

Leave no-one behind: infrastructure and inclusion

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Question

What approaches and experiences are there to learn from in developing country contexts and in more developed economies in the field of infrastructure development to tackle extreme poverty and leave no-one behind? What aspects of infrastructure development and infrastructure services emerge as providing most opportunities and, conversely, challenges?

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1. Overview

This review outlines ways in which different groups of people might be unintentionally excluded if their needs and livelihoods are not taken into account in infrastructure projects. The Sustainable Development Goals (SDGs) and the concept of 'leave no one behind' capture the desire to ensure people are not excluded as citizens in their society. Some of the SDGs that illustrate factors to be addressed to prevent social exclusion and leave no one behind include: (1) No poverty, (2) Good health and well-being, (5) Gender equality, (10) Reduced inequalities and (11) Sustainable cities and communities.

This review links to the need for inclusion of all people, in particular stressing the importance of those who are disabled, people in all age groups, and women. It is guided by the consideration of how the concept of 'leave no one behind' can be incorporated into infrastructure planning, development, implementation and evaluation. The report focuses on transport, electricity and water infrastructure.

Key messages found in the literature include:

Approaches and experiences

- It is often simply assumed that infrastructure investment will trigger economic growth and that this will reach/benefit the poorest
- There is little recognition that infrastructure may harm or have negative impacts on poor
- Pro-poor infrastructure development may not involve bottom-up inclusion of the poor and vulnerable
- Where there is recognition of the problems of non-inclusive infrastructure development, there is little evidence about how to resolve these issues
- Tools which can help engage with the nexus of infrastructure and inclusion include life cycle analysis, participatory planning, social equity audits, and universal design.

Opportunities and challenges

- Investments directly and indirectly affect communities living in or near the area where the infrastructure is built
- Potentially adverse social impacts of upstream infrastructure development should be addressed at the beginning of a project and continue through its life cycle
- A useful hierarchy for considering gender entry points in infrastructure projects is: (i) do no harm, (ii) achieve the project objective, and (iii) seek opportunities to improve gender equity
- The above hierarchy could be extended to include other vulnerable groups.

2. Why is inclusive infrastructure important?

DFID aims for its policies and programmes to be inclusive of and accessible to people who may be discriminated against and excluded due to disability, gender, geography, income, age or other characteristics (DFID 2014). The 2030 Agenda for Sustainable Development similarly declares

that all of its targets should be met for all segments of society, including vulnerable groups such as children, youth, persons with disabilities, people living with HIV, older persons, indigenous peoples, refugees, internally displaced persons and migrants (United Nations 2016, p. 48). The Sustainable Development Goals emphasise the importance of inclusion by mentioning, in Goal 1, vulnerable social groups where ‘no poverty’ initiatives would be most beneficial, including women, children, older people, people with disabilities and the unemployed.

Leaving no one behind: the UK’s promise

We pledge to ensure that:

- every person has a fair opportunity in life no matter who or where they are
- people who are furthest behind, who have least opportunity and who are the most excluded will be prioritised
- every person counts and will be counted

As governments, citizens, civil society and businesses, we commit to work together to eradicate extreme poverty and leave no one behind by:

1. listening and responding to the voices of those left furthest behind, such as people with disabilities, children, older people and those who face discrimination based on who they are or where they live. Every country, regardless of their stage of development, has a responsibility to empower and address the needs of its most vulnerable citizens
2. holding ourselves and each other accountable for designing policies and building inclusive institutions that put the furthest behind first and sustainably address the root causes of poverty and exclusion
3. taking steps to enable all people to reach their full potential, including by securing good nutrition, protection from disease, access to quality education, access to clean water and sanitation, and freedom to have a say in the decisions that affect their lives
4. challenging the social barriers that deny people opportunity and limit their potential, including changing discrimination and exclusion based on gender, age, location, caste, religion, disability or sexual identity
5. building inclusive and open economies and societies, where there is rule of law, inclusive political systems, action to address corruption and where all people are able to hold their governments to account
6. working with young people to help break the cycle of discrimination, exclusion and poverty
7. achieving gender equality, prioritise the empowerment of girls and women and end violence against girls and women, and stop modern slavery
8. supporting a data revolution, to ensure timely, accurate and high quality data is used to achieve and measure sustainable development and to monitor progress and assess whether targets are being met by all peoples and all segments of society

Source: DFID 2017

Infrastructure, of all types, is important for achieving a wide range of social and economic development outcomes. However, if the needs of all people are not taken into account in the design and delivery of different types of infrastructure, there is a risk that segments of society may be excluded. “Infrastructure is critical to social functioning with direct impact on social wellbeing, earnings, education and health. When infrastructure is inaccessible to any social group, that group is at risk of social exclusion, unable to participate in and contribute to society” (Agarwal and Steele, 2016, p. iv).

Infrastructure programmes should also consider possible unintended side effects of non-inclusive design or delivery on social groups impacted by infrastructure projects (for example, through eviction, failure to consider unique or different needs, or non-adoption of inclusive planning approaches). For example, Barclays (2015) point out that the construction of large infrastructure projects such as dams, ports, and harbours may entail the displacement and resettlement of communities and potentially the loss of sources of livelihood. “Economic displacement, resettlement and relocation can result in significant upheaval of a community and even breakdown of traditional social structures and cultures” (Barclays, 2015). The Asian Development Bank has cautioned that “there are instances where transport investments have failed to provide benefits for the poor, despite aggregate gains in productivity and income. At its worst, transport infrastructure appears to have exacerbated existing inequities as well as given rise to a number of negative externalities” (Setboonsarng, 2005, p.2). Experience from the housing sector in Rwanda (see box below) illustrates how insensitive approaches to infrastructure change may negatively impact vulnerable people who should have gained the most benefit from a bottom-up approach to decisions affecting their lives. A project aiming to move people into villages and replace thatched roofs with corrugated iron roofs to improve housing conditions left some rural dwellers in a worse situation because of a top-down and forceful approach that did not allow for dissent and undermined the positive effects of this infrastructure change.

