

A CONCEPTUAL ANALYSIS OF THE IMPACT OF INFRASTRUCTURE DEVELOPMENT ON POVERTY REDUCTION

Research Report 2016 No 8

Authors: Lelethu, Keke and Okem, Andrew Emmanuel

Author Contact: Andrew Okem, University of KwaZulu-Natal, School of Built Environment and Development Studies.

Email: okem@ukzn.ac.za

This work is based on the research supported by the South African Research Chairs Initiative (SARChI) of the Department of Science and Technology and National Research Foundation of South Africa (DST/NRF Grant No 71220). The contents of this work are the sole responsibility of the authors and can in no way be taken to reflect the views of the National Research Foundation.

Copyright © 2016, the authors

DST/NRF SARChI in Applied Poverty Reduction Assessment

University of KwaZulu-Natal

<http://appliedpovertyreduction.com/>

ISBN: 978186840587-9

Table of Contents

TABLE OF CONTENTS	3
ACKNOWLEDGEMENTS	4
EXECUTIVE SUMMARY	5
UNDERSTANDING THE MEANING OF POVERTY AND POVERTY REDUCTION	7
THE LINK BETWEEN INFRASTRUCTURE DEVELOPMENT AND POVERTY REDUCTION	9
INFRASTRUCTURE DEVELOPMENT AS A POVERTY REDUCTION STRATEGY	9
ARGUMENTS AGAINST THE LINK BETWEEN INFRASTRUCTURE AND POVERTY REDUCTION	13
TOWARDS A PRO-POOR INFRASTRUCTURE DEVELOPMENT	17
CONCLUSION	19
ANNOTATED BIBLIOGRAPHY	20
REFERENCES	26

Acknowledgements

The authors acknowledge the peer review provided by Ms Mbali Mthembu and Kathleen Diga and the editing services of Ms Amy Winsper.

Executive Summary

The dearth of infrastructure affects economic activities of the poor in various ways. Against this backdrop, a number of studies argue that the provision of different forms of infrastructure will free the poor to engage in productive income generating activities and thereby reduce poverty. In this technical paper, we examine the linkage between infrastructure development and poverty reduction. Through a review of existing literature, we interrogate whether poverty reduction can be mediated through investment in infrastructure. The review established that the lack of/limited infrastructure is one of the key constraints to economic development in developing countries. In addition, lack of infrastructure, particularly in rural areas, was found to be a major barrier to productive economic activities of the poor. This review shows that infrastructure development can stimulate economic growth and poverty reduction if provided in an adequate and targeted manner. Given the fundamental roles that infrastructure play in mediating societal wellbeing, it is inevitable that the provision, proper management and maintenance of these facilities will contribute towards the well-being of societies in general and the poor and vulnerable population in particular

Although the foregoing demonstrates a causal path between infrastructure development and poverty reduction, opposing arguments note that the link between infrastructure development and poverty reduction is not automatic. The poor are often precluded from the benefits of infrastructure by factors such as weak governance systems, corruption, failed/poor implementation of infrastructure development programmes, and poor planning resulting in the failure to incorporate poverty reduction in the design and implementation of infrastructure projects. To address these weaknesses, it is recommended that there should be a paradigm shift from the trickle down perception of the benefits of infrastructure to one that advances a pro-poor infrastructure investment. It is further recommended that to better harness the benefits of infrastructure development in poverty reduction, the question should go beyond the provision of infrastructure to issues of access. Infrastructure, in and of itself, cannot reduce poverty if it is inaccessible to the poor due to factors such as costs, location and regulatory/governance systems. Addressing these challenges entails actively engaging target beneficiaries of infrastructure development projects. It is also important to strengthen governance systems and the institutional settings within which the design and implementation of infrastructure projects operate. There is also a need to extend the view of poverty reduction of infrastructure beyond income generation and employment creation by incorporating the multidimensional view of poverty. In doing this, attention should be given to how infrastructure interacts (either positively or negatively) with the

social, economic and natural capital of the poor. We recommend further research to gain insights into the best model of public participation in infrastructure provision that is most beneficial to the poor.

Introduction

This study views infrastructure from a holistic approach and examines its relevance to poverty reduction. The study explores contending perspectives of the impacts associated with infrastructure development projects with the goal of providing insights into how the benefits of infrastructure development can be better harnessed in the provision of targeted pro-poor interventions. The review observes that water, sanitation, electricity, health, roads as well as telecommunications are some of the most important forms of infrastructure that need to be improved in developing countries to meet the goal of poverty reduction. The justification for developing these types of infrastructure is that they are quintessential for the daily operation of every society and are critical to improving the quality of life since they facilitate access to health and transport facilities, safe drinking water, adequate sanitation, energy, and stimulating economic activities.

This review is organised into three sections. In the first section, we provide a conceptual understanding of poverty and poverty reduction. This is followed by a review of the impact of infrastructure development on poverty reduction. This part of the review is divided into two sub-sections. The first sub-section presents studies that argue in favour of the link between infrastructure and poverty reduction while the second section presents counter opinions. In section three, we present a new conceptual approach to using infrastructure as a poverty reduction tool. The paper concludes with recommendations and the way forward.

Understanding the Meaning of Poverty and Poverty Reduction

Lately, the subject of poverty reduction has been the focus of rigorous research and policymaking (Agénor, 2010). To engage in any discussion about poverty reduction, it is pertinent to explore its meaning. Poverty is often defined in economic terms that equate it to the lack of income (Olawale & Garwe, 2010; Statistics South Africa, 2014). Consistent with this definition, Olawale and Garwe (2010) notes that “Poverty is often defined in absolute terms of low income – less than US \$2 a day, for example”. This understanding of poverty has been characterised as limited since it fails to acknowledge that poverty is multidimensional (Berardi, 2012). Berardi (2012, p. 100) explored the multidimensional perspective of poverty in a study of urban poverty in Lesotho which found that urban poverty is characterised by “lack of social and cultural as well as economic means necessary to procure a minimum level of nutrition to participate in everyday life of society and to ensure economic and social production”. Berardi (2012, p. 100) further argue that “Poverty does not encompass only low income and consumption but also low achievement in education, health, nutrition and other areas of human development. It extends to powerlessness and voicelessness, vulnerability and fear”.

