



**MEETING THE CHALLENGES**  
Interdisciplinary research for global development



**DSA-ESRC Workshop series 2018-19**

**Frontiers in Urban Infrastructure Research and Action**  
Convened by Diana Mitlin and Seth Schindler

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***Summary Report, Sarah C. White, 27 March 2019***

'How can we plan for the bottom 40%?' was the key question addressed in this workshop on urban infrastructure, focusing in particular on water management, transportation and energy. Of 37 participants, 9 were based in the Global South, with the others working mainly at the Universities of Sheffield and Manchester. There was a tremendous volume of experience in the room, drawing on diverse disciplines from natural science to engineering and hydrology; architecture, design and urban planning; geography, development studies and politics. Cross-cutting these disciplinary differences were the diverse ways in which people engaged in practice: as social entrepreneurs, as public intellectuals, as civil servants, as planners, as designers. This report summarises some of the discussion, posing the following questions: How can people who live in poverty come to the centre of the planning process? What kind of planning works for people in poverty? What are the strengths and tensions of inter- and trans-disciplinary research? Who are, and should be, the key actors in urban infrastructure development? The value of the workshop is indicated by its outcomes: one successful research bid already, and another larger bid in the pipeline!

**1. *How can people who live in poverty come to the centre of the planning process?***

For some, this question immediately propelled us into a trans-disciplinary space, because disciplines and professions were seen as inherently anti-poor. In science and technology, the drive to innovation tends to lead to more expense and complexity, rather than to something cheaper and simpler. Cultures of management can emphasise rules and regulations which inhibit social innovation, as well as other forms of creative work. Corporations have big interests in big visions, such as the 'smart city', which is also beloved of politicians. Similarly, the way cities look is very significant to planners, and they are motivated by status, matching prestige against the achievements of other cities, rather than designing with local needs – and constraints - front and centre.

***'Affordability is key'***

The question of affordability was raised by Diana Mitlin in her opening talk, and recurred throughout the day. As illustration, Diana described an informal settlement in Kampala, where each use of the toilet costs 5¢. This sums to US\$30 for a family of 4 over a month, out of an average income of \$48. But such calculations are rarely made by planners. The question of affordability is frequently overlooked. And people may themselves not know how much they are consuming. More positively, however, when affordability is put central, it can spark imaginative thinking, leaping the bounds set by the disciplines, when the standard approach will simply cost too much. This is discussed further in the section on planning below.

There can also be trade-offs between affordability and sustainability. For example, in engineering systems it makes most sense to re-use waste water locally. And for sustainability you would want to encourage circularity. But the question can arise, do you still continue to re-use water even if it costs twice what it would to pipe in?

Affordability is key to the approach of a social entrepreneur based in Nairobi: 'Understand how people live and build your products and services around that.' He also pointed out that historically the focus is on capital expenditures and not operating expenditure, whereas day to day operational costs can be the critical factor.

But affordability may only be one part of the picture. A Latin American professor of design argued for a larger vision: to maximise value at the local level following a 'distributed economy' approach. This looks to create networks between local producers, service providers and consumers, keeping as much value as possible within the local economy, and generating numerous multiplier effects. So people's needs for furniture, for example, may be met either through products shipped in from outside, or by local carpenters using locally sourced materials. Key to such an approach is also the recognition of local knowledge as an economic asset, which may help both in reducing costs, and in increasing value creation. This perspective thus shifts attention onto *how* needs may be met, with a focus on the local economy as a whole, with local people involved actively in the supply chain, not simply as recipients or consumers.

This local and holistic orientation echoes the idea of 'complete streets' in transport design, which considers how streets work safely for all their different users and across all different features. This is clearly an approach that lends itself to interdisciplinary working.

### *Time and Empathy*

The same professor described how, when he goes to a new community, they take a week to understand each other. This is a fuzzy stage of flexibility and ambiguity – time to get to know each other and clarify their goals. He explained that taking time with people is critical if you really want to solve their problems. Otherwise, it may be that the real problem you are seeking to solve is your own.