Rural Rwandan roofs: an example of ineffective participatory planning

The gleam of new corrugated iron sheets shimmers through the blue-green haze that veils Rwanda's rural valleys and hillsides. It is a visible sign of Rwanda's metamorphosis from a nation devastated by genocide seventeen years ago to the fastest modernising state on the continent. But are the shiny roofs the jewels on Africa's emerging bride, or the bling worn by a bully?

Most of the new houses are the result of a hugely ambitious plan to bring rural families, at present scattered across the countryside, together into villages called *imidugudu*, enabling the government to more easily provide electricity, water, schooling and security. But it is a smaller programme, the replacement of grass-thatched houses with more modern structures, which caught the attention of aid agencies when complaints emerged last year that the homes of the minority Batwa, former pygmy forest dwellers, were being destroyed by the government. The issue is complex, encapsulating many of the tensions haunting Rwanda as well as the strides it is making towards prosperity. Apart from ubiquitous building activity, the extent of Rwanda's housing progress is most evident in the north-western town of Rubavu, formerly Gisenyi, on the border between Rwanda and the Democratic Republic of the Congo. On the Rwandan side solid concrete and stone houses – many newly built or under construction – contrast with the squalid shacks of Goma, the sprawling, chaotic town some 200 metres away on the Congo side of the border...

Up until 2010, the poorest of the poor lived in grass-thatched mud-brick or wattle-and-daub huts known as *nyakatsi*. The last of these are being eradicated by the government campaign called Bye-Bye Nyakatsi with an efficiency for which Rwanda is increasingly becoming known.

The statistics roll off the tongues of the proud technocrats driving Rwanda's grand development plan, Vision 2020. James Musoni, the minister of local government whose department is in charge of the anti-thatch programme, says when Bye-Bye Nyakatsi was launched in December 2009, Rwanda had 120 000 families living in grass-thatched houses. "As of end last month, we are remaining with 18 000 families still in those houses... in the next three or four months we should be done with that exercise," he says. Kigali had 1,559 grass-thatched houses before the Bye-Bye Nyakatsi campaign started, says mayor Fidele Ndayisaba. So far, 1,093 houses have been built to replace them. By the end of April, the remaining families living in *nyakatsi* will be able to move into new houses.

Officials and politicians are somewhat less clear about the reasons for the removal of thatched roofs and their replacement with metal sheets if a family cannot be moved immediately into a "modern" house. Some mention the fire hazard, especially with mass electrification taking place in Rwanda, others point to the dangers of snakes and insects living in the roof, and the fact that maintaining a grass-thatch roof in rainy Rwanda drains the little resources available to those who live under these leaky canopies.

Generally, Rwandan policy makers seem to conflate the idea of living under thatch and the poverty of those who do. Replacing the thatch with metal sheets is therefore seen as an important step in upgrading their living conditions. As for the disadvantage of corrugated iron roofs – its lack of insulation – officials point out that rain is much more of a problem than temperature, which rarely leaves the range of between 15 and 25 degrees Celsius.

There is an argument that some government decisions are taken more for the sake of boosting the image of Rwanda as a modern society than in the interest of its people. A retired politician who spoke on condition of anonymity for fear of being branded unpatriotic, points to a recent decision to ban bicycle taxis from the streets of Kigali, leaving hundreds of young men out of work. This, he says, was done merely to improve the image of Kigali.

The permanent secretary of finance, Kampeta Sayinzoga, counters by arguing that the decision was taken to bring down an unacceptably high number of accidents involving the bicycles.

It is highly probable that the Bye-Bye Nyakatsi programme was conceived as a genuine and necessary step to raise the poorest Rwandans out of indigence. It forms part of a comprehensive approach which includes a one-cow-per-family programme, the subsidising of fertiliser and seeds, indigent grants and educational support.

But the issue of show over substance at the level of elected district leaders seems to have caused the problems of the Bye-Bye Nyakatsi programme. Ildephonse Niyomugabo of Coporwa, a Kigali-based organisation advocating the rights of the Batwa, says the *nyakatsi* dwellers welcome the replacement of the thatch with metal sheets, and would gladly move from their *imidugudu* into modern houses. The problem is that the authorities removed the grass roofs – and in some cases destroyed entire homes – of 720 Batwa families without first providing alternative accommodation or iron sheets to replace the thatch. "It was catastrophic," says Niyomugabo. To date, about 100 families have been able to move into new homes. The rest are housed in dreadful temporary conditions while their houses are being constructed – sometimes six families in one house without windows or doors. Such overcrowding worsens the already bad health conditions of the Batwa, who suffer from high HIV infection rates and cholera, he says.

Source: *Ipsnews* 2011

With sufficient knowledge, planning and management, such as through mechanisms like social impact assessments or audits, it may be possible to mitigate disruptive effects and deliver inclusive benefits (Barclays 2015). However, while the literature recognises that inclusive infrastructure is important, much of the literature tends to be qualitative and descriptive rather than providing practical tools and approaches for embedding inclusivity into infrastructure projects.

