

Urban Expansion and CHALLENGES on Livelihoods of Residents of Barut Location (Peri-Urban Zone) Nakuru Sub-County, Kenya

Samuel Akeyo Ojode, Francis Nyongesa Wegulo, Kennedy Nyabuti Ondimu

Department of Geography, Egerton University

Abstract: *The peri-urban zone is an interface where a town spatially meets the rural area. Such zones are often subjected to enhanced human activities from both the urban and rural areas through rapid change from traditional rural to urban livelihoods by impacts of an expanding town. Within the belt, livelihoods undergo constraints in the face of increasing pressures on land through the progressive transition from a rural to a more urban land-use and the attendant impacts on livelihoods. This study sought to determine the influences of urban expansion on the livelihoods of the residents in Barut Location, a peri-urban zone near Nakuru town. The researcher sought information on the respondents' educational level, gender, marital status, land tenure, household land size and land utility, livelihood options, value-additions on farm products and contiguity to Nakuru town over time. In addition, data were obtained through observations and holding discussions with key informants such as local administrators and land surveyors. The obtained data and relevant explanations on the socio-economic impacts on livelihoods was classified and subjected to analytical measures to determine meaningful relationships. The results from the study showed a deficient facilitation of road infrastructure for produce to access the large urban market as well as easing the flow of farm inputs into the area. It established that in the face of an irreversible urban expansion in the area, instituting an appropriate land-use planning process ensures a smooth transition from a rural to an urban landscape, providing a base for forward planning of urban expansion and improved livelihoods in the peri-urban zone. Further findings indicate that accumulation through savings in financial institutions such as banks and co-operatives are at infancy and need addressing so as to open the channels for credit necessary in appropriate investments. Through improved infrastructural services and the setting up of small-scale industrial sites and **jua-kali** (literally means 'hot sun', encompassing all informal fabrication of woodwork and steel structures in open air) sheds, the possibility of gainful employment, the ensuing positive impact on livelihoods and enhanced socio-economic accumulation can be achieved. The results from the study are expected to provide insights into urbanization process **vis-à-vis** impacts on peri-urban zone land and the ensuing impact on livelihoods, the socio-economic opportunities and challenges on residents of Barut peri-urban zone. Policy frameworks and governance issues targeting interventions would prepare the Barut peri-urban zone into an imminent future urban status through forward planning processes.*

Keywords: *peri-urban challenges, wholesome water, electric power distribution, roads, agricultural extension services, infrastructure.*

1. BACKGROUND INFORMATION

Peri-urban areas or zones are spatially located between the urban and rural areas where people's livelihoods are under constant pressure resulting from urban expansion. The nature and extent of urban influence perceived in the peri-urban interface varies considerably, among other factors, in accordance with the size and geographical location of the urban centre. Many indigenous spaces in the peri-urban zones, previously located in rural areas, have often experienced migration through the receiving of migrants from urban citizens seeking a more rural lifestyle or cheaper accommodation, as well as rural people searching for work and better chances for their offspring. Further, these zones have experienced growth and changes in population composition, land use and economic base (McGregor *et al.*, 2006). These processes have resulted into a global urbanization of 50% and increasing at a rate of 21-24% between 2003 and 2010 respectively (World Bank, 2013). In comparison, Kenya's urbanization stands at 39.7% (2009) and increasing by 24 % in the 2008-2012 period, expected to hit 50% by 2030 (Kenya National Bureau of Statistics, Kenya Population Census, August 2009). Such increases have largely been brought about by urban pull migration,

transformation of the economy from agricultural to industrial and the urban area reclassification processes.

In addition, urban spatial expansion often depicts fairly extensive consequences on the lives of the peri-urban zone residents and on the fringing natural environment. These changes include new industries and housing where migrants from both the city centre and the surrounding rural areas work and settle, as well as intense pressure on the natural resources from competing demands (Mattingly and Gregory, 2006). Eventually settlements become part of the built-up urban area, thus comprising a complex mixture of permanent houses, crudely built shacks and rural huts, a transition that is more pronounced from rural to urban the closer the city comes (McGregor *et al*, 2006). On the other hand, urbanization creates livelihood opportunities through allowing the residents access to services and infrastructure from the expanding town (Knox, 1995). These benefits include small-scale trading, wage labour as well as cultivating and supplying higher-value agricultural products to the urban area. In this way the urban area and its fringe are mutually linked (Simone and Abouhani, 2005).

However, the rapid conversion of rural agricultural land to non-agricultural purposes leads to loss of traditional and dominant farming activities (Gugler, ed. 1988). With an expanding urbanization, rural spaces on the urban fringe undergo exposure to sources of vulnerability and possible poverty, typical of urban livelihoods, such as integration into a monetized economy and access to fewer safety nets that normally would occur in the rural areas (O'Connor, 1983). As a meeting point of the 'rural' and 'urban' environments, acknowledgement of a peri-urban interface can counter the tendency of simplifying a reality. Urban expansion causes shifts and re-adjustments in economic aspirations and livelihood strategies on the residents of a peri-urban interface (Simone and Abouhani, 2005). The city becomes increasingly important for people's livelihoods through a trend away from natural resource-based production, particularly as one gets closer to the city. The rate of change may not be the same and such differences often reflect people's livelihood strategies. There are instances where people develop multi-stranded, risk-reducing options that enable them cope with the changes that result at the rural-urban interface (Adell, 1999). The rapid and largely irreversible decline in the availability of natural resources on which non-cash livelihood activities are based serve as a major driver behind peoples' gradual move into the cash economy. These include farming and trading in agricultural produce as well as commercial and service activities.

