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Effect of Uncontrolled Urban Development on Infrastructure in Medium Sized Towns in Sub-Saharan Africa

Jocelyne Malakwen
Department of Development Studies, Moi University.

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ABSTRACT

The rapid rate of uncontrolled urban development is becoming a major challenge facing policy makers in the urban areas. Increase in population demands has led to high demand for housing hence scramble for space. This paper gives an overview of the global and local situation in regard to the adverse effects of uncontrolled urban development on the basic amenities in sub-saharan Africa**.** The paper was based on Mann's Urban Model which emphasizes the need for a systematic growth of urban centers in a more concentric and planned manner. It was based on a study undertaken in Eldoret town; Kenya strives to discuss uncontrolled urban development and its mitigations. It was a case study, focusing on two informal settlements: Langas and Munyaka selected purposely. The two settlements were selected for study due to; the high density and consolidation and they are settlements outlying on the urban periphery with lack of appropriate infrastructure, poor maintenance regimes, overcrowding, uncontrolled and conflicting land uses. Arising from the study is that lack of adequate professional planners private land owners are not exposed to proper professional advice resulting in land use plans which reflect the wishes of land owners. People find immediate, although substandard, solutions to their occupation problem which carries a negative impact for the overall urban structure. It limits the expansion of infrastructure, Illegal connection, Vandalism of water transmission lines, poses a serious health hazard of the town and pressures on service and utility systems, hence system overload. This study recommends that, the current cadastral system in the different counties should provide useful information for formulating development plans, which will form a basis of managing the expansion of medium sized towns.

Introduction

Uncontrolled urban development is becoming a threat to growth of cities and development of towns worldwide. Urbanization in many African countries is a blessing in disguise in that, rapid urban growth has brought with it a host of problems, including unemployment and underemployment, a burgeoning informal sector, deteriorating infrastructure and service delivery capacity, overcrowding, environmental degradation, and an acute housing shortage. The rapid expansion in urban population has occurred without the needed expansion in basic services and productive employment opportunities. The problem is compounded by weak urban government structures with very limited capacity to stimulate economic growth, mobilize resources and provide the most basic services resulting to uncontrolled urban development.

Society is increasingly becoming diverse and complex, new forms of leadership, institutional forms and local networks are needed for local authorities to cope with emerging trends and challenges of urbanization. The anti-urban bias goes against the prevailing view that sees urbanization as a progressive process and as one of the key forces underlying technological innovation, economic development and socio-political change. Urbanization has been found to have positive impacts on fertility, mortality and other demographic trends. The current resurgence of interest in and attention to urban management, and the view that cities are the engines of national economic growth and development in general, is in part, based on this pro-urban perspective. This is particularly true today in knowledge-intensive globalizing economy where cities have played a central role as agents of innovation diffusion and socio-economic transformation. Like many other regions in the world, sub-Saharan Africa is confronted with the challenge of rapid urbanization in the context of economic stagnation, poor governance, and fragile public institutions. By the year 2010, it is estimated that approximately 55% of Africans will be residing in cities (UNDP, 1991: 1).

A controlled urban development process consists of the following sequence: Planning (P), Servicing (S), Building (B), and Occupation (O), (Baross, 1990).However, in uncontrolled land occupation the process is reversed to: O-B-S–P. While P-S-B-O enables effective provision of infrastructural services, it is difficult for the local authorities to provide services in O-B-S-P due to lack of planning. The authorities in charge, plan following the landuse /Zoning plans. The informal development of land on the urban fringe in many medium towns in Kenya follows the second sequence with a common scenario of spontaneous settlements.

The rapid rate of uncontrolled and unplanned urban development have brought with it complex urban problems,

Tele:
E-mail address: hildalyne2006@gmail.com

like traffic congestion, limited controlled access to land ,rapid growth of slums ,blockage of sewers accompanying health hazards and rural problems such as qualitative and quantitative depopulation of rural areas (Oinobkun,1973).

