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PROFESSIONAL PRACTICE

Linking environmental assessment and rapid urbanization in Kampala City

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Linking environmental assessment (EA) and infrastructure development projects as a result of rapid urbanization reveals serious environmental problems in Kampala City, Uganda. Of the many infrastructure development projects implemented to meet the growing demands of rural–urban influx, few are subjected to EA as part of the project approval process. This paper investigates the environmental impacts of infrastructure development projects that are implemented and seeks to understand the nature of these impacts. The study results suggest that ecological infrastructure is as vital as physical infrastructure for the functioning of the economy – a path that can meet both long-term economic and environmental imperatives. A mechanism for integrating EA into planning and development processes is proposed and the need to look into environmental fiscal reform (EFR), compliance with environmental legislation, integrated urban development policy, and strategic environmental assessment among others is examined.

Keywords: ecological infrastructure; physical infrastructure; rapid urbanization; infrastructure development projects; environmental assessment; ecosystem; Kampala

Introduction

By 2025 more than two-thirds of the developing world's population will live in cities (United Nations 2008). Although rapid urbanization brings opportunities to new urban developments, it also comes with serious loss of ecosystems and degradation of arable land, as well as social and environmental changes to urban populations. The current urbanization process in developing countries is indicative of a process that needs considerable attention, not only as a basis for transformation of cities but also for sustainable development. As cities have grown to enormous sizes, their inhabitants' consumption and production patterns have generated environmental stresses beyond those due to limitations on land, water and other natural resources required to feed, clothe and shelter them. Unplanned population growth and massive rural–urban migration has also contributed to environmental degradation. Ecological infrastructure is the key spatial pattern to keep land and life safe and healthy and to maintain the historical and cultural features, unlike physical infrastructure which lacks land-use planning. Ecological infrastructure is the basic security for the city and citizens to obtain continuing natural service (ecological service), as well as the rigid framework for urban and land development. (Yu *et al.* 2005, Wang *et al.* 2008). Unless environmental dilapidation is arrested, development of physical infrastructure for the functioning of the economy in cities will not be sustained. In addition, ecological infrastructure will not be achieved. One of the most challenging tasks is guiding the process of urbanization in cities of developing countries. These cities grow beyond administrative limits without adequate support from infrastructure networks,

land-use planning guidance or development control (Suparb *et al.* 2008).

Development of physical infrastructure has been promoted at the expense of ecological infrastructure. Hence there is need for local urban authorities to practise environmentally sustainable urban development where the improvement of the quality of life in a city, includes ecological, cultural, political, institutional, social and economic components without leaving a burden on future generations. There is a need to conserve existing ecosystems like wetlands in which ecological services are improved so that people can enjoy nature, including clean air and water, and even listen to birds sing beautifully. Environmental assessment (EA) should be made an integral part of the project approval procedure for local government and other authorities. Secondary data from various reports and policy documents found in different agencies, which have attempted to address the environment and development issues of Kampala City, were examined with a focus on housing, industrial development and how they relate to environmental degradation in the metropolitan area of Kampala.

Study area

Kampala is the capital city of Uganda with a population of about 1.8 million and an annual demographic growth rate of about 3.9%, well over the national rate of about 3.3% (UBOS 2002). It is estimated that the city's population will reach 2.4 million by 2012 (UBOS 2002). About 50% of Uganda's urban population lives in Kampala. The next largest urban centre is less than 10%

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of the size of Kampala in population terms (UBOS 2002). Kampala is the hub of the country's economic, political and administrative activities. It has evolved from a small hamlet of 8 km² to a 'city of seven hills' at independence in 1962 and is one of the fastest growing cities in Africa, now occupying more than 25 hills (Kibirige 2006).

The city derives its name from the 'impala' (antelope) that roamed the area before it was taken over for human settlement. The first administrative post was set up at Old Kampala Hill in 1890 covering an area of 0.68 km². It was given a town council in 1906 with an area of 8 km² and was extended to cover an area of approximately 195 km² in 1968 (Nyakaana *et al.* 2004). Currently, most urban population is increasingly shifting to Nansana, Kyengera, Kajjansi and Nyanama. The physical expansion of Kampala has been guided by different planning schemes. The first one was produced in 1912 and others were produced in 1919, 1930, 1972 and 1994 (when a structural plan was developed, Nyakaana *et al.* 2004). Despite these planning schemes, developments in Kampala City, especially housing, have continued to be haphazard, unplanned and located outside planned areas. This is a consequence of Kampala City Council's (KCC) failure to implement and enforce planning schemes, or address corruption, political interference, conflicting land-use policies, and uncoordinated instructions between KCC and the Ministry of Local Government and, occasionally, State House (Kampala City Council 2006, Tamale 2010).

