

Developing an Environmental Physical Development Plan for Medium Size Town of Ahero in Kisumu County, Kenya

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Abstract

The study examined the urban growth of Ahero town in Nyanza Province of Kenya from an environmental planning perspective. This paper discusses the development of a physical development plan for Ahero town and how to propose a way to implementing it. The methods of data collection included survey questionnaires administered to 199 respondents in Ahero town, field observation, key informant interviews, photography, an analysis of topographical map, sheet 116/3 of scale 1:50,000 and Ahero Town Physical Development Plan dated 1966. Data analysis involved both quantitative and qualitative techniques. Quantitative data was entered and analyzed in SPSS and Excel while qualitative data was thematically analyzed. The proposed development plan was developed using Geographical Information System techniques. It was found that despite the existence of an old development plan, the town is currently developing outside the domains of the plan with serious environmental implications such as contamination of the River Nyando that straddles the town thus posing a health risk to the residents. As such, the study recommends the adoption and implementation of the proposed Ahero Town Development Plan by the Ahero Town Council in collaboration with other stakeholders.

Keywords: environment friendly, development plan, medium size town, Ahero, Kisumu county, Kenya

INTRODUCTION

Studies of urban development have been undertaken by scholars such as Preston (1979), who give an account of the growth of urban areas as influenced by among other reasons, biases in patterns of government expenditure and employment. Alan Gilbert (1976) supports this by pointing out that large capital cities contain relatively large numbers of government employees, who are often paid above prevailing market rates. These cities often enjoy disproportionate infrastructural investments and in some cases the distortions are a manifestation of colonial legacy. Hardoy (1977) confirms this distortion and points to the extreme coastal concentration of large cities in Latin America as evidence resulting from trade relationships with and natural resource exploitation by colonial powers. Preston (ibid.), however, adds that urban population growth in part has to do with the general national population growth rates of a given country. Economists have put forward other reasons for urban growth, which relate to economies of scale. They point out that firms in large cities enjoy economies of agglomeration, which are economies of operation that are external to a firm but result from the presence of other firms and of social infrastructure. However, diseconomies, as they call it, of large size urban areas occur in the form of congestion and pollution (Gugler, 1994). These are environmental problems of urbanization that this paper is concerned about and

that are of significance to the lives of many urban residents.

In Kenya, Ohas (1988) explains that the pattern of settlements was inherited from colonial period, which emphasized on a few towns. After independence, the influx of people to the cities of Nairobi and Mombasa intensified in pursuit of employment and other social benefits. However, the services existing in the cities could not sustain the increased demand and the result was overcrowding, unsanitary sub standard sprawling settlements. The Kenya government therefore made deliberate efforts to decentralize services and dispersed development using model of selective concentration (growth poles) and model of selective dispersal (hierarchy of centres). To achieve decentralization of urban facilities, certain towns which already had substantial infrastructure such as water supply, sewerage, and electricity grid and transportation system were selected to form future administrative, commercial and industrial centres throughout the country. Some of the selected towns were Kisumu and Eldoret which are subsequently described.

Kisumu City is third largest urban centre in Kenya after Nairobi and Mombasa. It has an estimated population of 345,312 and has a relatively well developed urban infrastructure that makes it a leading commercial, trading, fishing, industrial, communication and administrative center in the Lake

Victoria basin. The city is ranked the poorest in Kenya with 48% of its inhabitants living below poverty line UN-Habitat (2005).

Anyumba (1995) gives an account of urban development for Kisumu from the colonial days and says that on 7th September 1903, Kisumu was gazetted as Kisumu Township. By 1907/08 there was evidence of industrial development involving piecing together steam boats from parts sent out from England for the Uganda railways. In terms of transport development, the first railway lake steamer was launched in February 1903, fifteen months after the railway line reached Kisumu. In 1910/11, manufacturing technology was introduced through cotton ginnery. With the introduction of bicycles, motorcycles, cars and Lorries in subsequent years more development was witnessed in Kisumu. By 1972, Anyumba narrates that industrial developments such as fishnet factory, Nyanza containers limited that manufactured tins were established and an Industrial Vocational Training Centre was under construction.

Municipal Council of Kisumu's Annual report of 1972 viewed this performance as dismal in terms of success in industrial installation. With regard to environmental health problems during colonial period, Anyumba states that they included lack of provision of safe drinking water, anti-malarial measures and control of plagues. After colonial period, environmental concerns here still included the lack of adequate clean water supply, a problem that persists to date, Malaria menace brought about by rampant mosquitoes, unsafe liquid and solid wastes disposal among others. To date, issues of urban development and environment in Kisumu have persisted. According to UN-Habitat (2005), in collaboration with SIDA in their effort to improve urban environments for cities around Lake Victoria, describing the status of Kisumu city's development and environmental issues, the main Environmental and developmental issues include poor land use planning, where most powers pertaining to land ownership, land use, control, land acquisition, land allocation and provisions for major land development schemes are with the Central Government. Issues such as settlement expansion, slum upgrading and landfill relocation and development that touch on land take much time to implement. UN-Habitat (2005) continues to identify environmental issues as low literacy level, outdated and inadequate water and sewerage system, poor solid waste management, presence of water hyacinth on Lake Victoria hampering water supply and unplanned settlements. Eldoret town's development was rated at 8% annually by UNCHS (UN-Habitat, (1992). The town developed from an isolated post office serving mostly European farming community into a major dynamic regional administrative, commercial, educational and

industrial centre. Its development from the Kenya government urbanization strategy included a growth and services centre strategy; rural-urban strategy together with a rural trade and production centre's concept to decentralize urban growth.