The haphazard urban growth and spontaneous settlements in Kenya medium sized towns is enormous which indicates poor control system .Lack of physical development plans to be implemented by local governments has enhanced reactive rather than pro-active development .The situation has been intensified by the desire to invest from different interested stakeholders. The rate of uncontrolled urban development has outstripped the local authorities' management capacity, financial resources, infrastructural provision and even information on urbanization process itself.

Literature Review

Guiding urban development should be a priority for cities in developing countries .This is because the root causes of most current problems encountered by these cities start from urban expansion. The problem is further complicated by the lack of provision of basic services and appropriate places for housing sites.

Urban development is basically referred to as city development, and involves taking into site development. It takes into account all the social, economic, political relationships and the form in which is growing the city in a sustainable way (Baross, 1991). Development is a relative term, locating a particular society or economy in relation to others, usually developed or more developed (Healey, 1974).Urban models played a significant role in urban development; Based on the concentric nuclei and sector theories it was easy to co-ordinate development. Planning was based on the fact that many towns and nearly all large cities grow about many nuclei rather than around a simple CBD. Some of these nuclei are pre-existing settlements, others arise from urbanization and external economies Distinctive land-use zones develop because some activities repel each other; high-quality housing does not generally arise next to industrial areas, and other activities cannot afford the high costs of the most desirable locations. New industrial areas develop in suburban locations since they require easy access, and outlying business districts may develop for the same reason.

According to sector theory, the view that housing areas in a city develop in sectors along the lines of communication, from the CBD outwards. High quality areas run along roads and also reflect the incidence of higher ground. Industrial sectors develop along canals and railways, away from high quality housing. Thus a high status residential area will spread out along the lines of the sector by the addition of new belts of housing beyond the outer arc of the city. Once contrasts in land use have developed in a sector near to the city, these contrasts will be perpetuated as the city grows. This theory was advanced by H. Hoyt (1939) as an alternative to Burgess 'concentric model, and was based on residential rent patterns in the USA.

Today however, it is impossible especially when planning is following the development process. This has resulted into a scenario of informal settlements making it impossible to co-ordinate the service provision in these areas. The situation has also been enhanced by rapid increase in population; people migrate from rural to urban areas in search better conditions in life as well as from the natural growth of the existing urban population

Uncontrolled urban development emerged also as a result of available opportunities arising from political will. Public institutions are opening up various branches due to the demand for their services; public utilities such as airports, Hospitals have been established under a Government order which interferes with existing plans from the planning authorities. This resulted into unwanted occupation of urban space not anticipated in development plans or land use plans.

Zoning of urban space

Zoning is the legal regulation of the use of land .It involves segregation of parcels of land or acres of towns in a physical development plan and ascribes to them broad classification of appropriate use for example; residential, Industrial, Educational, Commercial. The zoning plan serves as a comprehensive guide for urban and regional development when adopted and rendered effective as legal ordinance.

Infrastructure

Infrastructure typically refers to the technical structures that support a society, such as roads, water supply, waste disposal, power grids, flood management systems, communication internet, phone lines, broadcasting. In the past, these systems have typically been owned and managed by local or central governments. These various elements may collectively be termed civil infrastructure, municipal infrastructure, or simply public works although they may be developed and operated as private sector or government enterprises. A more generic definition of infrastructure is the network of assets "where the system as a whole is intended to be maintained indefinitely at a specified standard of service body the continuing replacement and refurbishment of its components.

In other applications, infrastructure may refer to information technology, informal and formal channels of communication, software development tools, political and social networks, or beliefs held by members of particular groups. Still underlying these more general uses is the concept that infrastructure provides organizing structure and support for the system or organization it serves, whether it is a city, a nation, or corporation. Economically, infrastructure could be seen to be the structural elements of an economy which allow for production of goods and services without themselves being part of the production process, e.g. roads allow the transport of raw materials and finished product infrastructure assets generally have the following attributes: They are large networks constructed over generations which are not often replaced as a whole system

Urban planning

Planning implies to be ahead on what is going to come in terms of changes, prevention of crisis and vision of future design of cities. Planning is defined as prediction or projection of urban population and land requirements in the future, for housing, industries, commerce offices, public facilities, transport, green spaces etc; it also includes the forecasting and taking preparatory measures coherent with the sustainable urban development.