Peri-urban space can also be looked at as a transitional zone between town and countryside, an area being urbanized to a greater degree, depicting both remnants of the former farming practices of the local community and signs of its links with the town (McGregor, *et al* 2006). The resulting land-use changes, therefore influences the farming practices in the zone. The individualized land ownership, as opposed to communal ownership, accompanied with decreased size of land and intensification processes often tend to draw co-existing farming systems that vary significantly from rural traditions. The proximity to a large market may result into changed products altogether, meant largely for immediate sale and requiring minimal preservation or refrigeration facilities. Significantly low cost of transport, due to urban market proximity, assists in effecting such options.

Rural-urban migration is a world-wide trend, affecting the lives and livelihoods of increasing numbers of people who either change their residence by means of urban pull or are engulfed by the expanding cities through urban sprawl (O'Connor, 1983). The trend has stimulated interest in the links between urban and rural environments generally (Gilbert and Gugler, 1994). However, relatively little attention has been given to the nature of the meeting zone between urban and rural activities, often conceptualized as the rural-urban interface in so far as spatial planning and development stipulates. As cities expand, the peri-urban interface also moves outward, making places that were previously peri-urban attaining urban status and others that were rural becoming peri-urban. This implies that the nature of the peri-urban zone is one of constant change, with affected people experiencing continuous shifts in their livelihoods with regard to the problems they face and opportunities availed. Such assumptions have, however, lacked empirical study (Mattingly and Gregory, 2006) and this study sought to analyze collected data and observations to document findings that appertain to urban expansion and influences of livelihoods in the peri-urban interface.

1.1. Statement of the Problem

Similar to other medium-sized towns in a developing country, Nakuru town has continued to expand in the recent decades. Over time, the rapid spatial expansion has been linked to huge displacement of

population in the hinterland of the town (Kenya National Bureau of Statistics, Kenya Population Census, 2009). Urban-like land-uses such as are found in Nakuru town are likely to affect the immediate rural areas, leading to enhanced peri-urban land-uses. The residents of Barut Location, being in close contact with both urban and rural areas, therefore, appeared to experience the effects on their livelihoods resulting from increasing urbanization.

In addition, land-use change from natural resource-based activities such as subsistence arable agriculture and livestock husbandry to transformed urban-like landscapes could impact both positively and negatively on the opportunities and limitations experienced by the peri-urban residents in the area. Land-use change and land ownership patterns, which occur in such transitional zones, become key factors that define the dynamics of livelihoods in peri-urban areas. While farming, a major peri-urban non-industrial economic activity, has been studied extensively, such as its effect on household nutrition (McGregor *et al*, 2006) farm labour contribution and gender participation, few (if any) studies have focused on livelihoods in the interface areas especially in Nakuru town.

Moreover, traditional planning practices have largely focused on urban and rural areas as separate entities, excluding the rural-urban nexus. The peri-urban zone being an area of intense and vibrant spatial changes, create environmental and natural resource management problems such as urban influence on a rural zone that are beyond the scope of urban and rural governments. Over time, such environmental and natural resource management problems impact on the livelihoods of residents and therefore require adequate attention. Barut location peri-urban is one such area that necessitated a study of land-use changes, its impact on the rural zone livelihoods pertaining to income modes and potentials, and the need to include these in spatial planning. In preparation to a future urbanized status, it became imperative that such peri-urban interface livelihoods, through empirical studies, be captured, analyzed and documented to showcase a method for a smooth and subtle transition for both the city and the rural settings in the immediate region.

Currently, the socio-economic dynamics of peri-urban interface residents are hardly known, especially in the case of secondary cities, the likes of Nakuru. It is against such background that this study investigated and brought to the fore the effect of the urban expansion phenomenon.

1.2. The Study Area

Similar to many other towns in Kenya, Nakuru owes its origin to the building of the then Uganda railway, the construction of which began in Mombasa by 1899 and reached Port Florence (now Kisumu City) on Lake Victoria in 1901. The construction was purposed on the opening-up of the interior and the annexation of large farming estates in the Rift Valley and Central Kenya by colonial settlers. By 1905, Nakuru had established itself as a communication centre for exchange and trans-shipment of agricultural produce (Strategic Nakuru Structural Plan, 1999).