Empathy is not perhaps what you would expect engineers to emphasise, but it was mentioned repeatedly across the two days, especially by those more closely embedded in contexts of intervention. Some maintained that empathy is also beginning to emerge in engineering scholarship, as interest grows in human-centred design and interdisciplinary working. Others were more sceptical: 'Design does not take place for people or for the environment, but for a particular function, that water should reach a tap.' People talked of the need for humanity and humility. The most radical statement came from a South Asian architect and activist: For significant change to take place, engineers must be taught to love people and the environment, and to act out of that love.

In his view, this love would be reflected in the following principles:

- there should be no ecological damage
- there should be no displacement
- the project should serve the majority
- there should be no damage to tangible or intangible heritage

## 2. What kind of planning works for the poor?

### *Incremental planning*

Incremental planning means being ready to do what you can with the resources that you have now, but in a strategic way, that looks to the longer term future. This applies not just to developing

technical solutions that might not conform with ideal engineering standards, but also getting the political support needed. An example was described from Pakistan, where a low income neighbourhood was able to manage its own sanitation at low cost through an incremental planning approach.

In another example, planning for water supply to large cities needs to happen 10-20 years in advance. It is very difficult to model how people will change their minds over such a period, or the cost and environmental impact. And when there is no crisis, politicians are unwilling to commit funding. So you need to formulate and present your plan, but be ready then to keep it in your pocket. So when the crisis comes you can pull out your plan and say, this won't help much now but it will in 10 years time.

### *Focus on implementation*

Many participants agreed that research needs to extend into implementation, with some arguing that without putting its results into practice the research itself cannot be considered finished. However, since there are relatively few studies of the implementation phase it is rather poorly understood. Implementation of a solution can also take longer than its design. This can make it difficult to get sufficient funding.

One difficulty in implementation is the gap between formal and informal practices. For example, in South Africa they are provided with 50 units of energy per household per month. But there are many backyard-dwellers, where the formal house has an attached shack, where they live off the same line. The threshold limits then get exceeded, and some people don't receive supply.

### *Going to scale/Keeping it local*

There was a tension in discussions about the need to go to scale and the importance of responding to local conditions. A striking example of the need to go to scale was the toilet in Blantyre, Malawi, which was the only one for 3000 households (Diana's keynote). Going to scale can be constrained by the lack of a broader ecosystem of finance and other support. This is a challenge for a social enterprise promoting gas stoves for low income households in Nairobi, for example.

On the other hand, some expressed distrust in large scale solutions that put all power in the hands of a few. Solutions based in the north may not work for technical reasons. For example, if there is intermittent water supply, micro-organisms can breed inside the pipes, so when the flow comes back, they contaminate the water. Scale was also seen as important for transparent pricing.

The example was given of different climactic regions in Pakistan needing distinct irrigation approaches and technologies. Engineers tend to design for clusters of villages. But designing for a single village or even neighbourhood lowers costs, as it involves less pipes and smaller pumps. Local people are given the pump and a two day training and it is then up to them to manage it. They can also extend the system if they wish to. The key issue is to give them responsibility.

Others objected that this approach had failed when people tried to replicate it elsewhere. Again, the issues were not technical but social, relating to differences within communities and their relations with each other.

### *Scarcity*

In her keynote Diana raised the issue of scarcity. There is a perception of water scarcity – is there lack of water or not? Non-supply in pipes is very serious. People wake up in the middle of night to get water, fights break out between women at water pipes, landlords may close toilets when there is no water so tenants can't access them....

An Indian engineer responded with humour: 'In our case it is predicted irregularity. Definitely water will come, but after five days!'

Scarcity is in large part the result of how resources are managed. For example, levelling and canal lining in Pakistan would significantly increase water availability. There may also be simultaneously water scarcity and flooding. An Indian hydrologist explained that aquifers may run one on top of another separated by a clay bed. As the first may be contaminated with arsenic, people sink borewells into the deeper one. The water level of the higher aquifer may be rising including because of sewage, while the lower is going down. If belief that the water level is dropping leads to a diktat for rooftop harvesting, this may recharge the shallow aquifer and lead to flooding while the level of the lower aquifer is still going down. At the same time, the higher aquifer may be getting increasingly contaminated.