In most countries urban planning is understood to refer to physical land use planning, typically consisting of three key elements first, an overall framework, usually a master plan, secondly, a set of planning and building standards and regulations and thirdly, a development control system. In most parts of the world, urban master plans constitute the heart of urban planning and this type of planning is often referred to as the "master planning approach".

This basic approach has, of course, been changed or improved in some countries, but for many countries, this remains the starting point of urban planning.

This type of physical planning is obviously a fundamental tool of effective urban development and management and can help the realisation of the objectives and other recommendations of Agenda 21. However, in spite of potentials for influencing the urban development and management process, this instrument has in recent years been much less effective than it could. It has severely been criticised as being too complex, excessively bureaucratic, time consuming, elitist and too static in nature.

An important criticism of master planning processes has been their over ambitious attempt to be comprehensive and their inability to deal with the uncertainties and incompleteness to the urban dynamics. Traditional master planning has shown uncertainty about the relationship between economic and spatial planning initiatives in promoting urban development. Because of these, many of its policies become outdated very quickly, thus rendering the process substantially irrelevant (UNCHS 1994). The master plan approach has also been criticised for not being participative with community groups, target beneficiaries and non-governmental organisations being largely excluded from the process. In addition it has been observed that urban planning tends to be divorced from sectoral processes responsible both for urban finance and for the provision of urban infrastructure and services. Because of these and other shortcomings, it has been argued that urban physical planning has been unable to cope with the rapid urbanisation processes.

Urban planning can intervene in the development process through three main instruments**:** plans (it provides a context for control decisions), control (It provides an administrative mechanism for the planning authority) and promotion (Is the most active way in which urban planning interacts with the development process) (Adams, 1994)

Not until the drastic decline in urban infrastructural standards that followed recession and structural adjustment in the 1980s was the economic importance of adequate infrastructure widely recognized. This recognition was assisted by the continued failure of African cities to compete for international investment in manufacturing and services (especially compared with Pacific Rim Asian cities); by research that demonstrated the costs to manufacturers of poor infrastructure and the important contribution made by economic activities located in urban areas to national economic growth; and by pressure from a growing business lobby that, especially where entrepreneurs had emerged from the informal sector, was less dependent on the state for its access to the means of production and accumulation than before.

The health of city economies has not, except more recently in South Africa, been within either the legal remit or the area of concern of local government, or indeed of central agencies responsible for local services, which have been preoccupied with routine administration, service provision, and political survival (Harris, 1992). Analyses of city that chart trends in demand for the package of goods and services produced in the city, identify activities with current or future comparative advantage, pinpoint constraints on the productivity of economic enterprises and their labour force, and analyse the spatial distribution of economic activities in the city and the links between them, as a basis for formulating economic development policies, are rare.

The "urban managers" in this context, Harris (1992) suggests, comprise the local authority, the chamber of commerce, and relevant industrial, commercial, financial, and professional associations (and, I would add, labour unions).

Some initiatives were mentioned in the case-studies, for example Nairobi's City Convention, the alliance between local government, big business, and inner-city residents to revitalize Johannesburg's CBD, and collaboration between local authorities, employers, and infrastructure companies to improve security and services in the Ikeja and Apapa areas of Lagos. The number and scope of such alliances in contemporary African cities compared with nineteenth-century and contemporary cities in, for example, the United States, Japan, or Europe are, however, limited. This reflects the absence of large-scale indigenous enterprises; governments' assumption that the management of the economy, installation and operation of infrastructure and services, and provision of housing were their responsibility; the lack of encouragement given to alternative associations during the authoritarian and post-independence decades; and the inheritance of good-quality infrastructure in the formally planned parts of cities, which, at least initially, was in working order. The forging of such alliances between local politicians and entrepreneurs (large and small scale), backed by officials more prepared to be proactive than traditional local government bureaucrats, can be expected to become more common in future, although the formation of politically strong local alliances in the largest cities is likely to provoke ambivalent reactions by central governments, even if they are committed to democratization and decentralization.