Environmental challenges witnessed as Eldoret developed include inadequate supply of housing, which resulted to the formation of slums of Kamukunji, Langas, Huruma and others. Solid waste management presents a challenge to the municipal council of Eldoret where it has been found by Kiplagat (1999) that a considerable proportion of solid waste is disposed of in open spaces within Eldoret Municipal Council.

Ombura (1996) indicates that environmental impacts of industrial siting in Eldoret are atmospheric pollution from industries such Corn products' fermentation processes, bad smell emanating from Eldoret waste treatment works, pollution of River Sosiani from the wastes in the town and industries situated along the River. In Ahero town, the author sought to find out the environmental problems the town faces as a result of human activities within the urban area.

Necessity of an Environment Friendly Plan in Ahero Town

Ahero town is one of the medium size towns in Kenya with a population of 34,834 people. It is one of the big urban centres in Nyando District. Like most urban areas in Kenya, the town's development has not been guided by planning principles. This has resulted into serious problems. The activities in the town generate a significant quantity of liquid and solid wastes, which normally find their way into the nearby River Nyando causing heavy contamination. The ever-increasing numbers of people that settle in the town every year produce such waste whose disposal is poor. The town lacks a formal waste management system, which affects even its peri-urban areas. Thus, with further development and expansion in form of unplanned built up areas and industrial sites, waste accumulation and disposal problems in Ahero town is set to increase.

Uncontrolled and unplanned expansion of built-up areas to marginal and environmental sensitive land such as banks of river Nyando has led to heavy pollution and poor quality of river water. This has caused degeneration of river reaches and led to heavy siltation into the river and nearby Nyando River wetlands. This situation, coupled with the topography of the area, has escalated drainage problems in the town and made it more vulnerable to flooding when it rains. Without sufficient environmental studies and/or adequate environmental planning and management, development control, poor development in Ahero town will continue to pose serious challenges to the

town council and nearby rural residents. Severe environmental challenges such as inadequate housing, pollution of River Nyando waters, inadequate and poorly managed sanitation systems and poor solid waste management, which need urgent attention, will be difficult to manage. There is need for scientific data that will inform the town's capacity to prepare a comprehensive long term physical and environmental plan and implement it. This paper thus examines the emerging environmental issues and discusses a proposal towards sound environmental planning of the town.

MATERIALS AND METHODS

In each development, the main criterion for inclusion in the sample was being resident or non-resident of Ahero town with knowledge of the town and its environment based on experience gathered out of daily life activities or residential history. Ahero town was divided into 4 geographical areas dissected by the highway from Kisumu towards Kericho (West-East) and by River Nyando (North-South), forming 4 quadrants. Fifty questionnaires were administered randomly in each quadrant. A combination of random, systematic, and purposive sampling techniques were adopted in selecting the respondents. Simple random sampling was used to identify the first interview point after which systematic sampling was used to identify the next interview point. An interview interval of 10 was used. Purposive sampling was used to bring into fore the opinions of key people in the management and administration of the town. For such respondents, key informant interviews were administered. The town clerk was one of the key persons interviewed.

A structured questionnaire was the primary mode of data collection used to interview the respondents for the study. Eight key informant interviews were administered to eight key persons purposively identified based on their role in the town's administration, management, and influence. These were: the Ahero Town Council clerk, Ahero town Public Health Enforcement Officer, Ahero town administrative officer, Ahero town Works and Planning officer, and Social work officer. Others were the Water technician from the Catholic Church water supply, a non-governmental organization working around the town (VIRED International) and one wholesale trader with the largest business capacity was interviewed.

Some of the environmental issues under study required physical and direct observation to enable triangulation and visual authentication of facts as reported by the respondents. Transect walks around the town using an observation guide was conducted during the study. Some of the areas visited included the condition of Nyando River banks and other solid waste dumpsites, storm drainage sites, built

up/construction sites, polluted water wells, among others. Some of the scenes observed in the sites were captured digitally using a Kodak KB-10 35 mm still camera. The scenes that appeared to sufficiently represent such phenomenon to add to the visual weight and comprehension as to the magnitude and severity of some of the issues and findings were captured.