Agreeing with the multidimensional perspective of poverty, Rahman and Rahman (2015, p. 249) argue that poverty "...is the lack of social and cultural, as well as economic means necessary to procure a minimum level of nutrition, to participate in the everyday life of society, and to ensure economic and social reproduction". This definition is similar to Sen (2001) who conceptualises development as freedom from want. The implication of this perception of poverty is that improving access to income for the poor only addresses one dimension of poverty and there is, therefore, a need to examine other dimensions of poverty beyond income measures. Recognising poverty as a multidimensional concept, scholars (such as Alkire & Foster, 2011a, 2011b; Bourguignon & Chakravarty, 2003; Tsui, 2002) have come up with tools such as the Multidimensional Poverty Index to access the multiple dimensions of poverty. The tool assesses poverty in areas of health, education and standards of living.

Poverty exists in different forms and it is, therefore, imperative to distinguish between the typologies of poverty (absolute, relative and chronic). Stark, Micevska, and Mycielski (2009) define relative poverty as a situation where individuals regard themselves as poor by comparing their socio-economic conditions to others. Poverty, in this sense, is a perception of where a person ought to be in terms of his/her socioeconomic status in comparison to others. For this reason, relative poverty is often presented as a false measure of poverty. Unlike relative poverty, absolute poverty exists when households or individuals suffer from a severe scarcity of basic human needs (food, safe drinking water, sanitation facilities, health, shelter, education and information). The indicator of absolute poverty is not limited to income but also includes the lack of basic infrastructure and other social and natural capital (Gordon & Nandy, 2012). Chronic poverty is defined as a situation whereby an individual or household is in a state of poverty over an extended period that is sometimes intergenerational (Hulme, Moore, & Shepherd, 2001). From the above, it appears that while absolute and chronic poverty are the same in all respects, the difference lies in the fact that absolute poverty is temporal while chronic poverty persists over a long period of time.

From the foregoing constructions of poverty, poverty reduction has to, necessarily, be a multi-pronged approach aimed at addressing the multiple dimensions of poverty. Ali and Pernia (2003, p. 2) are in agreement with this view of poverty reduction and argue that "Poverty reduction requires economic growth which, when accompanied by sound macroeconomic management and good governance, results in sustainable and socially inclusive development". Recognising the relevance of the multidimensionality of

poverty reduction, studies have explored the roles of various sectors including agriculture (Berardi, 2012; Cervantes-Godoy & Dewbre, 2010), tourism (Ashley & Mitchell, 2009), donor intervention (Humphrey & Navas-Alemán, 2010), economic growth (Haggblade, Hazell, & Reardon, 2010; Loayza & Raddatz, 2010; Montalvo & Ravallion, 2010) and infrastructure development (Parker, Kirkpatrick, & Figueira-Theodorakopoulou, 2008) in poverty reduction.

Although poverty exists in all countries of the world, developing countries are disproportionately affected by poverty. In attempts to reduce the high levels of poverty, governments find it difficult to come up with suitable mechanisms/policies to keep up with the growing issue of poverty. The government interventions for poverty reduction include the provision of targeted safety nets, human capital development (i.e. education and health), pro-poor economic growth, etc. In recent years, infrastructure has been presented as one of the tools that can be adapted for poverty reduction (see Ali & Pernia, 2003; Calderón & Servén, 2008; Hanjra, Ferede, & Gutta, 2009; Kurosaki, 2012; Ogun, 2010; United Nations Human Development Programme, 2015). Despite the growing interest in infrastructure development as a poverty reduction tool, there is currently no single definition of infrastructure. Rather, it is considered a broad concept and comprises many attributes¹.

The Meaning of Infrastructure and Challenges of Impact Measurement

Buhr (2003) defines infrastructure as a list of fundamentally tangible public facilities. Briceno-Garmendia and Estache (2004) advance a similar view of infrastructure noting that material infrastructure comprises electricity to the power industry, businesses and homes, telecommunications to support commerce, communication and roads, railways and ports to transport goods, sanitation for hygiene and water facilities for domestic and commercial use, and education facilities. Infrastructure, as used in this review, is limited to the above understanding and, therefore, relates only to tactile public infrastructure. These are large scale investments generally with country resources for its initial build as well as maintenance. In this paper, the term, infrastructure, is underpinned by this definition.

Infrastructure Development as a Poverty Reduction Strategy

In terms of the linkage between infrastructure development and poverty reduction, Ali and Pernia (2003) observe that two opposing schools of thoughts emerged in the 1990s. On the one hand are those who argue

¹ It is important to point out that there are also large scale private sector infrastructure (mines, malls, etc.). The focus of this review, however, is only on public infrastructure development.

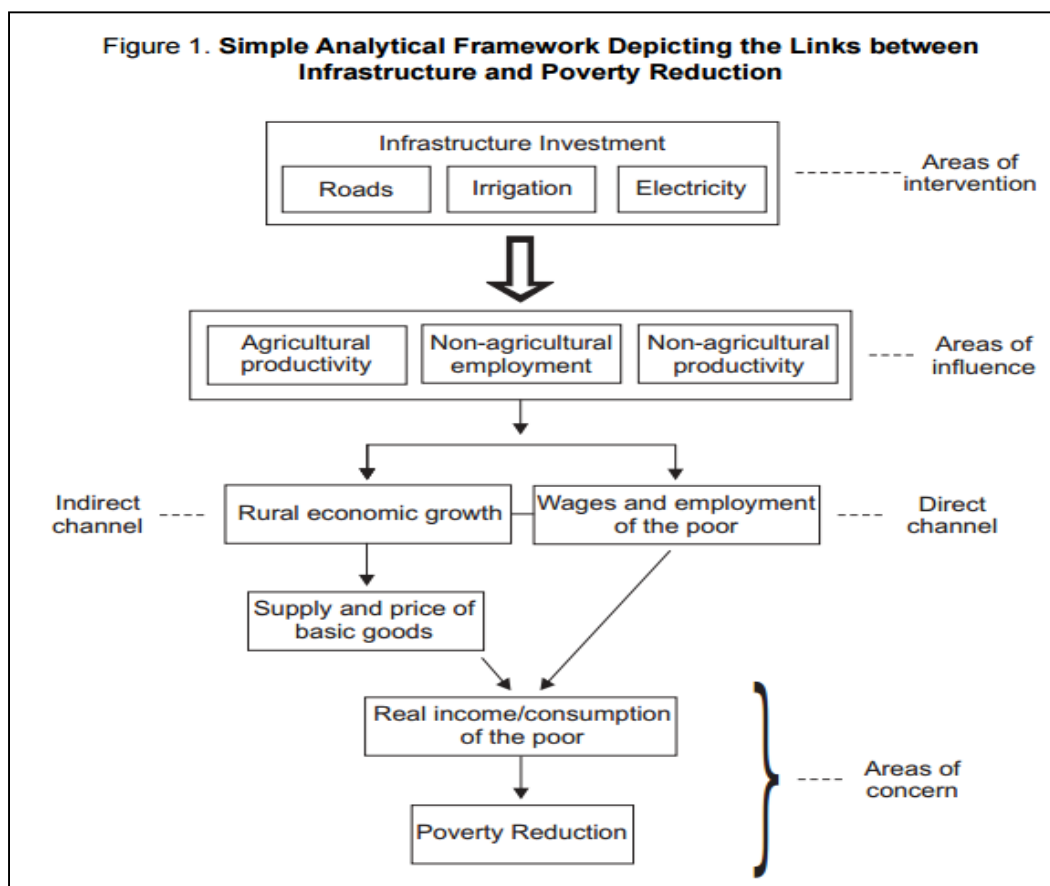
that infrastructure development contributes to poverty reduction while on the other hand are those who argue that there is no link between the two. We explore these two lines of arguments in the following sub-sections of the review.