Factors That Affect Controlled Urban Expansion

Urban areas are growing on a very fast rate in developing countries; a high percent population growth occurs in the major towns and cities. City authorities are unable to provide them basic infrastructure and services. In most large cities, a great percentage occurs as a result of:

Migration

Migration may be defined either a temporary or a permanent change of residence by one person or a group of people In developing countries, the migration process, which is directed towards the main cities, constitutes one process that affects the society and the territory over time. One of the main causes of uncontrolled development in Kenyan medium sized towns is rural urban migration usually for economic reasons. Eldoret's population increased from 8000 in 1948 to 197,000 in 1999 (See table 1). This is attributed to economic opportunities. The annual population growth rate is estimated at 3.35%, thus projecting the current population at about 500,000. (Municipal council of Eldoret strategic plan 2006/2010)

Table 1. The Population of Eldoret 1948-1999.

Year	Population	Average inter-censal growth rate % per annum
1948	8,193	-
1962	19,605	6.2
1969	18,196	-1.07
1979	50,500	10.2
1989	111,882	8
1999	197,449	4.9

Source: CBS, Population Census Reports for; 1948, 1962, 1962, 1979, 1989, 1999.

Reason for migration

If people are satisfied where they are, they will not migrate, for migration to take place there must be factors that pushes people out or that pulls them to a new environment;

the situation in many African countries is that the living condition in rural areas has less opportunities associated with poverty, thus people have tendency to move to main cities in order to get better life opportunities. (Gilbert. A, 1981)

Growth of Eldoret in the Post Colonial era

Owing to its rich agricultural hinterland and rail transport ,Eldoret was an important agricultural service and agro-processing centre by the late 1970s .In 1980s Eldoret was selected as a growth centre and thus benefited from infrastructure investment to enable it to perform its intended role as a regional centre for the western Kenyan region .During the period between 1994 and 1999 Eldoret recorded the highest wage employment growth rate in the country (45 percent) which attributed to the increased activities in the manufacturing and construction sector .In addition, the town has vibrant informal sector that offers employment to the large majority of its residents. However since the mid-1990s, some of the town industries have experienced mixed fortunes. The wattle tanning industry and two textile processing industries closed down. Though the textile industries reopened recently under new management

Changing ownership of land ownership

Land within the original municipal boundary was government land .But subsequent municipal boundary extensions brought into the municipality the privately agricultural land. The colonial land ownership pattern in the area surrounding the town comprised large tracts of land owned by a few white settlers. Upon independence, farms were acquired by the government, land buying companies, co-operative societies, self help groups or individuals .Most of the land within the town and its hinterland is therefore privately owned and each municipal boundary extension brings privately owned land into the municipality. Land ownership within Eldoret municipality can be classified as follows:

Government owned land

Land owned by government includes land already in use or reserved for future use by the government and land for public use .It is administered by the commissioner of lands and constitutes a small proportion of the total land in the municipality .The government can enhance its stock by acquiring land, if necessary as provided by the Land Acquisition Act

Council owned land

Eldoret municipal council own only a small portion of the total land in the municipality .It includes some underdeveloped land earmarked for public utilities especially health facilities and for residential development.

Lease hold

This form of land tenure includes land that is privately leased from either the Government or the council for a lease term normally of 99 years or less.

Freehold

The freehold category of ownership covers more than the municipality, because the municipal boundary extensions have incorporated privately owned agricultural land into the municipality. Some of the privately owned land, especially in the extended area, is still used for agricultural purposes but increasingly it is being converted to residential and commercial uses. The residential development includes among others the fast growing and uncontrolled settlements at Langas ,Munyaka, Kamukunji, Maili Inne ,Munyaka,Ya Mumbi and Kipkenyo, all of which have inadequate basic infrastructural services and community facilities.