It is also challenging to take into account all of the links in the chain of infrastructure provision. For example, in the energy sector, there has been attention on empowering women as energy users, but gender and social inclusion in energy infrastructure development have been 'little explored' (World Bank 2011, cited in Orlando et al, 2018, p. 1). In the transport sector, the 'travel chain' includes all phases of a journey from starting point to destination, including pedestrian access, vehicles, and transfer points, and if any link is inaccessible, the entire trip becomes difficult (Maynard 2009, in Agarwal and Steele 2016, p. 3).

3. Sectoral perspectives for inclusive development

Transport

Transport infrastructure has often been designed in ways that have not taken the needs of the poorest into account. Twenty years ago, "it was assumed that investments in urban and rural roads stimulated economic growth and development" and that the resulting benefits would accrue to everyone, but "recent research has shown that transport investments tend to benefit the 'non-poor' most, and that investments must be consciously designed to avoid further impoverishing poor people" (Starkey and Hine, 2014, p.4). Although "rural road building can directly benefit poor communities, urban transport interventions... are often designed to reduce urban congestion due to increasing car use, and can disproportionately benefit wealthier sections of the population unless properly designed" (p.7). In Ahmedabad and Mexico City, for example, bus rapid transit systems displaced street vendors and failed to increase ridership levels as a result of a failure to service low income areas and inappropriate pricing structures (Paget-Seekins and Muñoz, 2014).

Yet, despite increased awareness of the importance of pro-poor and socially inclusive investments and projects, there has not been a mainstreaming of 'pro-poor social measurements into conventional rural road assessments. This is partly because of the problems of identifying and accurately measuring consistent and robust statistics, and the considerable differences in perceptions and weightings given by local communities and by district and national authorities (Odoki et al, 2008)' (Starkey and Hine, 2014, p.20). The authors go on to cite evidence from many sources showing that:

Measurements of social benefits of roads tend to emphasise the benefits accruing to the better off rural people and omit benefits that favour the poor (van de Walle, 2000 and 2002). Modelling techniques to reduce bias when correlating road access and poverty have been discussed by Khandker, Bakht and Koolwal (2009), Gachassin, Najman and Raballand (2010) and Mu and van de Walle (2011). Bell (2012b) has proposed a model for estimating the social benefits of roads in terms of goods, health and education. The Asian Development Bank has been developing a project-based Sustainable Transport Appraisal Rating (STAR) multi-dimensional measurement tool that includes economic, poverty and social, environmental and sustainability risk criteria (Véron- Okamoto and

Sakamoto, 2014). This tool should be useful for appraisal, monitoring and evaluations and may assist in standardising approaches to measuring the impacts of transport on poverty. Researchers working with the International Forum for Rural Transport and Development (IFRTD) have been investigating ways of measuring rural transport services, with the aim of developing standard indicators that assess the access provided by transport services from the points of view of the users, the operators, the regulator and development personnel (Starkey et al, 2013a).

Measuring the impact of roads on poverty is clearly a retrospective exercise, albeit one that can be used to predict future impacts of investment decisions. As there is some discussion on the desirability of connecting all villages (Raballand et al, 2010), localised, participatory planning may allow local communities to determine their own priorities. Integrated rural accessibility planning (IRAP) has been developed as a tool for this (Dingen, 2000; Lema, 2007). It is likely that most rural communities would like to be connected to the national road network by a 'black-top', all-weather road. However, given limited investment resources, villagers may have other priorities. The poorest people may be more concerned about within-village tasks, such as collecting water and fuel. Investments in health and education facilities, electricity and agricultural irrigation may be of higher immediate concern than roads (although the influence of rural roads in achieving these benefits has been demonstrated in the literature). The more influential and vocal villagers may well be those who would benefit most from rural roads (eg, village leaders, storekeepers, teachers, health workers and agribusinesses). An example of gender-sensitive, participatory approach in Timor Leste was described by Gajewski, Ihara and Tornieri (2007). (Starkey and Hine, 2014, p.21)

Often the people for whom investment will be most beneficial are the highly mobile residents with car access, while the poor may experience major negative impacts on their lives:

Urban transport interventions are overwhelmingly designed to address the problems of urban congestion and the rapid increase in urban car populations. In this case the main beneficiaries are not the urban poor but are much more likely to be the rich and middle income sections of the population. The poor may benefit from the changes, although often the reverse is the case, particularly with new road building, severance and resettlement. (Starkey and Hine, 2014, p. 29)

During research in deprived neighbourhoods in Bristol, Rajé et al (2004) found that one of the major impacts on socially excluded groups of turning a local road into a dual carriageway to facilitate through traffic was that local residents found themselves cut off from their friends and family who had been readily accessible previously. The infrastructure improvement caused community severance and deepened the social exclusion people were already experiencing. Starkey and Hine (2014) describe similar impacts in a developing world context. "High volume roads can create major problems of community severance. They can be extremely difficult, and dangerous, for pedestrians to cross. The Nairobi-Thika highway, with six express lanes and four service lanes" was planned with footbridges but the "the highway was in operation before most of these were in place. The lack of convenient crossing led to many accidents and deaths, and major severance problems for the local residents located along the road." (Starkey and Hine, 2014, p.33)

Starkey and Hine indicate that lack of consultation and consideration being given to the poor when major redevelopments are taking place (particularly in slum areas) has been recognised by

many authors and provide examples, from Klopp (2012), Barter (2012) and Kumar (2005), to illustrate the concerns:

One of the current highway mega-projects in Kenya—the Thika Highway Improvement Project—failed to alter its design to accommodate or plan for the traders of Githurai market, one of the largest regional markets in the Nairobi area. This is the case even though the designs are being constantly updated (although not made easily available for the public). The road construction went ahead, destroying the market without a proper plan to relocate the businesses. Women traders, who had relied on the urban space for survival, continued to try and sell wares alongside the roadside; cars eventually hit and killed some of them, starkly revealing how the uneven struggle for urban space is intertwined with transportation decisions made at a distant bureaucratic level.