What is the current situation?

Unplanned housing developments in Kampala City

High-rise commercial and residential buildings are on the increase. The skyline around educational institutions, especially universities, is changing through construction of multi-storied residential hostels for the increasing university student population. For instance, Katanga, Kikoni, Kagugube and Kivulu slums, around Makerere University, have given way to high-rise hostel buildings. Slums which used to be found close to the Central Business District (CBD) are disappearing very quickly but are re-emerging at the periphery as slums continue to house the majority of the urban population (Nsambu 2006). Most infrastructure development is informal with no direct government support and has led to environmental stress. Developers generally try to bypass official planning processes, building regulations and standards because they can be cumbersome and costly procedures (Kampala City Council 2006). Housing production capacity in Kampala is limited and poorly organized. The demand will continue to exceed the supply and this has negative implications, for urban development and the environment (Uganda 2005). In spite of the well-documented physical planning bylaws and regulations that have been in place for some time, people's living environments are still in an unacceptable state. For example, the Kalerwe and Bwaise settlements have replaced wetlands, leading to floods and siltation (Emasu 2007, Lule 2010).

Industrialization in Kampala City

Industrialization has increased in Kampala largely due to the liberal investment policy and other macro-economic policies (Byandala 1996, Lwasa 2004 MoFPED 2000). Over time industrialization has contributed to the influx of migrants into the city. Kampala and the surroundings have attracted industrial investments due to existing infrastructure that can facilitate industrialization and government policy directed at the establishment of an industrial estate in the degazetted forest of Namanve. The formal industrial areas include Ntinda, Nakawa, Luzira-Port Bell, Kawempe and Namanve. These industrial areas accommodate 93% of Uganda's formal industries (Lwasa 2004, UIA 2005). Small-scale industries are involved in metal and wood fabrication, while large-scale industries are involved in textile manufacture, steel rolling mills, tiles and brick making, soft drink and beer bottling, and tanning. Though growth in industrial activity can lead to economic development, it has had serious environmental consequences such as wetland encroachment and destruction, disposal of solid and toxic wastes in the wetlands and drainage channels, water pollution, solid waste accumulation and land-use change which is reducing the ecological services from the natural environment of the Metropolitan area (NEMA 2000/01, Matagi 2001, Millennium Ecosystem Assessment 2005).

Environmental challenges of Kampala

There is an unfortunate trend in Kampala City, where rather than develop existing vacant land, nearly all developers have found it more profitable, and perhaps convenient, to develop natural ecosystems like wetlands and natural forest reserves, removing the city's existing carbon sinks. In 1993 it was noted that 13% of the wetland area was severely degraded, by 1999 the estimates show that 46% of the wetland was severely degraded, and by 2002 only 3.3% was remaining and was continuing to be degraded (NEMA 2000/01). Physical infrastructure development has played an important role in wetland degradation. A recent example is the construction of the Kampala Northern Bypass. The works carried out under this project comprised the construction of 21 kilometres of road, which includes 17.5 kilometres of single-carriageway road and 3.5 kilometres of dual-carriageway road. The bypass commences at Busega–Masaka Road Roundabout and proceeds for approximately 200 metres north along the Mityana Road. It then heads northeast and follows the edge of the Lubigi Swamp. It skirts north of Lubya Hill and crosses Hoima Road at Nnamungoona. The alignment then passes Kawaala Hill behind Makerere Hill, before reaching Bombo Road at its junction with Sir Apollo Kagga Road. The route then runs through Bwaise and south of Kyebando Hill before crossing the swamp again to Bukoto, Kigoowa and Nsimbi Ziwoome, to the south of Kkulambiro Hill. From Kkulambiro, the route crosses over to Kiwatule, Kamidi before crossing Jinja Road at Ntebettebe. It had three possible routes, but the 'green route', which passes through the wetlands, was selected and implemented. Kinawataka wetland, between

Nakawa, Ntinda and Kireka, and part of Nalukolongo, Kyetinda, Nsooba, Bulyera, Kiyanja, Kansanga, Mayanja and Nakivubo wetlands, which form a lining around Kampala metro area, have been encroached upon and degraded due to various driving factors including political interference; inadequate law enforcement capacity and mechanisms among the various institutions charged with environmental management; and lack of adequate knowledge and understanding among wetland users, law enforcement officers and legislators on functions of wetlands (Kahangirwe 2006, Tebajjukira 2010).