Kenya railways corporation land

Land owned by the Kenya Railways Corporation includes the railway reserve and areas served by railway sidings, including the old industrial area next to the railway station.

Urban land use pattern

The municipal boundary extensions in 1974 and again in 1988 led to spontaneous emergence of uncontrolled peripheral settlement in the boundaries between the old and the new boundaries. Such boundaries have been characterized up to date with poor housing and sanitation, roads, unplanned informal activities and other forms of inadequate infrastructure. Examples of such settlements include Mwiyenderi, Langas , Munyaka, Kamukunji, Maili Inne ,Munyaka,Ya Mumbi and kimumu refer to fig3.1

A short term development plan, Eldoret Physical Development Plan (EPDP) was prepared in1980.This planning strategy was based on land zoning regulation with special emphasis on the division of the municipality into specific and exclusive forms of land use for example, residential, Educational, Industrial etc. but following the boundary The town's spatial growth seems to follow the main roads radiating from the town centre towards the expanded municipal boundaries. The large farm owned by the East Africa Tanning Extract Company (EATEC) was subdivided and sold to individual extensions its applicability became limited. The extension of the boundary to 147.9sq km in 1988 has led to prevalence of unofficial formal activities which were not planned. Thus history shows that all spatial plans designated for the town has been overtaken by events leading to uncontrolled urban development.

Theoretical framework

The study was based on the Mann's urban Model (1965). Mann's urban model combined elements of Burgress and Hoyt models in his typical medium size British city. The model also incorporated the climatic consideration assuming the prevailing wind was from the west. The best residential area is located on the western fringe of the city, upwind and on the opposite side of the town from the industrial sector as shown below.

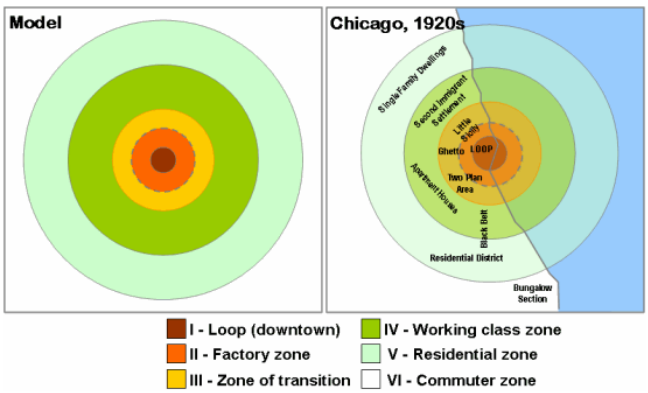

Fig 1. Mann's urban model (1965).

The areas of the working class and the main council estates are located close to the industrial zone. The lower – middle class housing borders each side of each best residential area. The model also identifies a CBD, a transitional zone, zone of small terraced houses in Zone III and IV, Larger housing in sector V and large old houses in the sector VI. Post 1918 residential areas and post 1945 residential house added on the periphery and dormitory settlements at commuting distance from the city.

According to Burgess, urban growth is a process of expansion and reconversion of land uses, with a tendency of each inner zone to expand in the outer zone. On the above figure, zone II (Factory zone) is expanding towards zone IV (Working class zone), creating a transition zone with reconversion of land use. Different land uses evaluates sites in terms of attributes such as size and proximity to the desired facilities. Since each is limited to what it can afford to pay for any site, consumers may trade off space for accessibility. As a result of such trade-offs, different land uses occupy different locations in the city in a process that produces land use pattern.