Most rural areas and informal settlements in peri-urban areas in developing countries suffer from the dearth of (or are characterised by) inadequate infrastructure that provides essential public services such as sanitation, clean water, electricity as well as transport (Parker et al., 2008, p. 180). The absence of infrastructure through which these services are provided limit the chances of the poor engaging in economic activities, and therefore prevents them from improving their poor economic conditions. The provision of public services through infrastructure development enables the poor to focus on core economic activities instead of wasting unnecessary time in unproductive, mundane activities such as “collecting water and fuel, cooking and performing other such tasks” (United Nations Human Development Programme, 2015, p. 173). The removal of these burdens frees up the poor to concentrate on income-generating activities, which can play a vital role in improving their socio-economic conditions.

Ali and Pernia (2003) present a framework showing the links between infrastructure and poverty reduction (see figure 1). The framework shows that the implementation of infrastructure projects such as roads, irrigation and electricity enhance both agricultural and non-agricultural activities which (directly and indirectly) affect the growth of the rural economy and the creation of employment and income-generating opportunities for poor. For instance, lack of road is a barrier to the growth of the rural economy as it impedes the transportation of commodities to and from these areas. This is a major constraint for many rural areas where farming is the primary livelihood strategy. The lack of or limited infrastructure implies that farmers spend a high proportion of their income on transporting their produce to the market. Similarly, lack of transport can also result in the loss of produce and by extension, a loss of income for rural farmers. This is why Zulu and Richardson (2013) argue that “rural transport remains a constraint to increasing agricultural productivity, achieving rural growth, and thus alleviating rural poverty”. Reflecting on the role of road infrastructure on rural development, a study by Banjo, Gordon, and Riverson (2012, p. 55) provides six lessons:

“(1) adequate rural transport is necessary for achieving rural development; (2) rural transport is concerned with more than just providing roads but also with the manner of their provision, use and maintenance; (3) available approaches to the design of rural transport projects are more flexible and varied than before with more funding windows (e.g., social funds) than before; (4) these approaches

facilitate use of rural transport improvements as tools for poverty reduction; (5) poverty has many dimensions, however (income, access, vulnerability); and (6) of necessity, rural transport policies should embrace a multisector approach and contribute to poverty reduction.”



Source: Ali and Pernia (2003, p. 4)

Just like road infrastructure, the provision of electricity in rural areas has also been linked to poverty reduction. The consumption of energy sources such as charcoal has health implications for local communities (Zulu & Richardson, 2013). On the other hand, lack of access to energy can be a barrier to engaging in certain economic activities. A study by Dinkelman (2011, p. 3078) found “that electrification significantly raises female employment within five years. This new infrastructure appears to increase hours of work for men and women while reducing female wages and increasing male earnings. Several pieces of evidence suggest that household electrification raises employment by releasing women from home production and enabling microenterprises”.

Supporting the link between infrastructure and poverty reduction, Ali and Pernia (2003, p. 3) argue that, “there is now wider recognition, including in the international donor community, that if governance and institutional frameworks are strengthened, the linkage between infrastructure and reduction of poverty can become stronger”. Against this backdrop, Calderón and Servén (2004, p. 26) note that “the conclusion that infrastructure both raises growth and lowers income inequality implies that infrastructure development may be a key win–win ingredient for poverty reduction”. This is because infrastructure, on the one hand, contributes to economic growth, and on the other hand, reduces poverty.

The work of Calderón and Servén (2008) recognises adequate supply of infrastructure services as a core ingredient of economic development. In their study, Calderón and Servén (2008) assessed contributions of infrastructure to economic growth and equity using an empirical assessment and measurements of the quality and quantity of infrastructure. Based on findings of their study (which assessed the contributions of economic growth in over 100 countries), the authors argue that infrastructure can be beneficial to African countries in areas of economic growth and equity. Against this backdrop, they maintain that

...since most African countries are lagging in terms of infrastructure quantity, quality, and universality of access, the tentative conclusion is that infrastructure development offers a double potential to speed up poverty reduction in Sub-Saharan Africa: it is associated with both higher growth and lower inequality (Calderón & Servén, 2008, p. 29)

Calderón and Servén (2004) further argue that infrastructure development is strategic to poverty reduction as there is a positive correlation between the quantity and quality of infrastructure and the decrease in income inequality. Recognising the linkage between infrastructure, development and poverty reduction, advocates of this view have argued for massive public spending on infrastructure (Agénor, 2010). The argument is underpinned by the notion that extensive public and donor spending on infrastructure is instrumental in removing barriers to economic activities that are critical to economic development and poverty reduction. The building of infrastructure and its ongoing maintenance require labour and therefore jobs and skills development is found leading to poverty alleviation. Confirming this argument, a study by Olawale and Garwe (2010, p. 732) found that “The quality of infrastructure can affect the growth prospects of new SMEs especially in developing countries such as South Africa. Many developing countries suffer from a deplorable state of basic infrastructures like transportation, telecommunication and electricity. Electricity supply in South Africa

does not meet the demand leading to power cuts which can affect the production and turnover of new SMEs". Having explored arguments that support the view that infrastructure contributes to poverty reduction, we now turn our attention to reviewing opposing views.

Arguments against the link between Infrastructure and Poverty Reduction

Unlike those who argue that infrastructure development contributes to poverty reduction, opponents of this view note that infrastructure development does not have any bearing on poverty reduction and the link between the two is too weak to argue for a causal relation to be established. In their study, Ali and Pernia (2003, p. 3) summarised this argument into three key points:

"First, though important for economic growth, infrastructure investment had little relevance to poverty reduction. Second, actual benefits from infrastructure were significantly less than anticipated. Third, weak governance and institutions gave way to corruption, distorted public investment choices, and neglected maintenance, thereby lowering infrastructure contribution to economic growth and diverting benefits intended for the poor".