In Parliament the local MP for the Githurai area asked whether the Minister of Roads was, “aware that the expansion of the Nairobi-Thika road will encroach on the entire Githurai market, thus putting at stake the livelihoods of more than 3,000 small-scale business people with attendant costs that will impact on their families?” The Assistant Minister responded that his “Ministry is not responsible for securing alternative land for use by the traders” (Hansard, Tuesday 24th November 2009). This is emblematic of the way that the interests and concerns of small businesses and the livelihoods of the many poor they employ and the farmers they support are secondary objectives to roads that serve other interests.” (Klopp, 2012).

Urban transport planning in this region tends to follow a “predict and build” approach, attempting to build enough infrastructure to cope with the demand, with hardly any effort so far to manage demand for transport. Transport planning and decision making tend to be conducted as a technocratic process with little or no public participation. In many cases, minimal information is released to the public until shortly before construction begins.” (Barter, 2012).

The urban transport ‘technocratic’ planning process involves undertaking surveys and collecting data on travel patterns. To this extent, data are collected from different groups in society, including poor people. There may be some attempt to understand the main characteristics of the travel patterns of different groups. However, as seen in the Nairobi example, what is often lacking is a comprehensive dialogue with different groups on the key urban transport choices, and their implications. A recent study for the development of an urban transport master plan for Dar es Salaam provided an example of stakeholder consultations. Here three stakeholder meetings were held, but on each occasion the meetings (lasting around 3 hours each with 17-35 stakeholders present) largely comprised officials from different organisations and consultants with only a handful of representatives from the local government and local communities (Dar es Salaam, 2008).

Considering inclusion – an example from researchers at UCL

The road upgrading projects of Nyalenda A & B are well known and appreciated in Kisumu. Residents of both neighbourhoods value the fact that roads will reduce the prevalence of waterborne diseases, lower the risk of flooding, and improve access to various essential services, such as emergency response, education, health, and infrastructure services such as sewage and drainage. Authorities at the ward level also mention the fact that roads will improve people's access to homes and businesses, and the links between the two neighbourhoods and with the rest of the city. Additionally, the ward authorities mentioned that roads would make Nyalenda more visible to other residents of Kisumu.

However, residents of Nyalenda A & B also highlight the fact that road upgrading implies the demolition of houses and businesses and an increase in property prices. Such consequences will affect the security of tenure of residents and the livelihoods of shop owners. Moreover, residents state that since the road upgrading will affect their lives, they should be able to influence and participate in the decisions regarding these projects. Thus, overall, communities agree on the importance of upgrading roads but feel left out of the decision-making process. In other words, they want to be more active participants – the central dimension of substantive citizenship.

Even though the idea of open and inclusive spaces for participation is encouraged by most development projects and backed up by legislation at a national level...there is a gap between legislation and practice, indicating poor performance on the implementation dimension of substantive citizenship. According to Article 57 (a) of the 2010 Kenyan Constitution, 'the State shall take measures to ensure the rights of older persons to participate fully in the affairs of society'. Participatory structures that are part of traditional community spaces tend to promote the participation of older men, who tend to have a legal claim to land. Since women have historically been unable to inherit land, they tend to be excluded from participating in any project that affects the land. Similarly, young men and women, who should also have a right to participate, feel left out of traditional spaces like the Baraza (Focus group, May 9th 2015).

Evidently, there are several challenges in place when it comes to participation of people with different identities and assets. It is also evident that the way participation is designed can create problems, as it privileges certain groups' views and inputs more than others, based on their identity and assets. If these challenges are not addressed, social inequalities between tenants and land- lords, young and old, men and women, will make their way into spaces of participation, silencing the voices of some residents and making their experience of citizenship unequal (Holston, 2009, 29).

Source: Frediani and Monson, 2015, pp. 26-27

According to Starkey and Hine (2014, p. 52) approaches to providing a better urban transport environment for the poor include:

- Encourage proper participation of all stakeholders, including the poor, in all matters related to city planning, transport systems, traffic matters and development schemes.
- Plan for compact cities, where all people can move easily and quickly by affordable public transport, cycling and walking.
- Pay much more attention to walkers and cyclists, provide safe pavements free from obstacles.
- Control polluting vehicles and enforce traffic laws and parking restrictions;
- Where schemes demand resettlement, ensure that it is done in fair manner to the residents, whether or not they have formal 'legal' rights. Try to ensure that people are relocated as close as possible to their previous locations and/or new work opportunities.
- Ensure transit schemes provide good access to poor areas.
- Introduce road pricing and area traffic controls.

- Introduce integrated transport services and through ticketing.
- Introduce city transport authorities that have the powers to impose vehicle and property charges and taxes to help pay for integrated transport services.

Research by Hine et al. (2015) on the poverty impacts of rural road networks showed that:

...the expansion of the rural road network has a positive impact on poverty reduction for the rural areas served. The evidence has provided a strong direct relationship between rural transport infrastructure and reducing transport costs and increasing traffic volumes. In addition, there is strong evidence that over the medium to long term, this leads to an increase in employment, income and consumption, and expansion of the agricultural sector. There is evidence to suggest that the health impacts are generally positive, but increased connectivity is also shown to lead to an increase in communicable diseases. With respect to marketing activity, the evidence base presents a mixed conclusion whereby communities closer to the transport improvement benefit but negative impacts are found in distant areas. There is a weak evidence base with regard to educational impacts, with no clear conclusions established.