The model depicts how the traditional cities were well planned unlike the urban centres today where nature of activities and population explosion determines the trend. The respective zones explained in the Burgress model depicted an ideal planned city but in the absence of this, cities have transformed into informal settlements thus the impossibility in provision of infrastructural amenities commensurable with the rate of development. However, the Burgess model remains useful as a concept explaining concentric urban development, as a way to introduce the complexity of urban land use and to explain urban growth in developing countries in the early-mid 20th century if well adopted

Research Methods

It was a cases tudy carried out in Eldoret municipality focusing on informal settlements. Eldoret has grown to become the fifth largest town in Kenya after Nairobi, Mombasa, Kisumu, and Nakuru. The town's urbanized area sprawls along an east-west axis due to escarpment that forms the edge of the Uasin Gishu Plateau and has set the limit of the built-up area in the North, and the stony, steep Sosiani River valley, which bisects the existing urban area, has been a hindrance to expansion in the South.The town is the main urban centre in the North-Rift region.The Two settlements Langas and Munyaka where purposely selected for this study, they have characteristic patterns of uncontrolled urban development Participants comprised of households and business owners in the two selected case study settlements identified through a cross-sectional survey. There was large number of plots with non-resident owners who were impossible to trace. In this case snowballing was used to identify the plot owners. Semi-structured interviews were carried out with 23 key informants purposively selected on the basis of their positions in their local authority, knowledge of urban development and involvement in the issues discussed.

Results and Discussion

Road Network

Langas is one of the informal settlements with a good transportation network. There are three main tarmacked roads; Kisumu Ndogo road, Corner Mbaya road and Kisumu Ndogo-Corner Mbaya road. From observation, the feeder roads serving the plots are not tarmacked and lack connectivity. The roads are unpaved and maintenance is completely missing, this is as a result of the disorganized distribution intensive subdivision of plots.

It was observed that most developers have fully built on their land, beacon to beacon, barely surrendering any land for infrastructure facilities. There are also no pathways between plots, owing to the fact that they have been consumed by developers.

A photo showing murram road in Langas; it represents the many minor untarmacked roads in the area.

Small scale business traders have also encroached into the road reserves, only sparing the right of ways for passage of motorized traffic. Pedestrians on the other hand, muddle through the street vendors to make their way causing congestion.

A photo showing a road reserve which has been consumed by small scale businesses causing congestion.

Munyaka informal settlement consists of one major tarmacked road and several minor and major murram roads. The major roads are wide enough, ranging between 6-9m, and they facilitate vehicular movement. In terms of observation of road reserves, most developers have given due respect to the reserves; there relatively minimal encroachment onto the reserves.

Effects of Uncontrolled Urban Development on infrastructure

Eestablished results are as shown by the table below.

Table 2 Effects of uncontrolled urban development on infrastructure

Factors	Sum	Mean	Variable
Increases the costs of re-planning.	754.40	4.1	Agree
Causes congestion and overcrowding	747.04	4.06	Agree
Leads to environmental pollution	729..74	3.966	Agree
Overstraining of the existing social amenities	828.00	4.5	Agree
Interferes with the expansion of road and other physical facilities	761.76	4.14	Agree
Interference of the flood control system and blockage of the water runways	625.60	3.4	Undecided
Opens way for disasters such as fires, floods	642.00		Undecided

Total number=184

Systems overload

According to the data collected, a mean of 4.50 represented those who agree that uncontrolled urban development, leads to overstraining of the existing social amenities. This is common in uncontrolled areas, were large number of people share the existing public utilities. Inevitably, rapid expansion brings with it major pressures on service and utility systems. It not only calls for a quantitative increase in supplies but, beyond a certain size, may also call for a change in the type, organization, and nature of the systems themselves. This often requires capital and technologies beyond the capacity of local governments.

This is particularly true in the areas of mass transit, communications, and utilities. Rapid growth also brings pressures on the administrative and institutional ability to plan for, and control, development. It defies the governments' ability to respond in a timely fashion, because planning and development of major infrastructure projects are by their very nature time-consuming processes. In face of the rapid pace of change, many improvements become either inadequate or obsolete by the time they are finished. (El-Shakhs, 1992)

Causes congestion and overcrowding

The resulting data from the questionnaires shows that a mean 4.06 of the sampled population agrees that uncontrolled urban development causes obstruction to the road users. Encroachment into road reserves has led into difficulties in expansion of infrastructural facilities.