Other environmental challenges include poor maintenance of the water system and sewerage system; storm-water networks creating avenues for contamination in the supply network from the widespread pit latrines and open disposal of human wastes (Byamukama 1998 and Byamukama et al. 2000); improvised 'mobile' toilets in the form of plastic bags, which have resulted in frequent outbreaks of cholera, dysentery and diarrhoea; and increased solid waste generation rates where Kampala generates an estimated 30,000 tonnes of waste per month and the average per capita solid waste generation rate is 0.6 kg/per person/per day (Kampala City Council 1995, Mwiganga et al. 2005). Lack of community sensitization, absence of sorting of garbage by type at generation points and indiscriminate dumping still exist, creating unsightly and unhealthy conditions with the potential for multiplication of disease-carrying vectors (NEMA 2000/01).

Environmental assessment and infrastructure development

Although EA was fully established in Uganda in 1995, when a National Environment Act Cap 153 was enacted and the National Environment Management Authority (NEMA) was created and mandated to put into operation and implement this requirement, EA as an environmental management tool is not commonly applied in the context of small and medium-scale infrastructure development projects in Kampala. EA is one of the policy innovations designed to contribute to the integration of economic, social and environmental concerns in the development process in a balanced way as key to the attainment of sustainable development at or above the project level (Suparb et al. 2008). If applied at the project level, it is termed traditional reactive environmental assessment, while if applied above the project level it is known as strategic environmental assessment (SEA) (Canter 1996, Goodland et al. 1996, Mitchell 2002, Glasson et al. 2005, Suparb et al. 2008). It should be noted that the EAs conducted so far in Kampala have focused only on large-scale projects and more particularly on the planning and construction phases, with very little or no emphasis being placed on operation and maintenance phases. Small and medium-scale projects have not been given much attention due to a misconception that less investment results in minimal environmental concerns. This can be attributed to NEMA's inability when it comes to post-construction

monitoring, evaluation and follow-up. In order for EA to be more effective, there is need for the project developers to seriously consider environmental management plans as part of project implementation throughout the design, construction and operational stages (Benson et al. 2006).

There is also a need to invest in ecological infrastructure to facilitate healthy ecosystems such as water catchments, and wetlands which provide substantial economic services. Ecological infrastructure also provides services like water purification, storm-water protection, erosion control and carbon sequestration (UNEP 2009). The enforcement of EA regulations for the infrastructure development projects in Kampala City is still inhibited by a number of challenges, and ecological infrastructure development is still limited. The enforcement of EA regulations for infrastructure development projects has faced three major setbacks, namely: (1) that the EA process mandatory for large-scale projects, such as big, mixed-use shopping malls, is not taken seriously, (2) implementation and monitoring phases have been given very little attention, and (3) lack of political will and follow-up.

What needs to be done?

Need for an environmental fiscal reform (EFR)

EFR refers to a range of taxation or pricing instruments that can raise revenue, while simultaneously furthering environmental goals (DFID, CEC, UNDP and World Bank 2002). This can be achieved by providing economic incentives to correct market failure in the management of natural resources and the control of pollution. EFR can mobilize revenue for governments and improve environmental management practices and conserve resources. Hence, by encouraging sustainable use of natural resources and reducing pollution from energy use and industrial activities as a result of urbanization, EFR can address environmental problems that threaten the livelihoods of the poor. EFR encompasses a wide range of taxation and policy instruments which can be used to address specific environmental and resource use issues including the following:

- (1) Taxes on natural resource use (e.g. forestry) – to reduce the inefficient exploitation of public owned or controlled natural resources resulting from operators not paying a price that reflects the full value of the resources they extract.
- (2) Environmentally related taxes – to make polluters (motor vehicles, industrial activities) pay for the 'external costs' of their activities and encourage them to reduce these activities to a level that is more ecologically and socially desirable.
- (3) User fees/charges and subsidy reform – to improve the provision and quality of basic services such as electricity and water, while providing incentives to reduce any unintentional environmental effects arising from their inefficient use.