In the years between 1920 and late 1950, with the railway yard as a pivot point, Nakuru developed its internal urban structures through expansions of settlement to the north and south. These expanded developments led to its acquisition of municipality status in 1952 covering some 32 square kilometers. Further expansion was, however, limited by Menengai Hill and Lake Nakuru to the north and south, respectively. On the western edge, faulting became a major barrier to meaningful expansion of the town. To the east, however, a linear structure along the railway ribbon became more pronounced on the geologically stable stretches. Residential land use thereafter encroached on freehold lands of Mwariki, Kwa Rhonda and Kaptembwa to the south-west of the town, a process that by 1972 had spread to the municipal council administrative boundary along River Enjoro. Further extensions of municipal council boundaries occurred in 1992, to include Barut Location and Lake Nakuru National Park. Beyond River Enjoro, is placed Barut Location which to this day, by nature of its environmental outlook tends to remain a peri-urban settlement, where generation of new knowledge regarding the dynamics of livelihood changes due to urban expansion and distinctive implications for natural resource use can be ascertained. The expansion of Nakuru since its upgrade to municipality ran in tandem with the expansive growth rate of its population. Before independence in 1963, the movement of the African population into Nakuru, then considered as a 'White Man's' town, was 'restricted'. In 1948, the population stood at 17,625, while in 1962, this figure had just doubled to 38,181. After independence in 1963, the town was opened to all, achieving a figure of 47,151 in 1969, and 92,851 in 1979. A phenomenal increase was noted in the next census of 1979 at 289,288 and 334,347 in 1999 while it was projected to hit 624,480 by the turn of the century in 2000 (Strategic Nakuru Structure

Plan, 1999). Such increases did exert pressure on the capacity of the municipality the provisioning of services, such as rental units to house the burgeoning residents, leading a sprawling of settlements around the town.

As stated earlier, Barut Location lies to the south of Enjoro River. The river coincides with the then boundary of Nakuru Municipality upto 1972. Barut Location is a distinctive region, marked by a physical boundary of Nakuru town unlike such other peri-urban zones such as Ngata to the west, or Engashura to the north. An area of medium population density at over 249 persons per square kilometer (Government of Kenya, Statistical Abstract, 1999), Barut Location is bounded to the north by Kaptembwa, and to the west by Kipkonor farms. To the south and east the area borders Pwani and Ronda-Mwariki settlements, respectively.

Barut Location settlement is composed of two-acre plots with a few that are subdivided and built-up for rental occupation. Some houses are constructed of stone, even though earth and timber walls predominate within some comparatively larger pieces of land. Most plot boundaries are made of live fences, comprising of Euphorbia, Cactus and a wide-spread of Grevillea trees. Few zero grazing activities are evident, though, while large areas are under crops of maize, finger millet, sweet potatoes and fodder grass. The area is well served with planned earth roads even though water supply is indicative of scarcity since activities of laundry and drawing of water at accessible sections of nearby River Enjoro, appear fairly busy. The former extensive sisal estates characteristic of 1974 had by 1997 been cleared of the crop and transformed into a settlement scheme where the infrastructure that survived the change are the motorable tracks traversing the area.

2. RESEARCH METHODOLOGY

The study was conducted as a survey research and dealt with the effect of an expanding Nakuru Town urban area on the livelihoods of the peri-urban interface residents, particularly the Barut Location to the southwest of Nakuru Town.

2.1. Sample Size

The spatial context was expected to provide data on effect of urban expansion on peri-urban livelihoods.. Barut Location that covers 36.8 square kilometers, according to the Republic of Kenya, Statistical Abstract, 1999, had 2,048 households. Data collection by structured questionnaires was administered randomly at the household level to a sample of 322 households obtained by a formula to obtain the sample size:

$$S = \frac{X^2NP(1-P)}{d^2(N-1) + X^2P(1-P)}$$

where

S= sample size

N= the given population size

P= population proportion that for the table construction has been assumed to be .50, as this magnitude yield the maximum possible sample size required

d= the degree of accuracy as reflected by the amount of error that can be tolerated in a fluctuation of a sample proportion p about the proportion P- the value of d being .50 in the calculations, a quality equal to plus or minus 1.96 σ p.

(Kathuri and Pals, 1993, Sekaran, 1992). The tabulations of the calculations indicated that for an N of 2000 (in this case 2,048 households), the S would be 322 at a percentage of \approx 15.7% of the total.

The data required for the study included variables at the household level, such as respondents' educational levels, gender, marital status, period of residence in the research area and in particular land size accessed by individual households over time. Further variables included land-use change in the context of the expansion of the built environment and access to urban markets. The data were obtained through the administration of research questions that collected primary data of independent and dependent variables covering the periods between 1992 and 2010.

Key informants such as Licensed Land Surveyors provided information on the frequency of land transfers in the study area. Key informants comprising local administrators, village elders and

businessmen as well as non-governmental organizations operating in the area also to provide valuable relevant opinions to the study theme. Such data were subjected to quantitative analysis to provide in-depth and relevant explanations to the research. Secondary Data sources on the other hand included registry index maps that indicate the sub-division and changes that have taken place in Barut Location over time. Observations were considered a vital component of secondary data collection process.

2.2. Data Analysis

Being a quantitative research that sought to generate discrete or quantifiable data (Mugenda and Mugenda, 1999) the independent and dependent

data were subjected to descriptive analysis to provide a summary and meaning to salient features obtained through questionnaire administration, observation and key informants. In the analysis process, the study utilizes the tabulation of quantitative data and percentages presented in pie-chart diagrams. These included such independent variables as land holding (in hectares), land use over time, distance to a huge urban market and the urban expansion into peri-urban belt. The dependent variable on the other hand included intensification of land use, extent of crop farming and livestock husbandry over time, product demand for farming produce emanating from the peri-urban zone and shifting focus from natural resource-based livelihood to that of built-environment and urban wage employment.