In others' view, scarcity is a decision that we make. It is a political decision that water can be carried to a capital city as an industrial hub but that it is not realistic for a rural backwater. Whether we see scarcity or not also depends on the scale that we use. E.g. at India level there is no scarcity, but there are political blockades between states. At Africa level there are a few pockets of absolute water physical scarcity, but it is mainly economic scarcity.

### 3. *What are the strengths and tensions of inter- and trans-disciplinary research?*

Overall there was strong advocacy of the need for multi-, inter-, or trans-disciplinarity. Some saw it as a way to align different agendas, north and south, national and local. For others it meant getting real about the interconnected issues that all problems represent, a way of thinking, rather than a form of collaboration. Many thought it was critical if research were to have practical outcomes.

One approach would be to take people of good will from one location to another – e.g. a person from government into the private sector - leading to a whole host of exchanging. This could help people understand each other and work more efficiently together. Others argued that interdisciplinarity should be built into the education system from the mid-teen years. Some believed that shifting focus onto the practical results of research would itself change academic culture, breaking down disciplinary compartments. The needs of the local context would be the central focus, instead of the development of a particular technology. For practical impact it was seen as important for interdisciplinary teams to work also with practitioners at the local levels e.g. on parking policy and pedestrian infrastructure.

Partnership can also be temporary, an alliance of people with different agendas or goals. Sometimes a strategic collaboration may serve your purpose for part of the way, but might not take you all the way. If these different agendas are unacknowledged however, or even unrecognised, this can result in real difficulty.

As in other workshops, the limited length of funding was seen as a constraint on inter- and trans-disciplinary research. It was noted that this did not seem to apply to medical research grants, and people wondered if it was possible to learn something from them.

#### *The value of social science*

An obvious value of social science is to raise awareness of class, gender, ethnicity or other differences within a particular context, which may undermine a project's effectiveness.

A common danger is that we gravitate to 'people like us' – those who are easy to access, have familiar experience, who talk like us and offer us tea and snacks. In transport, 'windscreen perspective' describes the approach of prioritising cars over bikes or pedestrians, which reflects middle class aspirations. Such unconscious bias can lead to strongly biased outcomes, which point the need to combine technical and social expertise. An example quoted was an American university

that gave a water treatment plant to a village in Bihar. As a piece of engineering it ran well. But only 5% of the village used the water, as the operator was a (high caste) Rajput.

A social science perspective may also help to de-construct taken for granted terms. 'Investment friendly infrastructure' is one of these. This includes fast roads to aid the speed and the mobility of more goods and people. These roads have documented effects in dividing communities, settlements, and damaging businesses and trade. But such terms can appear neutral when adopted by engineers who are typically concerned with efficiency and the efficacy of the technology, buttressed by a strong underlying sense of financial imperatives.

The value of social science was also a matter of dispute. An example from South Africa was given of water being declared a human right, and thus rationing being imposed to curb excessive consumption by the rich. This meant that even in years where there was plenty of water, people were unable to purchase a higher rate of use for a higher tariff. The result was a loss of revenue in the system, which raised prices overall and meant less funding was available for housing so ultimately poorer people lost out. This was presented as a case against taking a strong rights-based approach, which was identified with social science, and a case for community based discussions about how best to manage constrained resources. In response it was argued that there is no single social science approach, but understandings of issues such as equity, rights and entitlements vary according to where researchers are located and different traditions of thought.

A further value that social science can add is reflexivity regarding the research process itself. This involves encouraging everyone to be conscious about their own default settings and the patterns of thought and action that they assume from their disciplinary background. The focus is not so much on self-reflection, but on the group process. This can be very useful in bringing to the surface underlying power relations which otherwise might simply be reinforced.

Again, however, this was disputed. In this view, engineers already worked effectively with practitioners, and for implementation they worked with people in business. Social science was thus simply a diversion. Another practitioner was similarly sceptical about the value of academic research. In his view universities develop knowledge for universities. The only reason they are now incorporating practitioners is because academics have instrumentalised impact.