In line with this strands of arguments, Ogun (2010) argues that investment in infrastructure has little applicability to poverty reduction. According to Ogun (2010), weak governance, coupled with corrupt public officials, lowers the contributions of infrastructure to growth and diverts benefits to a few elite. The implication of this is that infrastructure tenders can be awarded to those with connections but with little capacity resulting in the delivery of poor infrastructure facilities that have a short lifespan and by implications insignificant impact in improving the socioeconomic conditions of intended beneficiaries. Confirming the above thrust of the argument, a study that assessed the impacts of infrastructure investment in Mozambique and Vietnam, Otsuki, Read, and Zoomers (2016, p. 3) found infrastructure "seldom benefits marginalized communities". They further note that there is little consideration for local participation in demanding equity of benefits associated with infrastructure development. Consequently, the voices of the poor are often absent in the planning of infrastructure.

Added to the foregoing is corruption that is sometimes associated with infrastructure build projects. This is particularly the case when the tendering process of public infrastructure is not transparent and results in the award of infrastructure build projects to those with a link to government officials. More so, infrastructure development, particularly those funded externally, have been used as a guise through which money is

channelled illegally. The use of large build infrastructure as a mechanism for illicit financial flows. Sarah I know makes the connection that infrastructure companies evade tax or give money mainly to consultants through their arrangements and this money thereby does not go back to governments to subsidise the poor with safety nets and public services (Bracking, 2012). Reflecting on infrastructure development programmes in South Africa, Bracking (2016, p. 94) argues that the promotion of infrastructure is often linked to a number of arguments.

“First, in the absence of industrial policy that is working to produce jobs, building something that creates just an opportune moments in the fiscal and electoral cycle. Second, in a country with racialized inequality, the construction sector is one of the few where previously historically disadvantaged persons can gain entry as start-up costs are relatively low, so the jobs can be distributed among a constituency within an economic justice discourse, and also to key ruling party supporters in exchange for political finance. Third, public procurement and tendering processes can be further designed to assist new market entries, political support for the ruling party and to raise political finance. Fourth, justifying public expenditures on infrastructure procurement can be done principally by talking of the beneficiaries from procurement, building and the employment created in these processes, while the actual long-run costs in loan repayment and actual sustainable jobs that remain after the construction, which are often much fewer, are downplayed. Thus, in terms of financialisation processes overall, there is also synergistic relationship between building infrastructure; concentrating power within party-states and the greater extractivism made possible by financiers from the national economy. The whole infrastructure exercise is then made popular through a language of “mega projects” (Bracking, 2016, p. 94)

There are other compelling arguments against the building of mega infrastructures which have been advanced as a strategy for urban development. Often, arguments on the contributions of mega infrastructure projects revolve around the employment created in the building of such projects. However, little evidence exists that suggests that these mega infrastructures are bringing about the desired changes. Such projects lack stable decent jobs and the participation of the poor in large build infrastructure development are exclusionary. Using the case of the 2010 FIFA World Cup in South Africa to assess the impacts of megaprojects on poverty alleviation, Pillay and Bass (2008, p. 329) argue that “it is unlikely that poverty alleviation, as a result of fast-

tracking South Africa's urban development impetus, will constitute a significant outcome of the World Cup. Rather, development benefits in cities are likely to be fairly circumscribed".

Rather than contribute to poverty reduction, these infrastructures create temporary employment during project implementation. After construction is completed, work activities for the poor either end or few low skilled work for maintenance or operations would be available. In the long run, infrastructure development associated with mega events worsens the situation of the poor due to associated high maintenance costs, which deflect government attention from meeting the needs of the poor (Bracking, 2012). In addition, the poor are often excluded from accessing the facilities built for mega events since these facilities are often the exclusive preserve of professional athletes even when the facilities are located in poor communities (Bracking, 2016, p. 94).

Another type of project that is often linked to poverty reduction is dam construction. However, dam constructions have been known to affect fish migration, which then impact the livelihood and food security of poor fishing communities (Dugan et al., 2010). A study of dam construction on the Mekong River found that if existing proposals of new dams are implemented, "part of the river's fish production, and the economic, nutritional and social benefits of this ecosystem service will be lost in the coming decades" (Dugan et al., 2010, p. 346). Large-scale dams have also been associated with negative health outcomes for communities in close proximities to these dams. Lerer and Scudder (1999, p. 144) note "increases in the prevalence of schistosomiasis, malaria, encephalitis, hemorrhagic fevers, gastroenteritis, intestinal parasites, and filariasis (including onchocerciasis and bancroftosis) have been documented after dam and irrigation projects". Since the poor are often without access to health facilities, these negative health outcomes associated with dam construction worsen their poor socio-economic conditions.

Linked to the foregoing is the negative effects of infrastructure projects on the environment. There are negative environmental impacts associated with road construction (Andrews, 1990; Daigle, 2010; Laurance, Goosem, & Laurance, 2009). In a study about the negative environmental impacts of road construction, Andrews (1990) asserts that the partitioning of natural areas into small fragments disturbs wildlife populations by decreasing the number of species through restricting their capability to move from one area to another. In addition, the death of wildlife resulting from collision with vehicles is often associated with roads. From an

environmental perspective, the main question is whether human mobility is more important than the mobility and lives of species.

Often, large-scale infrastructure projects such as dams, new housing settlements and electricity projects require the resettlement of entire communities. These communities, once resettled, are frequently without access to basic necessities such as water, sanitation, transportation and health (Lerer & Scudder, 1999). In addition, they might come in direct conflict with host communities as they compete for scarce resources. Poor communities that are resettled to make way for infrastructure projects sometimes lack access to livelihood means such as land (Otsuki et al., 2016). Furthermore, resettlement results in the loss of social and natural capital that defines the community. The negative impact of infrastructure development on the poor; therefore, goes beyond the loss of income and livelihood assets.

Recognising the potential and actual negative impacts of infrastructure development on the environment, the concept of mitigation has now been introduced in the field (Hayes, 2014). The argument here is that mitigating the negative impacts of infrastructure development should be a core component of project plans rather than being an afterthought and implemented piecemeal. There is also an increasing recognition of the need to balance between the social, economic and environmental needs in the implementation of infrastructure projects. Zhang et al. (2014) recognise the role played by public-private partnerships on infrastructure delivery in trying to achieve quality and efficient infrastructure development.