Since the research was descriptive, surveys and fact finding inquiries of different kinds were made during the administration of the structured questionnaire in Barut Location. The purpose was the description of the state of affairs that existed in the research period and that the interviewed sample population was inferred that the total population had the same characteristics. The researcher having no control over the variables, therefore a method of *ex post facto* was utilized to discover and evaluate the events surrounding the effects of an expanding urban area on the livelihoods of a peri-urban interface zone that is in close proximity (Kothari, 2004).

3. RESULTS AND DISCUSSION

This section presents the results and discussion arising from investigation of the impacts of urban expansion on peri-urban zone livelihoods in Barut Location of Nakuru County. The period covered (i.e. 1992-2010) defines the time when the administrative boundary of Nakuru was last extended beyond Enjoro River in the south-west of the town, to encompass Barut Location into the administrative jurisdiction of Nakuru municipality, which determines challenges experienced by residents of the Barut Location peri-urban zone since 1992 and determines challenges experienced by residents of Barut location peri-urban zone since 1992 as a result of urban sprawl into previously rural areas.

3.1. Determine Challenges Experienced by Residents of the Barut Peri-Urban Zone Between 1992 and 2010

Even as the Barut Location was administratively included in Nakuru Municipality some two decades ago, from field observations the public services provision by the local authority, appear to have taken time to attain ideal levels compared to the rest of the town. According to McGregor *et al* (2006) the terms 'urban' and 'rural' are still used colloquially (informally) in tradition as mutually exclusive terms, and most people have clear mental conceptions of some ideal landscape corresponding to each. But this simple dichotomy has long ceased to have much meaning since there is no neat dividing line where the city meets the savanna. McGregor *et al* further offer a combination of seven factors that define the peri-urban zone, one of which is the relevant physical terrain and environmental barriers beyond the existing built-up area.

The deficient provision of infrastructural services may be attributed to the physical barrier of River Enjoro. Due to the obstruction, the 'administrative urban area of Nakuru Town' which Barut Location had been part of since 1992, has remained largely 'rural' in so far as infrastructure development is concerned. An earlier boundary change (1963 to 1972) before the 1992 inclusion of Barut Location into the Nakuru town municipality, took place in less than a decade it is noteworthy that it did take another two decades for the 'urban' boundary to be shifted to the 1992 limit.

The proximity of Barut Location to a large expanding urban area of Nakuru Town affected the provision of services in varied formats that had translated as challenges. These include infrastructure

such as water supply, health facilities, electricity, roads and agricultural extension. The peri-urban zone, according to McGregor *et al* (2006) is a complexity that poses formidable challenges to planners, government and non-governmental organizations as well as the residents in terms of service provision, integration with urban areas, associated governance issues and forward planning. To obtain a clear perception of the challenges, data were collected on infrastructure and services such as water supply, health facilities, electric power distribution in the area, access roads and agricultural extension. Ideally, the infrastructure and services when availed in an equal measure, together augment the effectiveness of each individual facility.

3.2. Wholesome Water Services to Improve Livelihoods

As a facility, water is a major constituent of living matter and thus possesses great value to both urban and rural consumers. Particularly in cases of transformation of a zone from agricultural to municipal use as a settlement, the value of land increases markedly given the status of water availability. Given its appropriate importance, therefore, the sample respondents in Barut Location were required to provide their evaluation of the availability of water resources. Some 50.9% was of the opinion that water service be increased to positively affect livelihoods in the Location while 49.1% were satisfied with water services. As indicated by the sample respondents, more than half of the residents of Barut Location did not have access to clean and safe drinking water, a situation that affects the livelihoods negatively and therefore a challenge in two ways.

The group consists of a populace that has to spend part of their time or resources in acquiring the vital commodity through long distances they have to cover to purchase treated water. Alternately, other sample respondents of Barut Location prefer to purchase the water from vendors who obtain it from undetermined sources.

Further, water acquired from untreated sources such as rivers, water pans, sand quarries or boreholes, would adversely affect the health if it is not well handled. Waterborne ailments often severely affect people, resulting into medical condition that restrict the vitality to perform daily chores. Combined with the distances that residents have to cover to access treatment interventions, the community faces challenges of huge magnitude that need addressing.

3.3. Health Services

The general condition of human health defines as the state of body or mind in terms of the presence or absence of illness. Being a matter of key concern to individuals, households and communities, the general condition therefore determines a peoples' participation in life's pursuits for their wellbeing. The access or alternatively non access to health facilities is important in determining the economic participation of a community. The sample respondents of Barut Location were required to provide their evaluation of health services in the area. Some 20.9% requested for more health facilities or services in Barut Location while 79.1% were satisfied with the services so far offered. Out of every five residents, one according to the figures, did not access a health facility, on grounds of the distances that some have to cover to reach any. The health facility was not centrally located and some residents that had to cover eight kilometers or so could not admit its accessibility. The health centre is located at the far north end of Barut Location at the densely populated commercial area near River Enjoro.