Analysis has shown that some of the strongest impacts are experienced in countries with low road densities. Some studies indicate that providing feeder roads (basic access roads) provides greater social welfare gains than higher standard gravel or paved roads.

Along with the development of knowledge related to practical interventions for inclusion, there has also been research to advance approaches to vulnerability assessment, adaptation planning and implementation actions associated with rural access provision for vulnerable local communities in rural areas. Burrow (2014) combines three models in order to develop a first order means for assessing the vulnerability of local communities in relation to rural access provision, prioritising the associated risks and how this may be influenced by climate change. The first model is associated with identifying and quantifying geophysical exposure of rural communities associated with loss of rural access provision, the second considers the responses of the communities, or their sensitivity to the exposure, whilst the third considers the resilience of the community.

The World Bank's Third Rural Transport Project in Vietnam demonstrated successful inclusion of ethnic minority women working on road maintenance projects (World Bank 2012):

A total of 1,533 ethnic minority women have been trained as rural transportation managers; many more eagerly await the opportunity. The project contributed to women achieving a greater voice in community decision-making and a more visible role in managing affairs at the household level, arising from increased economic power and social status. Road maintenance is also now more efficiently managed because local people have clear incentives to promote quality, limit corruption and directly benefit communities.

Water

Access to safe water and sanitation can help open opportunities for education, employment and improved health. Yet, one in nine people lack access to safe water and one in three people lack access to a toilet, and a greater number of people have a mobile phone than a toilet (Water.org, 2018). While three-quarters of the countries reporting to the UN-Water Global Analysis and

Assessment of Sanitation and Drinking-Water in 2017 indicated that they had specific measures to reach poor populations in their WASH policies and plans, implementation is lagging, with monitoring taking place in only half of these countries, and targeted financial implementation mechanisms existing in only one-fifth of the countries (WHO 2017, p. 41). Delivery of water and sanitation services in rural areas (which tend to be poorer) is problematic and can lead to geographic and socio-economic exclusion.

A lack of water impacts everyone, but women are disproportionately affected due to their responsibility for fetching water and maintaining healthy environments for children. Therefore, attention to their views and needs plays an important role in any water infrastructure project (Schechtman, 2013). However, efforts to involve women in water infrastructure development have not necessarily led to inclusivity. Manase et al (2003, p.967), in their research on mainstreaming gender in integrated water resources management in Zimbabwe, summarise the difficulties they uncovered as follows:

Zimbabwe embarked on a water sector reform programme in 1995. Two goals of the water reform were to broaden women's access to water and to enhance their participation in water management. However, it was found that although the government of Zimbabwe made considerable progress in mainstreaming gender at the ministerial level, departments which are involved in the actual implementation of water programmes do not have clear gender policies. Therefore although gender equity was one of the main goals of the water reform, most poor women and men were not involved in the consultations. Consequently neither the new Water Act nor the Zimbabwe National Water Authority (ZINWA) Act addresses gender in explicit terms. Strategic gender needs are not addressed at all. It is recommended that all institutions in the water sector, including NGOs, should have clear gender policies, include a gender perspective in their organisation culture and practices and address strategic gender needs through training, education and supporting productive use of water.

An innovative electronic payment system for water service in Tanzania has been shown to be very helpful in extending access to all. Wateraid (2018) reports significant investment in creating new water infrastructure over 15 years in Tanzania, but community water schemes were often operated by vendors who were only available for a limited number of hours a day, which limited users' access and resulted in long queues at water points. An eWATERpay system using tokens was introduced and has been life changing for people in the affected areas. Prior to the introduction of the system the revenue collected over a three-month period was 1,125,425 Tshs. In the three months following the installation of eWATERpay, revenue more than doubled to 2,383,304 Tshs. In one village (Gidewar) the average time spent collecting water was reduced from three hours to just ten minutes, and revenue collection more than tripled from 425,250 Tshs to 1,427,786 Tshs, which enabled the community-owned water supply organisation to operate, maintain and extend the water network (WaterAid, 2018)

Another example of positive participatory approaches to water infrastructure comes from a project at a rural school in Papua New Guinea (PNG) which provided students with adequate access to toilets and clean water for hand-washing and drinking via inclusive planning involving students, staff and parents. As well as new infrastructure, the project provided the school girls with information session on menstruation management – a taboo topic in PNG that often leads to misinformation and shame (Footprintsnetwork, 2018).

Electricity

A lack of electricity affects the most vulnerable in society, and impacts on factors such as economic growth and human well-being. The International Energy Agency (IEA) argues that a lack of electricity traps poor families in poverty and that modern energy services are crucial to human well-being and to a country's economic development. Globally, 1.2 billion people are without access to electricity and more than 2.7 billion people are without clean cooking facilities. More than 95% of these people are in sub-Saharan African or developing Asia, and around 80% are in rural areas, where provision of services over distances can be challenging and expensive, so there is a risk of geographic and poverty exclusion.

In a report on utilising electricity access for poverty reduction based on research in Kenya and India, Practical Action Consulting (2015) suggest that cost and access to finance for electricity itself and the infrastructure needed to use it productively are strongly identified as factors driving or preventing its take up and use. Barriers to local economic benefit included low skills levels and capacity to operate and maintain electrical machinery. It was also suggested that a lack of knowledge of the benefits and possible productive uses of electricity acted as a hindrance to wider adoption (Practical Action Consulting, 2015, p.3).