One of the challenges associated with understanding the link between infrastructure and poverty reduction relates to difficulties associated with impact measurement. The term 'impact', although a commonly used term in the development field, is often hard to theorise as it is applied in varying contexts to multiple phenomena with little attempts geared towards its definition. This creates confusions, which ultimately result in miscommunication among project sponsors, implementing organisations and beneficiaries of development projects. As a result of this conceptual ambiguity, the measurement of programme impact is often characterised by methodology and theoretical pluralism, further resulting in difficulties associated with the comparison of projects across multiple settings.

Some authors (Leroy, Ruel, & Verhofstadt, 2009, p. see; Wallman-Stokes, K, McLaughlin, & Rosqueta, 2013) view impact as a result of certain programme or intervention. However, these programme results, according

to Wallman-Stokes et al. (2013), are dependent on individual perceptions which ultimately renders the understanding of impact subjective. Wallman-Stokes et al. (2013, p. 1) therefore argue that “[I]mpact definitions are not abstract, objective truths. They are the product of decisions made by people and organisations, and they often aim to change behaviors or situations for those on the receiving end of an intervention”. For Wallman-Stokes et al. (2013), subjectivity in the definition of impact is not a problem in programme evaluation since each actor’s view about expected impact of a development project is valid. However, they caution that it is critical that what constitutes programme impact be clearly defined prior programme implementation in order to address issues such as bias and disempowerment. Achieving this objective entails clearly mapping out the programme theory of change (i.e., identifying the causal link(s) between intervention and intended impact(s)). Leroy et al. (2009, p. 104) observe that programme theory encompasses three components:

- 1) a programme impact theory, which refers to the hypothesised cause-and-effect pathways that connect a programme’s activities to its expected outcomes; 2) a service utilisation plan, which relates to the assumptions of how and why intended recipients actually use the programme; and 3) a programme’s organisational plan, which relates to the implementation and operational aspects of the programme and its resources.

In line with the foregoing, the Organization for Economic Cooperation and Development (n.d., p. 1) notes that “[I]mpact evaluation is an assessment of how the intervention being evaluated affects outcomes, whether these effects are intended or unintended”. This entails accounting for possible scenarios in the absence of programme intervention.

Towards a Pro-Poor Infrastructure Development

The arguments presented in the previous sections demonstrate that the link between infrastructure development and poverty reduction is not automatic. When viewing infrastructure investment and poverty reduction, a key issue that should be considered is how to address inequality and low levels of economic development through such developments. To address this reality, there is a need for a paradigm shift in the understanding of how infrastructure development contributes to poverty reduction. Majumder (2012) presents a shift from the ‘trickle-down approach’ towards the notion of ‘pro-poor growth’. This entails the deliberate design of infrastructure projects with a poverty reduction theme rather than embarking on infrastructure

development and expect that the poor will passively benefit from the trickle down effects of such development. Perhaps, infrastructure projects need to be explicit of the changes they aim to effect and a causal link is provided in the design of such infrastructure projects.

In most developing countries, the public sector is facing challenges of effectively managing and providing infrastructure (Rahman & Rahman, 2015). This challenge is more nuanced in rural communities that are resource-constrained and impoverished. The poor, despite their socioeconomic status, are willing to engage in decision-making in relation to infrastructure provision. Building public infrastructures like electricity poles and water & sanitation within informal settlements where land ownership is private can be problematic. The literature on public-private partnerships (PPP) reveals that there is not just one form of PPP but different models depending on the nature of the projects. In contrast to large PPPs, Bhemer and Bhuiyan (2014) came up with the idea of 'grassroots public-private partnerships' (G-PPPs). In supporting the concept of community participation, Bhemer and Bhuiyan (2014) argue that the construction and management of self-built infrastructure need to be acknowledged and adopted as an approach within the regulatory framework governing infrastructure services. Bhemer and Bhuiyan (2014) recognise public-private partnerships as a tool that will enhance development in informal areas. The paper argues that self-driven or community driven projects produce better end-results in meeting local needs with regard to service provision since they incorporate local voices in the design and implementation of such projects.

Community-led projects are seen as very efficient as knowledge and information come locally or within the community (Kirubi, Jacobson, Kammen, & Mills, 2009; Mara, Lane, Scott, & Trouba, 2010). In addition, community driven projects elicit a sense of ownership that is critical to the success of many projects. Against this backdrop, Wong et al. (2013) suggest the active participation of local communities in infrastructure build projects. There is, therefore, a need for policies to push this idea and implement it in many communities as this will lower the strain on government and will introduce skills development for most community members. Among other things, this approach is significant for the sustainability of infrastructure development. The involvement of local communities will also facilitate monitoring of such infrastructure projects for anti-competitive and corrupt practices.

Additionally, it is important to explore alternative forms of infrastructure provision. For instance, rather than connecting to the grid, or building a water connection or sewage line, government should investigate the feasibility of alternative sustainable options such as solar, rainwater harvesting and various sanitation

designs. Such options, however, should be able to meet the needs of resource-poor communities and not further undermine them through the provision of inferior facilities.

According to Berardi (2012), increasing attention to sustainability is driving the construction sector in the direction of speedy changes. Policies, laws and regulations globally are requesting that the sector adopts sustainable innovations in terms of products and processes to encourage more sustainable infrastructure (Dutil, Rousse, & Quesada, 2011). Sustainable development refers the ability to meet the needs of the present without limiting the ability of future generations to meet their own needs. The shift towards sustainable development is viewed in recent literature as a trend that needs to be followed by most developing nations (Zhang, et al. 2014). Berardi (2012) notes that construction sustainability comprises bearing in mind sustainable development in terms of its three principal aspects (environment, economic and social) while meeting the necessities for technical and functional performance.

Conclusion

Developing countries have the largest population globally and competition for resources, services and other developmental needs is very high. This, coupled with limited infrastructure, accentuates poverty and poor socio-economic conditions in the developing world. This review has shown that there are views that see infrastructure investment as a poverty reduction tool in developing countries. However, the review shows that the link between infrastructure and poverty reduction is not automatic. The poor are often precluded from benefits of infrastructure by factors such as weak governance systems, corruption, failed/poor implementation, poor planning and failure to incorporate poverty reduction theme in the design and implementation of infrastructure projects. To address these challenges, this review identifies the need for a shift in programme theory associated with infrastructure development. This is a departure from the trickle-down perception of infrastructure and advances a pro-poor infrastructure development. What the review has shown is that infrastructure can stimulate economic growth and poverty reduction if provided in an adequate and targeted manner. This entails actively engaging target beneficiaries of infrastructure projects in its design and implementation.