3.4. Electricity as an Infrastructure

Sample respondents upto 27.1%, when questioned on their views about electricity that would improve their livelihoods, requested for more provision of electricity as an infrastructure. On the other hand, 72.9% of sample respondents were satisfied with the electric installation in the area. It appeared therefore that electric installation is available in an almost ideal measure for a peri-urban area such as Barut Location.

3.5. Roads as Infrastructure

A section of the sample respondents comprising 19.3% requested for improvement of roads as an infrastructure while 80.7% were satisfied with the access facilities. The availability of roads in Barut Location appears not as a challenge as such, since a majority of four-fifths sample respondents indicated by their responses that they were satisfied. As indicated earlier in the background statement of this study, what were essentially motorable tracks in the sisal estates were retained as openings and

used by the settlers to access their portions of land allocation. While maintenance of the tracks or compacting the surfaces was not accomplished, access in the view of respondents was still possible. However, from field observation, it was clear that accessing the interiors of Barut Location with farming inputs and delivery of farm products to markets became a challenge and significantly affected the economic viability of the peri-urban zone.

3.6. Agricultural Extension Services

As a peri-urban zone that was largely subsistence oriented in agricultural practices, the determination of a key supporting component for this status required interrogation. Some 18.7% of the sample respondents were satisfied with the extension services offered by the government officers on the best practices of optimal utilization of their land. The rest, comprising 81.3% did indicate that the service needed improvement. With less than one-fifth receiving the agricultural extension service, it can be construed therefore that a large portion of the residents (four-fifths) do not receive the service and are therefore not exposed to the modern agrarian knowledge pertaining to an economic utility of the land. It should be noted that the distance the agricultural extension officers have to cover to reach the Barut Location farmers is not restrictive, given that the headquarters of government offices are in the nearby urban setup in Nakuru town. The greater portion of farmers who received no advice on the best practices and appropriate utility of their land therefore have no option but to revert to subsistence production techniques, to merely satisfy household food needs. Such lack of extension service became a challenge that needed addressing to make Barut Location a viable economic zone to sustain the residents in so far as adequate food production is concerned as well as generate surplus produce for sale in the region and beyond.

3.7. Infrastructural Facilities

Looking at the evaluation of the sample respondents on infrastructural provision for water, health, electricity and agricultural extension, there is a close correlation with opportunities provided to Barut Location community. However, on roads as an item on infrastructure, there is an understandable reversal in so far as its provision and satisfaction thereof. For water, the challenge is a slightly smaller figure 49.1%, while satisfaction rates 50.9%. It should be remembered that 51.1% were satisfied with its provision while 48.9% were not.

Regarding the issue of health facilities and provision, some 20.9% of the sample respondents wanted it improved, while 77.3% were satisfied. This corresponds fairly close to 22.7% who were not receiving any service, while 80.7% were satisfied.

As regards the electric power supply, a large 72.9% of the respondents requested for access to its provision while 27.1% were already satisfied, corresponding closely to a mere 17.8% who were connected. Power promotes many activities that improve people's livelihoods through small-scale industries, security and the permeation of information by way of radio and television. On this matter, Barut Location community is heavily challenged.

The question of roads for transport did draw responses such as some 80.7% of the sample respondents called for their improvement while 19.3% were satisfied. Even though earlier, respondents were nearly divided equally on its availability, it appeared from field observation that the roads that traverse Barut location are poorly maintained. It was therefore noted that the thoroughfares are in place and yet impassible, particularly during wet seasons.

The agricultural extension services required to improve farming practices in Barut community were not satisfactory according to 81.3% of the respondents. However some 18.7% respondents agreed with the services so far offered. In observing opportunities, the respondents were nearly equally divided at 43.3% accepting its provision while 56.7% who had not received it, larger percentage of respondents viewing it as inadequate and calling for its improvement.

The challenges as enumerated by the respondents clearly overcome the opportunities and therefore the closeness of Barut Location to Nakuru town has not translated into any notable advantage as such. The potential of the Location can be construed to have been decimated by the diminished provision of relevant infrastructure and services purposed on achieving self sustenance as well as extra production to be availed to the national food requirement.

However, Barut Location being a peri-urban zone has been spared the characteristic challenges experienced by rural-urban interfaces in similar proximities to large urban areas. These challenges include environmental degradation through pollution of its air, soil, groundwater or its aquifers by sewage emissions from urban-based activities at the nearby city. Two factors help in reducing or eliminating any effects of urban pollution interfering with Barut Location. The physiography of the zone dictates that whatever liquid effluents that emanate from Nakuru town end up into the natural drainage of River Enjoro which forms the boundary between the urban area and the peri-urban zone. Since the river flows in its valley, which is the lowest point between the two areas of the urban and peri-urban zones, no sewage water, whether raw or treated, ever crosses onto Barut Location fields or farmlands and is instead taken down eastward into Lake Nakuru.

The gaseous or aerial pollutants from urban industrial emissions would occur in an intensified industrialization in the urban area. However, no intensified industrialization is apparent in Nakuru Town; instead the chief function of the town has involved the exchange of large amounts of grain crops grown in the expansive Central Rift region.