According to (Stern, E.R. 1993.) The existence of economic opportunities has attracted many small scale business enterprises that provide services to ever increasing urban population. They maximize available space in most cases are; road reserves, junction layouts, way leaves for trunk services such as water and sewerage, underground telephone cables and high voltage power lines.

Increases the Socio - economic costs

From the analysis this factor was given a mean value of 3.8 where respondents agree that uncontrolled urban development increases the cost of re-planning and the cost of demolition is high in unplanned settlements.

Land acquired and informally does not initially benefit from infrastructural services, for in most cases such development is considered illegal by urban authorities. But overtime the settlement gain acceptance from the municipality and services start to be provided incrementally (Musyoka, R, 2004).The process of re-planning increases economic costs.

Environmental pollution and health hazards

This factor is mainly correlated to the uncontrolled urban development especially plots owned by the urban poor. In the analysis carried out sampled areas, this factor was given a mean value of 3.9 among population.

This was common factor with a low percentage of urban services who are most exposed to environmental hazards because they are most likely to depend on untreated water, to live in risky areas, not provided with sanitation and solid waste collection services, to live in overcrowded conditions and work in unregulated enterprises, and to be exposed to high levels of indoor pollution from cooking fuels.

(Stern, 1989b noted that, Reliance on pit latrine sanitation can give rise to groundwater pollution and problems occur as density rises, while the use of septic tanks needs to be backed up by private or public sludge removal services and suitably located disposal sites. Where waterborne sewage disposal to conventional treatment works is available, it is costly, limited in coverage, and poorly operated, because revenue and foreign exchange shortages have made it increasingly difficult to obtain spare parts and maintain systems. Both have adverse health and environmental implications.

Storm water drainage channels

Despite provision of storm water drainage channels along the main roads, they have become sites for both solid and liquid waste disposal and they have with time been rendered dysfunctional. As a result, rain water floods the roads, thus increasing dilapidation. Only 20% of the residents interviewed claimed satisfaction of storm water drainage channels citing the lack of responsibility by the council to collect waste as their main reason. From observation, developers in Munyaka have given due respect to road reserves although the area is prone to floods the residents linked the practice of draining raw sewer onto storm water channels and road reserve to the poor reticulation of the sewer channels.

A photo showing storm drainage channels which have been rendered dysfunctional due to lack of regular servicing.

Solid waste management

The residents complained bitterly of lack of proper solid waste disposal against their allegations of monthly payments to the Eldoret Municipal council. Most the residents interviewed the response was unanimous of having no garbage collection services. At plot level, just a few have dug compost pits, which are situated next to pit latrines. The bulk of the residents have gone the easy way; of converting storm water drainage channels into solid waste disposal sites; regretfully citing the lack of responsibility by the council to collect waste as their main problem.

A photo showing storm drainage channels they have become sites for both solid and liquid waste disposal. A photo taken in Langas informal settlement

Human waste disposal system

The study inquired into the common disposal system used by the participants to find out the level of availability of services especially sewer reticulation at plot level and the results were summarized in the table below.

Estate	Factor				
	Sewer	Septic tank/latrine	Pit latrine	Bush	Total
	frequency	frequency	frequency	frequency	
Langas	30 (15%)	17 19.1%	37 (75%)	7 (8.4 %)	88
Munyaka	18 (5%)	6.1%	61.9%	(13.5%)	96

Pit latrines form the main human waste disposal mechanism for the two settlements; due to the fact that there is no sewer reticulation in this settlement. Only 15% of the residents in Langas and 18.5% in Munyaka agreed to have sewer reticulation at plot level. However from observation it was noted that the settlements have no sewer reticulation. Approximately, 19% of the people in Langas and 6.1% of in Munyaka use septic tank, and 6.1% does not have any sanitary service while others share the facility available.