There is a need for further research to gain insights into the best model of public participation that is most beneficial to the poor. There is also a need to strengthen governance systems in general and the institutional settings within which the implementation of infrastructure projects operate. To further enhance the benefit of

infrastructure for the poor, we recommend that the question should go beyond the provision of infrastructure to one of access since infrastructure, in and of itself, cannot reduce poverty if it is inaccessible to the poor due to factors such as costs, location and regulatory/governance systems. We further recommend that the poverty reduction theme in infrastructure development should go beyond issues associated with income and employment creation and should incorporate how infrastructure can enhance the social and natural capital available to the poor. Given the fundamental roles that infrastructure plays in mediating societal wellbeing, it is inevitable that the provision, proper management and maintenance of these facilities will contribute towards the well-being of societies in general and the poor and vulnerable population in particular.

Annotated Bibliography

Bremer, J. and S. H. Bhuiyan (2014). Community-led infrastructure development in informal areas in urban Egypt: A case study. *Habitat International*, 44(0): 258-267.

This article recognises public-private partnerships as a tool that will enhance development in informal areas. It looks at a case study that represents public-private partnerships as private sector collaboration. The paper argues that self-driven or community driven projects produce better end-results in meeting their needs with regard to service provision. The thinking behind this is Turner and Fichter (1972) ideas on self-help housing where the government will only act as an enabler rather than the provider. Wong, Luo, Zhang, and Rozelle (2013) highlight a probable solution towards this paper's main argument in achieving quality by suggesting that infrastructure must be managed and constructed by community leaders with the support of government. Bremer and Bhuiyan (2014) conclude that governments need to recognise self-built infrastructure and provide support to achieve efficiency.

Calderón, C. (2009). *Infrastructure and Growth in Africa*. Washington: World Bank.

Calderón identifies inadequate infrastructure as one of the biggest issues in Africa. In line with his literature, other authors in development economics appreciate the relevance of infrastructure on productivity growth. This paper delivers an all-inclusive assessment of the impact of infrastructure development on economic growth in Africa. The author argues that African countries have a higher

chance of getting more benefits from infrastructure development through larger stocks of infrastructure which can increase economic growth.

Calderón, C. and L. Servén (2008). *Infrastructure and economic development in Sub-Saharan Africa*. World Bank Policy Research.

This paper recognises adequate supply of infrastructure services as the core ingredient for economic development. Other authors supporting this argument indicate that poor infrastructure hinders development in various ways. Thus, there is a need to understand that infrastructure, in general, is not a catalyst for growth. However, if provided in an adequate manner, infrastructure will facilitate growth. This means that there is a need to ensure quality provision of infrastructure. Wong et al. (2013) bring forth the idea of community leadership in spearheading infrastructure in a more sustainable and efficient way. The contribution of infrastructure to growth and equity is assessed using an empirical assessment and measurements of quality and quantity of infrastructure are taken into account as well as a comparative cross-regional perspective to put Africa's experience with the international context in this article.

Matthews, J. C., et al. (2015). Social cost impact assessment of pipeline infrastructure projects. *Environmental Impact Assessment Review*, 50(0): 196-202.

In this paper, Matthews et al. (2015) bring forth the idea that trench-less technology needs to be a new trend in order to mitigate the negative impacts associated with traditional open-cut pipeline infrastructure projects. The paper uses an analysis of different case studies in order to show the social costs associated with open-cut methods as opposed to micro-tunnelling. The paper makes note of some aspects of environmental concerns; however, the loss of valuable land, due to land degradation, is not explored in this study. It is definite that there are other impacts that these forms of infrastructure projects have on the other spheres of development, i.e., economic and environmental costs.

Majumder, R. (2012). *Removing poverty and inequality in India: the role of infrastructure*. MPRA Paper No. 40941.

In this article, infrastructure is also looked at from the perspective of development towards poverty reduction and increase in equal economic gains. Critiques against this perspective allude that benefits from infrastructure are considerably less than anticipated, having minimal direct significance to poverty reduction. Even though infrastructure has a linkage to poverty reduction, the author also brings to the fore a multi-dimensional association between different types of infrastructure (physical and social). The author is one of the few that explores this multi-dimensional association.

Ogun, T. P. (2010). Infrastructure and Poverty Reduction: Implications for Urban Development in Nigeria. *Urban Forum*, 21(3), 249-266.

This is another exploration of infrastructure development in the aid to reduce poverty. As argued by Bremer and Bhuiyan (2014), this could be taken as a recommendation by development agencies to implement strategies that help reduce poverty. The author offers more to the debate on infrastructure and brings to surface a view by a school of thought on the effectiveness of investment in infrastructure as a poverty reduction strategy. The argument is that investment on infrastructure, in general, has no effect on poverty reduction. Another burning issue in this literature is urbanisation. The author sees this as a high incidence of poverty. This issue inevitably brings challenges to inner-city infrastructure management and development. Arguments by Wong et al. (2013) encourage rural infrastructure development in the fight against issues such as urbanisation.

Rahman and Rahman (2015) Climate extremes and challenges to infrastructure development in coastal cities in Bangladesh. *Weather and Climate Extremes*, 7, 96-108.

This paper promotes the same views in line with other literature on achieving sustainable development. The article is influenced by the growing concern about weather and climate change. This paper takes an approach that looks at the impacts that infrastructure has on the environment. It offers more of a reflective perspective for planners as it brings to light the importance of the environment as well as the associated impacts if used inappropriately. The author acknowledges the contributions of infrastructure to economic growth and poverty reduction.

Sartori, D. and G. Catalano (2013). *Infrastructure investment long term contribution: Economic development and wellbeing*. Centre for Industrial Studies. Working Paper N.01/2013.

This paper draws on the fact that investment projects can foster economic development. The paper also brings an important view that economic development is part and parcel of the well-being of society and that there are a variety of other factors that may affect public welfare which is not usually captured by the traditional economic indicators. Another interesting thought the author explores is that the level of social satisfaction can be affected by a variety of other factors such as social cohesion. Environmental effects, territorial cohesion, institutional learning and social happiness are, for instance, are factors that affect the level of social satisfaction and the perception of social reality. In the paper, a study is represented that gives the assertion that the impact of infrastructure on wellbeing varies from project to project. Expectations are a major contributor to social satisfaction and dissatisfaction.

