

Infrastructure Provision, Gender, and Poverty in Indian Slums

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Summary. — We examine the relationship between infrastructure provision and poverty alleviation by analyzing 500 interviews conducted in serviced and non-serviced slums in India. Using a mixed-method approach of qualitative analysis and regression modeling, we find that infrastructure was associated with a 66% increase in education among females. Service provision increased literacy by 62%, enhanced income by 36%, and reduced health costs by 26%. Evidence suggests that a gender-sensitive consideration of infrastructure is necessary and that a ‘one-size-fits-all’ approach will not suffice. We provide evidence that infrastructure investment is critical for well-being of slum dwellers and women in particular.

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1. INTRODUCTION

With high rates of population growth and urbanization, the provision of infrastructure in urban centers of developing countries is of utmost importance. Infrastructure in the form of water and sanitation is essential for achieving the Millennium Development Goals (Fay, Leipziger, Wodon, & Yepes, 2005). There is evidence to support the direct link between infrastructure investment and national economic growth (Esfahani & Ramirez, 2003). Across countries, a 1% increase in the stock of infrastructure typically corresponds with a 1% increase in GDP (World Bank (WB), 1994). Infrastructure can deliver major benefits in economic growth, poverty alleviation, and environmental sustainability (Parikh & McRobie, 2009; Parikh, Parikh, & McRobie, 2012). While global development agencies recognize the importance of safe water and environmental sanitation, reports show that the world is likely to miss the Millennium Development Goal 7 of halving the proportion of the population without access to sustainable sanitation by 10% of the intended target population (e.g., United Nations (UN), 2011). It is estimated that the global population will increase by 2 billion by 2030, with most of the increase occurring in the developing world, and predominantly in urban settlements (Bhattacharya, Romani, & Stern, 2012).

In India, the recent census (Government of India (GOI), 2010) reports a slum population of 93 million. Slums are characterized by illegal land tenure, inadequate infrastructure, poor quality housing stock, and poor neighborhood conditions (Gulyani & Talukdar, 2008). Globally, the infrastructure gap is increasing as slum populations rise and living conditions in slums deteriorate (UN, 2011). The low-income settlements are denser and more challenging to serve because of issues related to land tenure, ownership, resources, access, and high densities (WB, 2004).

Inequity is not just restricted to the quality of access to services based on income. Within low-income communities, women face greater barriers for economic and social mobility (Prabhu, 2010; WB, 2006). Access to institutional support,

infrastructure services, and financial support is often inequitable and restricted for women in Indian settlements (UNDP, 2006; WB, 2006). For example, there is institutionalized gender bias against the education of female children in India (Dercon & Singh, 2013). Women bear the brunt of inadequate infrastructure provision as they have to spend time on water collection, waste disposal, and collection of fuel wood for energy provision (Floro & Swain, 2013; Parikh, Chaturvedi, & George, 2012; UNDP, 2006). In Indian slums, girls spend time for water collection in lieu of attending school, resulting in gender imbalances in education levels. Consequently, the infrastructure provision gap and its negative effects on aspiration and upward socioeconomic mobility are likely becoming more pronounced.

The notion that economic growth brings about reductions in both mortality and fertility rates has been advocated by many governments and donor agencies, and yet it was the public health movement – rather than economic growth – which was the key driver for the health improvements seen in 19th century London (Szreter, 2005). Research in India (Joshi, 2002; Seshagiri, 2006) and eastern Uganda (UNDP, 2006) found that women spend, on average, 2 h per day for water collection and disposal. If this time is saved via infrastructure provision, it would give women a greater capacity to participate in society, children the opportunity to attend school, and would meet the criterion of fair distribution of time and resources (Moser, 1998; UNDP, 2006). We posit that given that women face greater adversity in absence of adequate infrastructure it is likely that they will reap greater benefits from the provision of services.

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The capabilities and functioning approach propagated by Sen (1999) examines functional capabilities which could be in the form of, say, freedom to participate in an activity or society due to removal of barriers. Inadequate infrastructure provision potentially has a detrimental effect on well-being through time and resource loss thus infrastructure provision could improve the functioning of slum dwellers through freeing up their time and resources thereby resulting in improved productivity.

Despite the general awareness of this infrastructure provision gap, there is limited availability of data on slums due to the combined difficulties of collecting data in a resource-constrained setting, limited evidence gathering by governments, and the informality of community structures that need to be leveraged during the data gathering process. This study collected primary data conducting 500 household interviews in five Indian slum settlements. Through the use of rigorous data collection and a mixed-method approach, we document the positive changes in socio-economic indicators of health, education, income, and housing after the provision of integrated household infrastructure (water, sanitation, drainage, solid waste management, roads, and electricity) with emphasis on direct benefits for women and girls.