4. CONCLUSION AND RECOMMENDATION

The challenges experienced by residents of Barut Location are reflective of the provision and access of infrastructural facilities. These include water, health facilities, electricity, roads and agricultural extension services. As a measure of improvement on livelihoods of Barut Location communities, some 50.9% respondents requested for water supply while 49.1% respondents were satisfied. This response ties very closely with those which accessed and those who did not access water in the earlier question dealing with opportunities. Similarly, the health facilities challenges are only experienced by 20.9% of the sample respondents, while 77.3% received the service as reported by earlier case of opportunities available to the Barut Location peri-urban zone.

Access roads as part of infrastructure were essentially opened-up stretches, except that some proportion of sample respondents required their improvement. Such improvement could be achieved through the maintenance and if possible a re-gravelling and compacting to firm their surfaces. This would improve access in the area, to facilitate movement of agricultural input into Barut Location as well as farm products to easily access markets in the expanding town. In comparison with peri-urban zones such as Kiamunyi and Engashura a more elaborately planned network appear to have been put in place, even though the question of road maintenance in all the zones seems to have suffered similar fate. The road network in Barut Location only traced the original sisal tracks within Kalengin Estate before the land was subdivided and allotted to the settlers.

The proportion of sample respondents that were satisfied with the availability of electric power supply was 72.9%, while some 27.1% respondents require improvement of this infrastructure. As one traverses the peri-urban Barut, one notices a fairly cross-network of overhead cables in the area. However, chances are that not all the respondents have tapped into the power through installing it, leading to some percentage of residents who still do not receive the service. In comparison to the far-flung rural zones, the power supply in Barut Location could be termed as fairer, a fact that may portray its proximity to an expanding urban area, since cost factors determine the distances covered in power reticulation. Similar assessment can also be made for peri-urban interface zones to the north-west and north-east of Nakuru Town. However, in the Barut Location case, the largely subsistence agricultural practices diminishes the potential for income level or scale to allow for installation of the infrastructure in a number of households.

In so far as agricultural extension services are viewed, about one-fifth (18.7%) receive the infrastructure, while about 81.3% required it improved. The anomaly can be explained by way of a tendency of Barut Location, in spite of its peri-urban interface status, is more rural in nature since the adoption of improved agricultural techniques was still fairly low. Barut Location has depicted a largely subsistence economy with little or no effect from the expanding Nakuru urban area even for its two decade period as a peri-urban interface within the municipality.

The accessibility of infrastructure and services in the Barut Locations in terms of challenges to a future forward planning appear not to have appropriately picked up. About one-third of residents have an access to clean supply of treated, reliable and clean water, a proportion that is way too low, in the context of a degrading health environment. Accompanied with poor access roads and a low agricultural extension services for an area that has been encompassed within the Nakuru Municipality

and a peri-urban interface zone for close to two decades. More than three-quarters of the residents, however, have access to health facilities and nearly as much, reported power supply. In a deviation from other peri-urban zones, Barut Location does not suffer the usual challenges of environmental degradation of air, soil, or water aquifers by effluents that emanate from the urban settings due the unique physiography of the region in which both the town and the study site are located.

REFERENCES

- Aberra, E. and King, R. (2005): *Additional Knowledge of Livelihoods in Kumasi Peri-Urban Interface, Ghana* Development Planning Unit, University College London, at <http://www.ucl.ac.uk/dpu/pui/research/previous/synthesis/index.html>
- Adell, G. (1999): *Theories and Models of Peri-urban Interface: A Changing Conceptual Landscape* (Strategic Environmental Planning and Management for Peri-urban Interface Research Project), University College, London.
- Affon, S.Y. (1999): *Intra-urban agriculture in Ivory Coast: the nature of crops and stakeholders*, CIRAD, [www@cirad.fr](http://www.cirad.fr)
- Armar-Klemesu, M. and D. Maxwell, (1999): *Accra Urban Agriculture as an Asset Strategy, Supplementing Income and Diets*, in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. And de Zeeuw, H. (1999) *“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda*, Foundation for International Development, Feldafing, Germany.
- Beats, R. and J.C. Torreilles, (1999): *Supporting Peri-urban Agriculture Development in Congo, Backup for settlement and Market Gardening Business and Professional Groups*, CIRAD, [www@cirad.fr](http://www.cirad.fr)
- Bon K.P.C.(1999): The Role of migration and institutions in the Evolution and spread of Peri-urban Agri-food systems: products, people and expertise. CIRAD, [www@cirad.fr](http://www.cirad.fr)
- Bourque, M. (1999): *Policy options for Urban Agriculture, Thematic paper 5* in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) *“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.
- Carter, H. (1981): *The Study of Urban Geography*, 3rd edition, Edward Arnold, London.
- Chaleard, J. (1999): *Peri-urban Agriculture, between town and country; some lessons from Ivorian coast case studies*, CIRAD, [www@cirad.fr](http://www.cirad.fr)
- Saharan Africa, Centre de Cooperation internationale en’ recherche agronomique pour le development*, [www@cirad.fr](http://www.cirad.fr)
- Croz, M.C., and R.S. Medina (2001): *Agriculture in the City: a key to sustainability in Havana, Cuba, Ian Randle Publishers, Kingston. in the City: a key to sustainability in Havana Cuba*, Ian Randle publishers, Kingston. Dasso, A. and T. Pinzas, (1999): *NGO Experiences in Lima Targeting Urban Agriculture* in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) *“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.
- Developing Planning Unit, (2003): *A Synthesis of Peri-Urban Research of Kumasi, Hubli-Dharwad and Kolkata PUIs: Peri-Urban Interface Offers New But Volatile Sources of Income* at <http://www.ucl.ac.uk/dpu/pui/research/previous/synthesis/index.html>, University College, London, DFID Natural Systems Programme.
- Developing Planning Unit, (2003): *A Synthesis of Peri-Urban Research of Kumasi, Hubli-Dharwad and Kolkata PUIs: Well Targeted Interventions Shown to Improve Peri-Urban Livelihoods*, at <http://www.ucl.ac.uk/dpu/pui/research/previous/synthesis/index.html>, University College, London, DFID Natural Systems Programme.
- de Blij, H.J. (1996): *Human Geography: Culture, Society and Space*, John Wiley and Sons, Inc., New York.
- de Zeeuw, H. S. Guendel, and H. Waibel, (1999) : *The Integration of Agriculture in Urban Policies, Thematic paper 7* in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. And de Zeeuw, H. (1999) *“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.
- Dedstra, T. and H. Givadet, (1999): *Urban Agriculture and Sustainable cities* in Bakker, N.,

- Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) **“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda**, German Foundation for International Development, Feldafing, Germany.
- Foeken, D.E and S.O. Owuor, (2000): **Urban Farmers in Nakuru, Kenya**, African Studies Centre, Leiden, Netherlands and Centre for Urban Research, University of Nairobi.
- Foeken, D. and A.M. Mwangi, (1999): **Increasing Food Security through Urban Farming in Nairobi** in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) **“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda**, German Foundation for International Development, Feldafing, Germany.
- Garnett, T. (1999): **Urban Agriculture in London Rethinking Our Food Economy** in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) **“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda**, German Foundation for International Development, Feldafing, Germany.
- Gertel, J. and S. Samir, (1999): **CAIRO: Urban Agriculture and Visions for a “Modern” City** in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. And de Zeeuw, H. (1999) **“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda**, German Foundation for International Development, Feldafing, Germany.
- Gilbert, A. And Gugler, J. (1994): **Cities, Poverty and Development in the Third World**, Oxford University Press, Oxford.
- Gugler, J. (ed) (1988): **The Urbanization of the Third World**, Oxford University Press, New York.
- Hammond, R. and McCullagh, P. (1980): **Quantitative Techniques in Geography: An Introduction (2nd ed.)**, Clarendon Press, Oxford.
- Haring, L.L., J.F. Lounsbury, and J.W. Frazier, (1992): **Introduction to Scientific Geographic Research (4th Edition)**, Wm.C.Brown Publishers, Dubuque, IA.
- Hough, M. (2004): **Cities and Natural Processes: A Basis for Sustainability**, Routledge, London.
- Jamal, V. and J. Weeks, (1988): **“The Vanishing Rural-Urban Gap in Sub-Saharan Africa”** International Labour Review, Vol. 127 No. 3, pp.271-291.
- James, P.E. and Martin, G.J. (1981): **All Possible Worlds: A History of Geographical Ideas**, 2nd. Ed. John Wiley and Sons, New York.
- Johnson, R.J. (1991): **Geography and Geographers: Anglo-American Human Geography Since 1945**, 4th Ed., Edward Arnold, London.
- Kathuri, N.J. and Pals, D.A. (1993): **Introduction to Educational Research**, EMC, Egerton University, Njoro, Kenya.
- Kenya National Bureau of Statistics, Kenya Population Census, August 2009.
- Kirk, R.E. (1984): **Elementary Statistics (2nd ed.)**, Brooks/Cole Publishing Company, Monterey, California.
- Knox, P. (1995): **Urban Social Geography: An Introduction**, (3rd edition), Longman Scientific and Technical, Essex, England.
- Kothari, C.R. (2004): **Research Methodology, Methods and Techniques**, 2nd. revised edition, New Age International Publishers, New Delhi.
- Kreinecker, P. (1999): **La Paz: Urban Agriculture in Harsh Ecological Conditions** in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) **“Growing Cities, Growing Food” Urban Agriculture in Policy Agenda**, German Foundation for International Development, Feldafing, Germany.
- Lado C. (1990): **Informal Urban Agriculture in Nairobi, Kenya: Land-Use Policy**, Vol. 7p. 257-266.
- Lo, C.P. (1997): **The Significance of Urban Agriculture**, City Farmer, Canada’s office of Urban Agriculture, Tacoma. W.A.
- Losada, H. et al. (1998): **Urban Agriculture in the Metropolitan Zone of Mexico City: Changes Over Time in Urban, Sub-Urban and Peri-Urban Areas**, Environment and Urbanization, vol. 10, No.2, Mexico City.