One person joked that in 50 years he had seen many things change, but not the engineers. He appreciated their consistency! He also saw a clear difference between research and practical projects. In a research paper, you can move away from your discipline, but in a project you have to assert it.

### *Technical problems*

While many issues concern human dimensions, it is important to recognise that technical problems are also pervasive. For example, a new major dam is now being proposed in Pakistan which will cause significant environmental and social damage. A series of small dams would be much more effective, but less prestigious. Previous large dams are operating far below capacity as a result of major problems with siltation.

### *Models*

Simulation modelling in Singapore shows there is no optimal model for transport, all have to adapt to each others' conditionalities, and need to learn from each other. This is a check on the 'smart city' ideology.

In general, while there was recognition that models can also help support decisions with technical guidance, there was some caution concerning their use. There is a lack of models for urban sanitation in high density poor areas. Beyond this, the danger is that models can import the biases of their discipline, without it being clear that this is what they are doing. They can thus be presented

as examples to other disciplines without explaining what assumptions are embedded within them. There was also concern that models may be used uncritically by people who don't themselves appreciate their uncertainties.

#### 4. *Who are, and should be, the key actors in urban infrastructure development?*

The importance of people living in poverty being central to planning processes is noted above. Further issues raised were the balance of private and public, centralization and de-centralization.

Seth Schindler in his keynote noted powerful moves to re-centralise and formalise urban infrastructure, with a strong push towards mobilising private investment. Others commented that this had been the case for the urban water industry for the past twenty years. There is a real danger that the resulting infrastructure development could be very top down. There is also a real threat to public scrutiny. As one person put it, with the shift to large infrastructural projects, 'planning has been replaced by projects'.

There was general concern about the track record of public-private partnerships and the further privatisation of key resources. Cities exist because of public investment to support private investment – there must be acknowledgement of this. Sanitation is not a private good. It is not credible, as some funders seem to believe, for urban sanitation to be supplied on an individual household basis.

The boundaries between formal and informal were recognised as porous. Where you cannot supply water adequately you get informal supply. If you supply at a distance you need to be very powerful, and become a mafia, which controls not only water but politics. In one part of Pakistan, for example, 5000 tankers make 50,000 trips a day, making Rs 100 million a day. The profits are invested in real estate, becoming another mafia. Laws don't exist to deal with these situations and where they do exist they don't work. In another example, a bus transportation system that was formal but is falling apart is increasingly incorporating the informal.

There was some controversy over the approach small-scale enterprises should take to poverty or unequal gender or ethnic relations. Some felt that they could only address their products to the situation they found, as they were not charities. Others felt that corporate social responsibility was a major issue for all and that practical work on the ground could be improved only through better institutional governance.

Local government – facilitated by national political decision-makers – were seen as key players in urban development. For example, in South Africa it is common for poor communities to be located on the periphery far from facilities. In Johannesburg, they have a plan called 'corridors of freedom' to provide reliable, affordable and safe transport systems, new accommodation nearer the commercial centres and better public facilities.

Environmental governance needs to be network governance, whereas at present institutions are more or less autonomous. Self-management is the ideal. Systems that need regulation are a problem, as regulation costs and itself needs to be monitored.

#### *Sustainability*

The need to reduce wealthy people's levels of consumption, and certainly not promote them as ideals for others, was widely recognised. As one person put it 'people are hacked by companies to increase consumerism.' The key issue was equitable access. However, there were differences of view as to what this meant. An additional aim was also to shift the paradigm of value ownership, from owning consumer goods which use energy, to owning the means – like solar panels – to generate it.

There was, however, some scepticism about the power of sustainability to instil 'good' values in the population, when religion had failed to!

An important concept was the 'circular economy', which might mean, for example, the design of a building which can easily be constructed, dismantled, and then re-built. The further challenge is to ensure that the materials used in this are themselves manufactured through sustainable processes, since many construction materials are at present are quite high in energy use.

There is always the danger that environmental costs are just shifted out of view. For example, with incremental planning, a sewage system may make the local environment better but after some years the sea may be unhappy – and a treatment plant may need to be developed.