Tilt, B., Braun, Y., & He, D. (2009). Social impacts of large dam projects: A comparison of international case studies and implications for best practice. *Journal of Environmental Management*, 90, Supplement 3(0), S249-S257.

In this article, Tilt et al. (2009) recognise the effectiveness of infrastructure in promoting development. With that said, the basis of this article is the follow-up of social concerns linked with the delivery of infrastructure projects. It is undoubted that there is a range of benefits associated with large dam projects; however, there are other issues such as job loss and the loss of a sense of community due to resettlements caused by the construction of these projects. A different perspective may view this as being a worsening situation to the poverty experience as families need to re-organise themselves within their new settlements.

Wong, H. L., Luo, R., Zhang, L., & Rozelle, S. (2013). Providing quality infrastructure in rural villages: The case of rural roads in China. *Journal of Development Economics*, 103(0), 262-274.

Wong et al. (2013) argue that quality infrastructure is a remedy to the economic and poverty-linked issues in rural areas. The paper sees community engagement in infrastructure projects as an

approach that needs to be accepted by governments in developing countries to achieve quality infrastructure. The paper also shows that infrastructure quality and costs are complementary. The focus is centred on the development of rural roads. An argument against community led projects is that governments can also maximise quality by using their technical know-how and proven experience. However, the bigger issue here is management. The paper views village leaders to be a viable option in infrastructure management as they have better local information.

Yao, H., Shen, L., Tan, Y., & Hao, J. (2011). Simulating the impacts of policy scenarios on the sustainability performance of infrastructure projects. *Automation in Construction*, 20(8), 1060-1069.

In this literature, the author views infrastructure as a contributor to economic growth. Other literature further notes that poor infrastructure impacts negatively on the economic growth. The study brings to our attention what is not often explored in infrastructure development projects, i.e., the environmental impact of infrastructure projects. The author makes note that there is a need for a balance between the pillars of development (social, economic and environment). The main objective is the investigation of a different sustainability approach. This is done by considering impacts of dynamic interactions of different factors on the project performance. To some extent, the author only focuses on one form of infrastructure (transport) and does not consider other infrastructure modes, whereas other literature on this topic also considers water, energy and sanitation etc.

Zeng, S. X., Ma, H. Y., Lin, H., Zeng, R. C., & Tam, V. W. Y. (2015). Social responsibility of major infrastructure projects in China. *International Journal of Project Management*, 33(3), 537-548.

This article sets to find answers in addressing the social, environmental and ethical as well as stakeholder issues in relation to infrastructure development. The ideas and arguments brought about by this article are more or less in line with other works on the debate around the sustainability of infrastructure provision. The author does not depart from the views of others in the same field but recognises the need for a better management strategy that will allow economic growth while simultaneously trying to mitigate social and environmental concerns. Zhang, Wu, Skitmore, and Jiang (2015) supports the ideas of Zeng, Ma, Lin, Zeng, and Tam (2015) on the goal towards a

balance of infrastructure impacts. There are a variety of challenges in meeting the aspects of social responsibility and the author puts on the table issues associated with these challenges.

Zhang, X., et al. (2015). Sustainable infrastructure projects in balancing urban–rural development: towards the goal of efficiency and equity. *Journal of Cleaner Production*, 45, 445-454.

The issue of low-quality infrastructure is thought of as a hindrance towards achieving development. In support of this statement, Bremer and Bhuiyan (2014), along with Wong et al. (2013) hypothesise that poor levels of infrastructure has negative impacts on growth and result in a 'going-nowhere-slowly growth'. This article proposes that urban-rural development through the provision of infrastructure and facilities can improve health and education. Zhang et al. (2014), in line with Bremer and Bhuiyan (2014), recognise the role of public-private partnerships in delivering quality infrastructure efficiently. Another significant idea raised by the article is that local governments must achieve a balance in the provision of infrastructure between the rural and the urban areas in order to coordinate urban-rural development.

References

- Agénor, P.-R. (2010). A theory of infrastructure-led development. *Journal of Economic Dynamics and Control*, 34(5), 932-950.
- Ali, I., & Pernia, E. M. (2003). Infrastructure and Poverty Reduction-What is the Connection?
- Alkire, S., & Foster, J. (2011a). Counting and multidimensional poverty measurement. *Journal of public economics*, 95(7), 476-487.
- Alkire, S., & Foster, J. (2011b). Understandings and misunderstandings of multidimensional poverty measurement. *Journal of Economic Inequality*, 9(2), 289-314.
- Andrews, A. (1990). Fragmentation of habitat by roads and utility corridors: a review. *Australian Zoologist*, 26(3-4), 130-141.
- Ashley, C., & Mitchell, J. (2009). *Tourism and poverty reduction: Pathways to prosperity*. London: Taylor & Francis.
- Banjo, G., Gordon, H., & Riverson, J. (2012). *Rural Transport: Improving its contribution to growth and poverty reduction in Sub-Saharan Africa*. Retrieved from Washington: <https://openknowledge.worldbank.org/handle/10986/17807>
- Berardi, U. (2012). Sustainability assessment in the construction sector: rating systems and rated buildings. *Sustainable Development*, 20(6), 411-424.
- Bourguignon, F., & Chakravarty, S. R. (2003). The measurement of multidimensional poverty. *The Journal of Economic Inequality*, 1(1), 25-49.
- Bracking, S. (2012). Secrecy jurisdictions and economic development in Africa: the role of sovereign spaces of exception in producing private wealth and public poverty. *Economy and Society*, 41(4), 615-637. doi:10.1080/03085147.2012.661622
- Bracking, S. (2016). *The Financialisation of Power: How Financiers Rule Africa*. New York: Routledge.
- Briceno-Garmendia, C., & Estache, A. (2004). *Infrastructure services in developing countries: access, quality, costs, and policy reform* (Vol. 3468): World Bank Publications.
- Buhr, W. (2003). *What is Infrastructure?* Bremen: Univ., Fachbereich Wirtschaftswiss.
- Calderón, C., & Servén, L. (2004). *The effects of infrastructure development on growth and income distribution*: World Bank Publications.
- Calderón, C., & Servén, L. (2008). Infrastructure and economic development in Sub-Saharan Africa. *World Bank Policy Research Working Paper Series, Vol.*
- Cervantes-Godoy, D., & Dewbre, J. (2010). *Economic importance of agriculture for poverty reduction* (1815-6797). Retrieved from Paris:
- Daigle, P. (2010). A summary of the environmental impacts of roads, management responses, and research gaps: A literature review. *Journal of Ecosystems and Management*, 10(3), 65-89.
- Dinkelmann, T. (2011). The effects of rural electrification on employment: New evidence from South Africa. *The American Economic Review*, 101(7), 3078-3108.
- Dugan, P. J., Barlow, C., Agostinho, A. A., Baran, E., Cada, G. F., Chen, D., . . . Mallen-Cooper, M. (2010). Fish migration, dams, and loss of ecosystem services in the Mekong basin. *Ambio*, 39(4), 344-348.
- Dutil, Y., Rouse, D., & Quesada, G. (2011). Sustainable buildings: An ever evolving target. *Sustainability*, 3(2), 443-464.
- Gordon, D., & Nandy, S. (2012). Measuring child poverty and deprivation. *Global child poverty and well-being. Measurement, concepts, policy and action*, 57-101.
- Haggblade, S., Hazell, P., & Reardon, T. (2010). The rural non-farm economy: Prospects for growth and poverty reduction. *World Development*, 38(10), 1429-1441.
- Hanjra, M. A., Ferede, T., & Gutta, D. G. (2009). Reducing poverty in sub-Saharan Africa through investments in water and other priorities. *Agricultural Water Management*, 96(7), 1062-1070.