A recent report by Orlando et al (2018) highlights the importance of inclusive electricity infrastructure:

At each stage of electricity infrastructure development, investments can directly and indirectly affect communities living in or near the area where the infrastructure is built. To date, few robust studies have attempted to evaluate these socioeconomic impacts, particularly those that are gender- differentiated. Without lessons from rigorous analyses to inform projects, one might expect, based on anecdotal evidence, that women in contexts where gender inequalities persist will benefit less from the new opportunities brought about by the project and suffer disproportionately from any adverse effects. (Orlando et al, 2018, p.6)

Failure to address potentially adverse social and gendered impacts of upstream infrastructure development early on in the project cycle is a missed opportunity that slows progress toward achieving desirable project outcomes and development impacts. For example, large-scale hydropower projects with irrigation schemes that fail to recognize women as farmers and water users in their own right may put women at risk of losing access to their land and even the products of their own labor (IFAD 2007). Conversely, well-planned hydropower projects with irrigation schemes that invest in women farmers can have a positive multiplier effect via both electrification and water resources, increasing women's income and agricultural output (Orlando et al, 2018, p.6).

A useful hierarchy for considering gender entry points in electricity infrastructure projects is as follows: (i) do no harm, (ii) achieve the project objective, and (iii) seek opportunities to improve gender equity. To do no harm, project teams need to ensure the design will not lead to negative unintended gender impacts resulting from the energy project. For example, building ancillary access roads, which may improve women's access to health centres and markets, might also increase safety risks related to prostitution and sexually transmitted diseases (STDs). For transmission line projects, having a cleared and maintained right-of-way is advantageous if it improves women's access/travel options through dense forests and provides grazing options for their

animals. Including both women and men in the consultation process can help to identify potential negative impacts in order to mitigate or avoid them altogether. Teams also need to ensure that the project's design incorporates gender-specific elements necessary to achieve the overall development objective. Initiatives that focus on resettlement, livelihood restoration, and improved electricity access can target women through various credit schemes and longer-term employment opportunities at all levels of the plant—from cleaning staff to administrative and technical maintenance work. Finally, teams can incorporate design features that capitalize on opportunities to reduce gender disparities and improve overall development outcomes; these might include creating dual-title land deeds or including targets and quotas for women in new job markets (ESMAP 2013). Because gender is a cross-cutting theme, the potential positive and negative aspects should be considered throughout the project cycle in order to improve gender outcomes and maximize project benefits (Orlando et al, 2018, p.7).

Examples of electricity projects in Nepal, Morocco, and Senegal

In Nepal, the 144 MW Kali Gandaki “A” (KGA) Hydropower Project was completed in 2002.... The 40 km² area affected by the project spans four districts in western Nepal. The project resettled 18 indigenous minority families, each of whom received about US\$250 (25,000 Nepalese Rupees) in compensation for both land and house. After project completion, the resettled families were provided new modern houses to live in. The KGA Hydropower Project is operated by the Nepal Electricity Authority (NEA), the country's public entity responsible for power supply.

The NEA has a staff of 8,000, only 600 (7.5 percent) of whom are women. A strong national policy and legal framework for gender equality and social inclusion has been put in place; however, a review of energy policies and national mandates shows that this national framework has yet to be reflected in energy sector policies. At the operational level, the gendered impacts of hydropower and other large infrastructure projects are still little understood.

In Morocco, the 500 MW Noor-Quarzazate Concentrated Solar Power (CSP) plant is the first project of the Moroccan Solar Plan (MoSP) aimed at developing integrated solar development projects to ensure energy security while fostering socioeconomic development, long-term growth, and job creation. The Noor solar complex is located in Ghassate, a sparsely populated rural commune at the edge of the Sahara Desert. The region is highly vulnerable to environmental pressures and suffers from an overall economic decline. Noor 1, the construction phase of the project, was constructed on 3,043 ha of communal land belonging to the community of Ait Ougrour Toundout with no settlements. Compensation was provided in the form of infrastructure investments to benefit the local population. Construction work started in August 2013. Direct, plant-related employment peaked in October 2014 at 1,917 employees, subsequently declining as the construction phase came to an end. The plant was set to begin generating electricity in 2016. The recruitment policy of Noor 1 aimed to maximize the number of local workers. Training aiming to boost both direct and indirect employment for a range of occupations was offered to the local population and local job seekers. However, local employment fell short of the project recruitment goals, and only a small share of local women benefited from direct employment in the CSP plant owing to a lack of technical qualifications.

In central Senegal, SENELEC, the national utility, has recently completed the construction of medium-voltage distribution lines under the Electricity Sector Support Project (ESSP) (component 1), connecting selected towns and cities in remote regions with the grid network. The upgraded transmission and distribution network means that communities can switch from expensive diesel-run generation sets. The modernized network will also reduce the utility's technical and commercial losses. Since grid electricity arrived in the city of **Koumpentoum** (Tambacounda region) and the rural community of **Nganda** (Kaffrine region), connection requests have soared. Despite delays due to a lack of last-mile infrastructure and related funding, as well as safety concerns, local people have welcomed the arrival of a more reliable power supply.

Source: Orlando et al., 2018

4. Tools and approaches

Life cycle analysis

Schweikert et al. (2014) suggest that an up-front life cycle approach can enable more holistic planning: “The engineering project organizations field recognizes the need for sustainable infrastructure to consider whole project life-cycle up front, a holistic recognition of wider impacts, and the importance of creating value for stakeholders (Chi et al 2013; Feng et al 2013; Fellows 2014). The up-front approach to planning, including life-cycle costing and planning considerations can substantially reduce lifetime costs of operations and maintenance and maximize the asset performance (Feng et al 2013).”

