, UK
[80] Source: https://www.britishcouncil.pk/sites/default/files/moving_from_the_margins_final.pdf
[81] Source: https://www.humqadam.pk/fact-sheets/

All this has been achieved with very little additional funding compared to the investment that would be required if infrastructure had not been designed with accessible access in mind - and retrofitting were required. By including access ramps in the new construction; all Humqadam buildings have at least one classroom and one toilet compliant with universal design principles.

The programme also shares knowledge on lessons learned with relevant government stakeholders in Pakistan, as well as other development partners. The impact of better quality and more inclusive schools includes a much higher attendance rate, including for disabled students, less absenteeism of teachers and more engaged parents and communities. All of which is helping to build an effective and sustainable education system in Pakistan.[82]

Limitations: Data for this case study does not include information on how children with disabilities travel to school, and the barriers they face in travelling to school. This should be a priority for government and donors supporting initiatives to ensure that children have door-to-desk access to education.

Concluding Remarks

Financial resource or investment constraints are often perceived as common bottlenecks in achieving disability inclusion in infrastructure. However, the costs of ensuring that infrastructure is inclusive can be low if considered during early design phases and the impact can be transformational. Studies have shown that inclusive design can be achieved for just 1% of building cost, if considered early. Studies have also demonstrated the clear economic benefits of inclusive infrastructure services, making a clear case for governments and project sponsors of the business case for disability inclusive infrastructure delivery.

However, ensuring value for money can only be maximised if accessibility is designed in from the very start of the infrastructure project, and if appropriate incentives and contractual requirements are included in the procurement of infrastructure construction projects, and service contracts. It is therefore critical that all donors and project sponsors take an active role in embedding inclusive infrastructure requirements throughout the project life cycle.

Key reference material

Morgon Banks, L. & Polack, S. (2014). The economic costs of exclusion and gains of inclusion of people with disabilities: Evidence from low and middle-income countries. CBM, International Centre for Evidence in Disability, London School of Hygiene & Tropical Medicine.

9. Conclusions

There is a compelling case for investment in disability inclusive infrastructure in low income countries. Delivering disability inclusive infrastructure increases service usage, reduces the economic burden on households with disabled family members, and increases the economic opportunity for the 15% of the world's population with disabilities.

Ensuring the delivery of disability inclusive infrastructure requires action in six key areas:

[82] ref

Policy and legislative frameworks: Donors and programme stakeholders should be aware of the disability inclusive infrastructure commitments made under the UNCRPD, the New Urban Agenda, and within the Sustainable Development Goals. These commitments must then be integrated into national and sub-national policies, legislation and standards to ensure that commitments are delivered at local level.

Enforcement of regulations: Capacity of national and sub-national governments and agencies to enforce disability inclusive infrastructure-related policies and standards must be built, and appropriate incentive mechanisms for enforcement created. Built environment professionals play a key role in enforcement, and an increase in awareness raising and specialist disability inclusive design training is needed across all professions if lower income countries are to take ownership of disability inclusive infrastructure delivery. Finally, civil society should be empowered to support the enforcement of regulations through collective action.

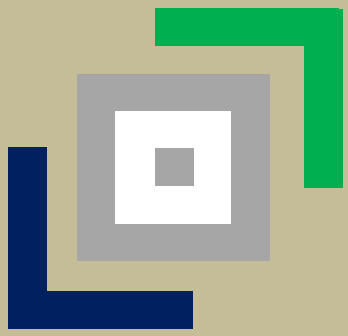
Designing Disability Inclusive Infrastructure: If infrastructure is to be made truly disability inclusive, consideration of people with disabilities needs to be embedded throughout the full project lifecycle. If not considered across the full project lifecycle there is a significant likelihood that inclusions and accessibility adaptations will be 'managed out' of projects, resulting in inaccessible infrastructure. Design can be approached using Universal Design principles (as promoted via the CRPD). Consideration must also be given to each link in the access chain, and provision of accessible information, and use of accessibility audits across the project life cycle is key to ensuring that designs have been effectively tested by people with disabilities.

Data and disability inclusion: Increasing the availability of data on barriers to infrastructure access, and on the effectiveness of infrastructure accessibility solutions is vital to improving the delivery of disability inclusive infrastructure in low income countries. Local governments and civil society both play a vital role in mandating the collection of data, and ensuring the collection of high quality data. Digital solutions can also play a key role in collecting data at scale.

Cultural factors affect access to infrastructure: Adapting the design of infrastructure plays a key role in achieving disability inclusive infrastructure. However, cultural norms, behaviours and stigma can negatively impact the effectiveness of these adaptations. Support is needed to address cultural and societal barriers to inclusive infrastructure if infrastructure is to be made truly accessible.

Finance and Procurement: There is a compelling economic and business case for delivering disability inclusive infrastructure. However, value for money can only be achieved if disability inclusion adaptations are built into projects and programmes from the start, and if robust incentives and enforcement mechanisms are built into infrastructure construction and service contracts.

If donors and stakeholders collectively address each of these six factors then significant progress can be made towards delivering inclusive infrastructure in low income countries, and in delivering against the UNCRPD and SDG commitments.



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Infrastructure and Cities for Economic Development ("ICED") is a project funded by the UK's Department for International Development ("DFID") and is led and administered by PricewaterhouseCoopers LLP, working with organisations including Adam Smith International, Arup, Engineers Against Poverty, International Institute for Environment and Development, MDY Legal and Social Development Direct.

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