Most of the pit latrines built of mud and wattle are located a few meters from houses, with some semidetached to houses. There is however there is existence of a few plots with septic tanks, especially plots with piped water. (See the photos below)

Common examples of human waste disposal system common in the two selected settlement are shown below;

Common human waste disposal pits; the first photo showing a permanent septic toilet, the second photo shows a semi-permanent pit latrines next to a temporary house.

Water supply

Residents of Langas informal settlement largely use boreholes, due to lack of piped water. However a few plot have access to piped water especially plots with permanent housing typology. Only 42% of the residents interviewed quoted ELDOWAS as the water providers; from public taps and private connection, whereas the rest have boreholes. Boreholes have been sunk at plot level barely without considering the health standards hence proximity to pit latrines.

The most common source of water for residents in langas, the first photo shows water tap and the second photo forms borehole.

Munyaka, an example of uncontrolled urban development; The outstanding activities observed are residential covering more than 69%, agricultural activities (18%) and (13%), even if this area is not designate to this later, the other activities are minimal. At the time buyers started settling in Munyaka, there was no piped water and people relied on a common well on the southern side of the settlement. Currently, piped municipal water is supplied through individual connection.

There is low percentage of urban services like water and disposal system partly provided by the municipal. At the present time, Almost 39.8%indicated taps as the main source of water for domestic use, 20.4% are private wells, 42% use water vendors who buy water from individuals with private connection and 10.4% fetch water from the river. The main sewer and water lines have been laid down by ELDOWAS (the providing organization) but larger percentage of the occupant is reluctant to connect as a way of avoiding costs. The respondents indicated the main source of water for domestic use was as shown in the table below.

	Main source of water for domestic use					
	public taps	Private well	water vendor	River/ streams	private conection to the pipeline	Total
Estate	Count	Count	Count	Count	Count	Count
Langas	8	39	5	7	29 33%	88
Munyaka	7	18	37	6	28 (29.2%)	96
Total	23	29	22	10	100	184

Occupation and building process

After determining the provision of basic services, the study sought to enquire on the legal approval of building plans and acquisition ownership documents from the relevant authorities and the results were summarized in the table below.

Occupation and building process

Factor	**Zone/ Estate**				**Total**
Building plan approved by the relevant authorities	**Langas (Frequency)**		**Munyaka (Frequency)**		
Not provided	38	(43.1%)	42	(43.8%)	42
Partially provided	25	(28.4%)	28	(29.2%)	36
Provided	25	(28.4%)	35	(36. 5%)	115
Total	88	(100 %)	96	(100%)	184

Currently some plot in Langas remains empty or unoccupied. From the respondents interviewed, only 7% claimed to own land in Langas informal settlement a whole 93% asserted the lack of land ownership. This raises the question of land ownership in this settlement as a very critical issue; that would at its most affect development.

Owing to its proximity to the town, the area has attracted low- income housing developers leading to further subdivision below the required standards. The ownership status of houses in this settlement is largely rental, with a few owner occupiers. For the respondents interviewed 92% lived in rental houses compared to only 8% living in owner occupier houses.

Conclusion

Encroachment into the spaces reserved for roads limits the expansion of infrastructure. Availability of investment opportunities and high demand for services from the ever increasing urban population, encourage the developers to maximize space without adhering to the approved plans .As a result the areas surrounding premises have been overbuild leaving no space for public use and infrastructural provision.

It also limits the rescue team in case of a risk.

Illegal connection, Vandalism of water transmission lines and other infrastructural facilities compounds the crisis of the unemployed population which has a negative impact on the legal user. Construction of high rise buildings adjacent to high power voltage may cause deaths.

Poor solid waste disposal and garbage collection poses a serious health hazard of the town, huge mounds of garbage dumped on daily basis could easily find its way into the water system, rendering the treatment system ineffective while endangering the lives of residents.

Rapid urban expansion brings with it major pressures on service and utility systems, hence system overload. Change of user without physically approved plans such as converting buildings intended for commercial use into learning institution leads to overloading of services. The amount water supply demanded increases resulting to water shortage Sewers will also be overloading following the design which was not planned well for the users causing hazards.

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