The Barclays (2015) method for helping to consider and control social risks in infrastructure development is to carry out a risk-based life cycle assessment which identifies for each life cycle phase of an infrastructure project (i.e. construction, operation, decommissioning and closure), associated risks and possible mitigations. The approach is summarised below:

<i>Life Cycle Phase and Activity</i>	<i>Risks</i>	<i>Controls</i>
Construction	<ul style="list-style-type: none"> • Land acquisition • Land acquisition – displacement and relocation • Loss of livelihoods – economic displacement • Disruption of social / community cohesion and exclusion of vulnerable Communicable diseases • Employee health and safety • Public nuisance • Community health and safety • Stakeholder / public consultation and disclosure • Cultural and archaeological heritage • Host country governance, human rights violations and revenue transparency • Site security 	<ul style="list-style-type: none"> • Minimize facility footprint • Resettlement and relocation management • Community/stakeholder relations management • Human resource policies • Social / community baseline assessment • Community health and safety plans • Supply chain sustainability • Cultural / archaeological heritage plans • Community development and investment • Employee health and safety • Appropriate training of Security Personnel
Operation	<ul style="list-style-type: none"> • Communicable diseases • Disruption of social / community cohesion and exclusion of vulnerable groups • Employee health and safety • Host country governance, national economy and revenue transparency • Strain on infrastructure and public nuisance • Site Security 	<ul style="list-style-type: none"> • Community health and safety plans • Human resource policies • Employee health and safety • Supply chain sustainability • Community/stakeholder relations management • Partnering with and supporting host governments • Community development and investment • Employee health and safety

		<ul style="list-style-type: none"> • Appropriate training of Security Personnel
Decommissioning and closure	<ul style="list-style-type: none"> • Host country governance, national economy and revenue transparency 	<ul style="list-style-type: none"> • Community sustainable development planning

Source: Barclays, 2015, table 8.2

Participatory planning processes

Starkey and Hine (2014, p.4) describe an example from Mumbai, India that shows how the poor can engage with the planning and resettlement process.

Since the 1980s, organisations such as Society for Promotion of Area Resource Centres (SPARC) have been working towards ensuring some security of tenure and the importance of recognising the urban poor as partners in tenure and making shelter improvements at global, regional, national and local levels. This initiative saw some success in 1997-98, when organised groups of slum dwellers were able with SPARC to reach an agreement with the Railroad Transport Authority and municipal authorities to relocate and resettle several thousand households living in slum settlements located alongside railway tracks in Mumbai (as part of the Mumbai Urban Transport Project). SPARC and the National Slum Dwellers Federation helped slum dwellers to organise and form cooperative housing societies. Both the MUTP and Mumbai Urban Infrastructure Project (MUIP) together accounted for the resettlement of 50,000 to 60,000 slum families. The key lesson that emerged was the importance for low-income households and their communities of being organised and of the necessity of their being able to engage in every step of the resettlement process from formulating relocation plans and determining the actual logistics of the move. The railway resettlement programme set several benchmarks – community organisations were ceded some of the powers traditionally enjoyed by government agencies in resettlement schemes, including the power to determine the eligibility of families and second, allocation of housing units in the resettlement area. It also stressed the importance of women-centred ('Mahila Milan' or women together) community participation, not merely on grounds of gender equity but also "on the demonstration of their skills as household and community managers" (Kumar, 2005).

There are other pertinent examples of participatory planning such as the Slum Networking Project (SNP) in India. It was described as an example of strong and substantial partnership among various stakeholders of civil society who engaged themselves in providing better physical quality of life to poor fellow citizens. It was also an excellent example of how, when a government body is willing to enter into strong and meaningful partnerships, many elements of good governance such as equity, transparency and accountability can be brought to the planning process (World Habitat, 1997). It has since been abandoned, despite significant successes, in favour of top down urban development initiatives.

Data collection: understanding excluded populations

Starkey and Hine (2014) found that inclusive frameworks for collecting data and engaging in participatory planning have been developed by Fouracre, Sohail and Cavill (2006) and by Sohail, Mitlin and Maunder (2003) to enhance urban transport planning and improve access to, and

quality of, public transport services. Compared with traditional urban transport planning approaches it is suggested that more information should be collected on ((Starkey and Hine, 2014, pp.38-39):

- Transport patterns (trip rates and purposes, distances, the roles of public transport for social and recreational purposes, and the correlation between fares, transport expenditures and household income)
- Travel needs and problems; service availability, affordability, quality of services etc.
- Livelihood opportunities; how do the poor respond to the changing conditions of livelihood and how does the transport market adjust?
- Identifying the urban poor; the heterogeneity of low-income groups, participatory poverty analysis, poverty impact indicators to measure poverty reduction, travel time and costs.
- Level of services in communities; do other interventions such as health and schools, precipitate the generation of new travel routes?
- Activities of the urban poor; livelihoods activities, productive, personal investment activities, i.e., health care/education, investment in social networks and leisure activities. The methods of enquiry should start with a stakeholder analysis including the community in general but also the poor, disabled, women and other disadvantaged groups, operators (including drivers, owners, etc), and regulators and administrators of roads and public transport. This would be followed by:
 - Key informant interviews
 - Participatory work involving focus groups
 - Transport surveys
 - Household surveys
 - Detailed activity analysis at the household level to help understand what the transport system constraints are on household activities and how these constraints affect livelihoods.