- Hayes, D. J. (2014). Addressing the environmental impacts of large infrastructure projects: making “mitigation” matter. *Environmental Law Reporter*, 44, 10016-10021.
- Hulme, D., Moore, K., & Shepherd, A. (2001). Chronic poverty: meanings and analytical frameworks. *Chronic Poverty Research Centre Working Paper*(2).
- Humphrey, J., & Navas-Alemán, L. (2010). Value chains, donor interventions and poverty reduction: A review of donor practice. *IDS Research Reports*, 2010(63), 1-106.
- Kirubi, C., Jacobson, A., Kammen, D. M., & Mills, A. (2009). Community-based electric micro-grids can contribute to rural development: evidence from Kenya. *World Development*, 37(7), 1208-1221.
- Kurosaki, T. (2012). *Urban transportation infrastructure and poverty reduction: Delhi metro’s impact on the cycle rickshaw rental market*. Retrieved from Delhi
- Laurance, W. F., Goosem, M., & Laurance, S. G. (2009). Impacts of roads and linear clearings on tropical forests. *Trends in Ecology & Evolution*, 24(12), 659-669.
- Lerer, L. B., & Scudder, T. (1999). Health impacts of large dams. *Environmental Impact Assessment Review*, 19(2), 113-123.
- Leroy, J. L., Ruel, M., & Verhofstadt, E. (2009). The impact of conditional cash transfer programmes on child nutrition: a review of evidence using a programme theory framework. *Journal of Development Effectiveness*, 1(2), 103-129.
- Loayza, N. V., & Raddatz, C. (2010). The composition of growth matters for poverty alleviation. *Journal of development economics*, 93(1), 137-151.
- Mara, D., Lane, J., Scott, B., & Trouba, D. (2010). Sanitation and health. *PLoS Med*, 7(11), e1000363.
- Montalvo, J. G., & Ravallion, M. (2010). The pattern of growth and poverty reduction in China. *Journal of Comparative Economics*, 38(1), 2-16.
- Ogun, T. (2010). *Infrastructure and poverty reduction: Implications for urban development in Nigeria*. Paper presented at the Urban Forum.
- Olawale, F., & Garwe, D. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. *African journal of Business management*, 4(5), 729.
- Organization for Economic Cooperation and Development. (n.d.). Outlines of Principles of Impact Evaluation Retrieved from <http://www.oecd.org/dac/evaluation/dcdndep/37671602.pdf>
- Otsuki, K., Read, M., & Zoomers, A. (2016). Large Scale Investments in Infrastructure: Competing Policy regimes to Control Connections.
- Parker, D., Kirkpatrick, C., & Figueira-Theodorakopoulou, C. (2008). Infrastructure regulation and poverty reduction in developing countries: A review of the evidence and a research agenda. *The Quarterly Review of Economics and Finance*, 48(2), 177-188.
- Pillay, U., & Bass, O. (2008). *Mega-events as a response to poverty reduction: The 2010 FIFA World Cup and its urban development implications*. Paper presented at the Urban Forum.
- Rahman, S., & Rahman, M. A. (2015). Climate extremes and challenges to infrastructure development in coastal cities in Bangladesh. *Weather and Climate Extremes*, 7, 96-108.
doi:<http://dx.doi.org/10.1016/j.wace.2014.07.004>
- Sen, A. (2001). *Development as freedom*: Oxford Paperbacks.
- Stark, O., Micevska, M., & Mycielski, J. (2009). Relative poverty as a determinant of migration: Evidence from Poland. *Economics Letters*, 103(3), 119-122.
- Statistics South Africa. (2014). *Poverty Trends in South Africa: An Examination of Absolute Poverty between 2006 and 2011*. Retrieved from Pretoria:
- Tsui, K. (2002). Multidimensional poverty indices. *Social Choice and Welfare*, 19(1), 69-93.
- Turner, J. F., & Fichter, R. (1972). *Freedom to build: dweller control of the housing process*: Macmillan.
- United Nations Human Development Programme. (2015). *Human Development Report 2015: Working for Human Development*. Retrieved from New York:
http://hdr.undp.org/sites/default/files/2015_human_development_report.pdf

- Wallman-Stokes, C. W., K. H., McLaughlin, C. A., & Rosqueta, K. M. (2013). *What Are We Talking About When We Talk About Impact?* Retrieved from Pennsylvania: http://ofgggcw7grfd3uv3nznpeipk.wpengine.netdna-cdn.com/wp-content/uploads/2014/12/What_Are_We_Talking_About_When_We_Talk_About_Impact.pdf
- Wong, H. L., Luo, R., Zhang, L., & Rozelle, S. (2013). Providing quality infrastructure in rural villages: The case of rural roads in China. *Journal of Development Economics*, 103, 262-274.
- Zeng, S., Ma, H., Lin, H., Zeng, R., & Tam, V. W. (2015). Social responsibility of major infrastructure projects in China. *International Journal of Project Management*, 33(3), 537-548.
- Zhang, X., Wu, Y., Skitmore, M., & Jiang, S. (2015). Sustainable infrastructure projects in balancing urban–rural development: Towards the goal of efficiency and equity. *Journal of Cleaner Production*, 107, 445-454.
- Zulu, L. C., & Richardson, R. B. (2013). Charcoal, livelihoods, and poverty reduction: Evidence from sub-Saharan Africa. *Energy for Sustainable Development*, 17(2), 127-137.