These benefits of EFR complement each other.

Need for compliance with environmental legislation

Kampala City Council is increasingly unable to effectively carry out law enforcement as required due to lack of funds and lack of sufficient staff. Although the national laws oblige EA for large-scale infrastructure development projects, small- and medium-scale projects are being implemented without EA. Hence, there is need for an evaluation of existing planning regulations which often do not address environmental effects. Also, KCC needs to strengthen its environmental legislation with adequate bylaws to make EA compulsory for small- and medium-scale infrastructure development projects in order to mitigate the environmental impacts of such projects. Also the central government needs to allocate sufficient resources for KCC to carry out law enforcement on, for instance, people who have constructed houses in wetlands.

Need for an integrated urban development policy

The major policy challenge is the existence and enforcement of contradicting policies as in the case of the Town and Country Planning Act 1964, which permits development in wetlands, and the National Environmental Management Act 1995, which restricts such development. The two are further contradicted by the Land Act of 1998, which protects the ownership of land by individuals and institutions irrespective of whether such land is a wetland or other ecologically sensitive area. These policies and laws need to be consistent to ensure sustainable management of the urban environment for ecological infrastructural development. Associated with the need for harmonization, is the requirement for urban greening policy, waste management policy and urban agriculture policy, which could offer support to urban environmental management through conservation. Urban greening and agricultural policies should be targeting projects like tree planting and wetland conservation.

Strategic environmental assessment (SEA) and planning policy

There is need to have EA techniques that place more emphasis on policies, plans and programmes such as SEA. Although SEA attempts to cover environmental assessment at policy and planning levels it can, for example, be applied in considering environmental impacts of urban development and, in particular, development plans. Unfortunately, there is not yet a legal requirement for SEA, as there is for project-level EA, in Uganda. KCC in collaboration with like minded institutions and partners should design an effective planning policy clearly spelling out responsibilities. The policy should have clear mechanisms for implementation and penalty measures for non-compliance.

Need for social infrastructure and public services policy

Municipal services (public transport, waste management etc.) and social infrastructure (schools, hospitals etc.) are

of vital importance for sustainable development of cities. These are essential economic and social factors for attracting production capital. When this capital is lacking, the urban economy translates into social distress. Due to unreliability of the electricity system, industrial and commercial businesses are using their own generators, which have significantly increased both their investments and running costs, but more importantly have increased pollution through deposition of oxides of carbon. Urban land-use and housing policy will lead to proper control of the use of urban space, which contributes to the sustainability of cities. The 'enabling housing' policy being pursued by government needs a review to consider more robust mechanisms of dealing with alternative building materials, minimum plot sizes, rental housing markets and semi-regulation of the land market in Kampala.

Conclusion

Fast-paced physical infrastructure development has made it difficult to implement the spatial plans that would otherwise guide the expansion of the city. Ecological infrastructure is as vital as physical infrastructure for the functioning of the economy – the role of wetlands, for example, is vital to economic health; they purify water, regulate its flow and act as carbon sinks. The contributions of these ecosystems to the economy is often unappreciated because their services are seen as provided naturally and thus not accounted for nor priced (UNEP 2009). This paper investigated the environmental effects of infrastructure development projects implemented, in addition to seeking to understand the nature of their impacts. The EA process for large-scale projects should be taken seriously, especially at follow-up stages, while enforcement of EA regulations and the introduction of EA for small- and medium-scale projects needs to be implemented by KCC. In addressing policy needs (like industrialization), sustainable development needs to be coupled with easing of urban poverty (Enyedi 2003, UNDP 2005) as it is difficult for a poor man to conserve, hence the loss of wetland ecosystems to urban farming. While it is difficult to measure the needs of future generations, it is important to reflect on how ecological infrastructure has provided, regulated and supported societies for millennia. Thus solutions are needed that address social well-being but maintain the basic services from the ecosystems.

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