2. LITERATURE REVIEW

Using World Development Report figures for ninety-nine developing countries, Caldwell (1986) found no direct link between income and health. In particular, the better levels of health in China, Sri Lanka, Costa Rica, and Kerala were attributed to factors such as equity and public health (infrastructure) provision. Numerous studies (for example Calderón & Servén, 2004; Straub, 2008) have shown the impact of infrastructure on overall human development. Policy changes which enhance the provision of infrastructure – particularly water and sanitation – for the poor in developing countries have a positive impact on health, education, income, and welfare (Calderón & Servén, 2004; UNDP, 2006; WB, 2004). There is a direct effect of infrastructure capital in nations which manifests in the form of a simple productivity effect potentially leading to growth (Straub, 2008). Infrastructure further enhances labor productivity through time saved and reduction in time wastage (Straub, 2008).

Slum communities in India that have limited access to basic services incur significant costs and losses as inferior environmental conditions result in poor health thereby reducing productivity and potential asset base (Parikh, Parikh *et al.*, 2012). Infrastructure such as energy can enable slum dwellers or disenfranchised rural communities to shift from survival mode to a higher quality of life (Parikh, Chaturvedi *et al.*, 2012; Schillebeeckx, Parikh, Bansal, & George, 2012). Sen (1999) proposes a “Capabilities Approach,” which emphasizes access and development of localized capabilities, would highlight the causes of deprivation more comprehensively than an income-based assessment. Moser (1998) argues that income-consumption is not always a good measure of poverty, and that vulnerability better captures the change process of people moving in and out of poverty. We apply Sen’s capabilities lens to the provision of infrastructure and its role in potentially improving productivity and living conditions in slums.

The notion of economic trickle-down was dominant in the 1950s and accepted until the late 1990s. Dollar and Kraay (2000) proposed the benevolence of economic growth and attempted to demonstrate that income rises one-for-one with overall growth; a viewpoint that was discounted through

evidence demonstrating increases in inequality (Lübker, Smith, & Weeks, 2002). Kakwani and Pernia (2000) discuss pro-poor growth and argue that governments need to follow a pro-poor economic growth policy rather than the blanket economic growth strand as the poor still do not have resources to address their basic needs. Further, structural adjustment policies had a tendency of generating a growth pattern in which the income divide worsened (Easterly, 2001); if inequity is greater it is likely that some households may not be able to take advantage of investments or policy interventions.

‘The Challenge of Slums’ (UN-HABITAT, 2003) was the first global assessment of slums presenting estimates of slum populations and identifying the main slum policies and frameworks. The assessment acknowledges that in-situ slum upgrading has significant advantages in terms of affordability compared to relocation and can be achieved with minimal disturbance to the social and economic life of communities and lead to visible results on the ground. Holistic, well-being, and multidimensional approaches have been used to examine slum living conditions in Brazil (Feler & Henderson, 2011), India (Lall, Lundberg, & Shalizi, 2008), and Nairobi (Gulyani & Talukdar, 2008). Uni-sectoral studies are prevalent with discussion on health and education in slums (Asthana, 1995; Butala, VanRooyen, & Patel, 2010). This study aims to build on existing studies and carry out a holistic multi-sectoral assessment of the impact of infrastructure.

In India, studies carried out by academic institutions such as the Centre for Environment Planning and Technology (CEPT) and charities such as the Self Employed Women’s Association (SEWA) and SAATH have investigated the impact of physical infrastructure on health, education, and incomes (CEPT, 2004; Joshi, 2002; SEWA, 2002) but they lack statistical rigor and technical expertise. In 2004, CEPT (supported by World Bank, SAATH and SEWA) studied a sample of 25 slums in the city of Ahmedabad in India via focus group discussions and household surveys which included 17 slums serviced through the Slum Networking Project (SNP). SEWA and the United States Agency for International Development (USAID) also conducted household interviews in 297 houses in three settlements in Ahmedabad (SEWA, 2002). The study looked at two settlements where services have been implemented and one adjoining settlement which is non-serviced. SEWA (2002) reported the positive impact of infrastructure but the study is less detailed than the CEPT study. In 1997, SAATH conducted a socio-economic survey in the settlement of Pravinnagar in Ahmedabad city to collect baseline and end line data (Joshi, 2002). Positive findings from the study include improvement in pre-and post-natal care and an increase in school enrollment (Joshi, 2002). The book *Alliance for Change* records the journey beginning from the formation of the partnership in the settlement of Sanjaynagar in Ahmedabad to project implementation (Tripathi, 1998), and the book *Change after Alliance* subsequently records the socio-economic impacts of water and sanitation (Tripathi & Jumani, 2001). Various agencies and individuals (Dutta, 2000; SAATH, 1995; SHARDA Trust, 1995–2001; SHARDA Trust & SAATH, 1999) have documented the impact of physical infrastructure for the Sanjaynagar settlement, which informed the current study.

Women in vulnerable households are likely to be engaged in food enterprises, water collection, fuel wood collection, and water disposal/cleaning activities (Floro & Swain, 2013; UNDP, 2006). Estimates by SEWA show that reducing water collection duration from two to 1 h a day would enable women to earn an additional US\$ 100/year (UNDP, 2006). Whittington, Mu, and Roche (1990) developed a

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