- Mabogunje, A. (1995): "*Perspectives on Urban Land and Urban Land Management Policies in Sub-Saharan Africa*" World Bank Technical paper No. 196, (Washington D.C: World Bank).
- Mather, A.S. (1986): *Land –use*, Longman Scientific and Technical, Essex, England.
- Mattingly, M. and Gregory, P., (2006): *The Peri-Urban Interface: Intervening to Improve Livelihoods*, The Natural Systems Programme (NRSP), Department for International Development, UK.
- Maxwell, D.G., (1995): "*Labour, Land, Food and Farming: A household analysis of Urban Agriculture in Kampala, Uganda*" PhD dissertation, Madison WI, University of Wisconsin.
- Maxwell, D.G., Egziabher, A.G. and Lee-Smith, D., (1998): *Farming in the Shadow of the city: Changes in Land Rights and Livelihood Peri-urban Accra*, CFP Report No. 23, in Cities Feeding People, IDRC, Washington.
- Mbaye, A. and P. Moustier,(1999): *Market-Oriented Urban Agricultural Production* in Bakker, N., Dubbeling, M., Gwendl, S.,Sabel Koshchella, U., and de Zeeuw, H. (eds.) (1999) "*Growing Cities, Growing Food*" *Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.
- McGregor, D., Simon, D. and Thompson, D. (Eds.) (2006): *The Peri-Urban Interface: Approaches to Sustainable Natural and HumanResourcesUse*, Earthscan, UK.
- Menion, P. A. and D. Lee-Smith, (1993): "*Urban Agriculture in Kenya*" Canadian Journal of Africa Studies Vol. 27 No. 1, pp. 25-42.
- Morril, R., G.L. Gaile, and G.I. Thrall, (1988): *Spatial Diffusion*, Sage Publications, London. (p.15)
- Moser, C. and A. A. Dani (eds. 2008): *Assets, Livelihoods and Social Policy*, International Bank for Reconstruction and Development/WorldBank, Washington.
- Mugenda, O.M. and A.G Mugenda, (1999): *RESEARCH METHODS: Quantitative and Qualitative Approaches*, ACTS Press, Nairobi, Kenya.
- Mulenga, C.M. (1995): *Peri-urban Agriculture: A Case of Small Scale Peasant Cultivation in and Around Zambian Towns and cities with specialReference to Lusaka*, Eastern and Southern African Geographical Journal, vol. 6, No.1 pp.1-16.
- Municipality of Nakuru (1999): *Strategic Nakuru Structure Plan: Action Plan for Sustainable Urban Development of Nakuru Town and Its Environs*, Belgian Development Co-operation, UNHCS (Habitat) and Republic of Kenya.
- Mwalukasa, M. (1999): *Institutional Aspects of Urban Agriculture in the city of Dar-es-Salaam, Thematic Paper 6*, in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999)"*Growing Cities, Growing Food*" *Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.
- Nodberge, L. and E. Nsamba-Gayiiya, (1991): "*Report on Land Delivery*," Ministry of Lands, Housing and Urban development, Kampala.
- Novo, G.M. and C. Murphy, (1999): *Urban Agriculture in the city of Havana: A Popular response to a crisis* in in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) *Growing Cities, Growing Food*" *Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.
- Nugent, R.A. (1997): *The Significance of Urban Agriculture*, City Farmer, Canada's Office of Urban Agriculture, Tacoma, Washington, U.S.A.
- O'Connor, A. (1983): *The African City*, Hutchinson and Company (Publishers), Ltd., London.
- Potutan G.E. et al. (1999): *Urban Agriculture in Cagayan de Oro: A Favorable Response of City Government and NGOs* in Bakker, N, Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) "*Growing Cities, Growing Food*" *Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.
- Republic of Kenya, (2001): *1999 Population and Housing Census Vol. 1: Population Distribution by Administrative Areas and Urban Centres* prepared by Central Bureau of Statistics, Ministry of Finance and Planning.
- Republic of Kenya, (2010): *Kenya Population and Housing Census, 2009*, prepared by Kenya

- National Bureau of Statistics.
- Roberts, B.R. (1995): *The Making of Citizens; Cities of Peasants Revisited*, Arnold, London.
- Sekaran, U. (1992): *Research Methods for Business; A Skill Building Approach (2nd ed.)*, John Wiley and Sons, New York.
- Simone, A.M. and A. Abouhani, (ed) (2005): *Urban Africa: Changing Contours Of Survival in the City*, Codesria, Dakar, Senegal.
- Spatial Dimensions of Agriculture in Urban Agglomerations*, <http://www.fao.org/docerp/003/x6998/x6998e05.htm>
- UIA-CIMES PROGRAMME AND UNESCO CHAIR ON INTERMEDIATE CITIES, (2010), Lleida, Spain.
- Wakusley D.J. and G.J. Lewis, (1993): *People and Environment, Behavioral Approaches in Human Geography*, Longman Scientific and Technical, Essex, England.
- Westcott C.G. and R.A. Obudho, (1982): *Between Farm and City: Secondary Towns in Kenya to the year 2000*, African Urban Studies, New York/Albany.
- Yi-Zhang, C. and Z. Zhangen, (1999): *Shanghai. Trends Towards specialized and Capital Intensive Urban Agriculture* in Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (1999) *“Growing Cities, Growing Food” Urban Agriculture on Policy Agenda*, German Foundation for International Development, Feldafing, Germany.