Social equity audits

The use of Social Equity Audits (SEA) has been suggested to build the concept of leave no one behind into infrastructure development: (UN Habitat, 2015):

SEA is a value-based approach, looking at development through the lens of the most vulnerable, the most powerless and the most helpless and to enquire if the development effort is really reaching them. The inclusion of these 'excluded' people in development, and eradication of discrimination against them, is central to equity concerns. This would mean empowering the vulnerable and changing power relations.

It is a process that is organisation-friendly and transparent, but not a fault-finding or policing exercise. SEA will not condone any gaps found, nor does it condemn any lapse. It is a rigorous process that is professional and supportive at the same time, based on mutual respect, an openness to learn, and an understanding of the difficult field circumstances.

The SEA process would be participatory. It would be facilitative and not extractive. All those who have a significant stake in service delivery will be actively involved throughout the audit, from the initial stages of design to implementing community-led solutions.

It is a proactive tool to understand and address structural, organisational and strategic constraints and bottlenecks that prevent or limit marginalised and vulnerable communities from equitable participation and benefit sharing in development programmes (National Centre for Advocacy Studies, 2007; p. 9).

In framing the process of systematizing best practice in post-conflict reconstruction, governments should adopt a people-centered approach, which is non-exclusive, and insures an integrated planning process.

Sustainability during post-conflict and imminent development must be secured through proactive, coordinated and participatory urban planning and design based on sound urban governance and the rule of law. Leaders should facilitate planning to focus both on the urgent needs while upholding the long term strategic principles e.g. the delineation of adequate public space and protection of ecological vulnerable land areas needs to be considered.

Universal design

The principle of universal design is that products and environments should be usable by all people, to the greatest extent possible, without the need for special adaptations (Center for Universal Design 1997). Universal design recognises that infrastructure designed from the beginning to be accessible can serve a wide range of people more effectively, including for example people with reduced mobility due to age or disability, families with children, persons carrying heavy loads, people with communication difficulties (including different linguistic and ethnic groups, and people who cannot read), and more (Agarwal & Chakravarti, 2014, in Agarwal and Steele 2016; WHO 2011).

Universal design is in many cases ‘practical and affordable, even in developing countries’ (WHO 2011, p. 178). It is being widely adopted in bus and rail transit, through features like low-floor buses combined with appropriately designed curbs and ramps. For example, accessible bus rapid transit systems have been constructed in Curitiba (Brazil); Bogota (Colombia); Quito (Ecuador); Ahmedabad, New Delhi, Pune, Indore, and Jaipur (India); and Dar es Salaam (Tanzania) (Agarwal and Steele 2016, p. 9). Examples of universal design in water and sanitation include a seating platform provided next to a hand pump to provide an opportunity for rest and help small children reach the pump; ramped access and a concrete apron at the pump post to help wheelchair users and make it possible to use large, wheeled water containers; and installing a bench over a pit latrine to make it easier to use (WHO 2011, p. 178).

Other resources

Considering disability in infrastructure programmes

<http://www.evidenceondemand.info/Core/DownloadDoc.aspx?documentID=1010&contentID=5115>

This literature review was undertaken in 2016 to provide DFID infrastructure advisors with a reference document that identifies and summarises evidence and recommendations on how to incorporate disability considerations into all aspects of infrastructure projects.

Enabling Inclusive Cities: Tool Kit for Inclusive Urban Development

<https://www.adb.org/sites/default/files/institutionaldocument/223096/enabling-inclusive-cities.pdf>

This toolkit from the Asian Development Bank supports inclusive urban infrastructure development, encompassing sustainable, resilient, accessible, and affordable solutions to the enhancing access to urban services and infrastructure. An integrated approach brings together all institutions and stakeholders including urban poor communities, slum networks, and nongovernment organizations in conjunction with the city government and the private sector.

Inclusive Urban Infrastructure Investments: a Guide for Municipalities

https://cdia.asia/wp-content/uploads/2016/09/Inclusive-Urban-Infrastructure-Investments_A-Guide-for-Municipalities.pdf

This guide aims to help local government officials support programming and design of urban infrastructure projects in medium-sized cities. It argues that inclusive infrastructure development helps reduce poverty and improve economic growth and competitiveness. It presents an approach to pro-poor infrastructure project design that is participatory and evidence-driven.

Planning for sustainable and inclusive cities in the Global South

<http://www.evidenceondemand.info/Core/DownloadDoc.aspx?documentID=898&contentID=4530>

This guide explores the poverty and environmental challenges facing cities of the global South. It argues that urban planning has the potential to bridge urban divides, if interventions are locally-appropriate and pro-poor, and if local governance is equitable and transparent.

Toolkit on disability for Africa: Disability-inclusive development

<http://www.un.org/esa/socdev/documents/disability/Toolkit/Disability-inclusive-development.pdf>

This learning module from the UN Division for Social Policy and Development outlines links between poverty, exclusion and disability; explains the importance of planning for inclusive development, including the relevant legal basis; and suggests general strategies for mainstreaming disability in development. It addresses development issues in general, however, and does not include advice specifically addressed at infrastructure sectors.

Taking a Community Approach to Development

<https://ida.worldbank.org/results/abcs/taking-community-approach-development>

This report shares experiences from 17 World Bank projects implementing Community-Driven Development, an approach to local development that gives control over planning decisions and investment resources to community groups. Most of the projects showed positive results attributed to better targeting of aid, more participatory and inclusive service delivery, local ownership and leadership, building community capacity, greater transparency, and flexible design and implementation.

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Key websites

- Sustainable development goals: <https://sustainabledevelopment.un.org/>
- International Energy Agency: <http://www.iea.org/topics/energy-poverty/>
- UN Habitat: <https://unhabitat.org/africas-urban-infrastructure-must-be-people-centered-says-kacyira/>

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