To identify planning problems in the study area, physical development plan produced by the colonial government in 1966 was used to identify built up areas, which do not conform to the physical development plan. Clarification was sought from the town council to establish their authorization through interviewing Ahero town council authorities. Further in-depth interviews were used to obtain information about solid waste management, sanitation, adequate water supply and housing through zoning and designation for such from Ahero town council officials on existence of development control policy at town council level and responses recorded by the researcher and his assistants.

An existing proposed boundary map for Ahero town was obtained from the provincial Physical Development offices in the city of Kisumu. A plastic transparent film material was laid on the boundary plan and pinned together using a masking tape. Boundaries, roads and other features were carefully designed and drawn. Pen and ink was used to draw while a measuring scale rule was used to establish the size of plots to be drawn in each neighbourhood.

Location of land uses was done in accordance with the planning principles established by the Ministry of Planning and National Development. Control points were evenly selected guided by the principle of even distribution of the points on the face of the manuscript and that the points should be able to enclose the whole manuscript. For ease of identification, the points were located at the intersection of sets of easting and northing co-ordinates. The drawn manuscript was then pinned on the digitizing board using masking tape. Control points, which were already identified randomly and marked on the face of the manuscript, were digitized to register them in the system and an acceptable level of accuracy for digitizing was obtained. The data on the manuscript were digitized and edited using catalinx computer program then exported to Map Info GIS program for further analysis. Combinations of qualitative and quantitative techniques were employed during analysis; however, the study was largely quantitative. Quantitative analysis was simplified using the SPSS, which enabled the running of frequencies, comparisons, percentages, deviations and correlations in the data stream. The qualitative information mainly arising from the open-ended questions were analyzed thematically. The data was

organized by questions to look across respondents and their answers in order to identify consistencies and differences.

RESULTS AND DISCUSSION

Physical Development Plan Proposals

The Ahero structure plan aims at suggesting to the community a comprehensive outline for future development by indicating specific areas for various land uses, all coordinated to maximize their complementarity or minimize their friction. The structure plan coordinates these and presents them in a narrative and visual form to be considered as a public record that would be modified from time to time. The plan applies approved and stated standards to arrive at quantitative area requirements and to fulfil the requirements of the future population. The proposed plan is aimed at fulfilling goals such as: providing a basis for incorporating environmental issues in development; providing a basis for development control; providing a basis for coordinating development and providing basic standards for future development of the area

Ahero town is located a few kilometres from the city of Kisumu along the Kisumu Nairobi highway. The town forms a gateway to the city of Kisumu and, therefore, deserves attention for development planning so as to create an attractive impression of the only city in the region to the visitors approaching entry from this direction. Ahero town has been a renowned livestock and rice market centre for decades and have now attracted residential and commercial developments, which have neither particular order nor standards. There is therefore need for proper guidelines to avoid disorderly development and mushrooming of slum like structures within and at the peri-urban areas.

The strategy for this plan is intended to make provision for social well being of the structure plan area and accommodate future additional population while at the same time conserving the character and environment of the area. Commercial and industrial developments are to be concentrated in strategic sites. This will fairly offer a fair level of employment opportunities. Additionally, the plan is focused on locating other land uses where they could be most acceptable in social, economic and environmental way so as to protect the character of the area and the quality of the landscape.

The plan assumes the provision of essential utilities (services) commensurate with the level of development expected over the period the local authority and community will determine as the plan period. Water and electricity are the most basic services that should be provided in the beginning phase of implementation of development program for the area. It was established that no working sanitation system exists in Ahero town. Therefore, the most

crucial challenge for the town is to urgently seek for funds and immediately construct a sewer system to alleviate the current environmental problem of sanitation in the town.

The plan has taken into account the provision of sewer system by allowing enough space on road reserve for such services to be constructed. Similarly, due to the topography of the town and frequent flooding ample space is provided for construction of storm water channels. In accordance with the planning principles and standards, sufficient area has been provided for plot frontage in residential areas. It is recommended by the planning standards that the width of streets or access lane in residential neighbourhoods be at least 6 metres. In Ahero town this should be exceeded because of the topography of the area and the frequent flooding. It is therefore proposed that at implementation, more space is allocated for street reserve to allow ample space for storm water channel construction. The neighbourhood concept has been used as the basic planning guideline in the structure plan. It has however, been modified to suit the unique conditions of Ahero town.

Transportation

The plan proposes a road network (circulation system) aimed at maximizing accessibility for essential movements between the various linked activity areas. The present road network in Ahero town hinges on the national trunk road leading to Nairobi, which traverses the area. Most of the feeder roads joining the trunk road are narrow in width. Considering the level of development expected in the area, these roads will neither provide for efficient movement nor can they accommodate the various street furniture and utilities to serve the expected population. The following hierarchy of roads is proposed:

i) Primary distributor roads

These are to be expanded to 30 m reserve from the present narrow ones. These expected to be the main commuter routes serving the various neighbourhoods and will be the main routes used by connecting to the international trunk road.

ii) Secondary distributor roads 20m road reserve, which will link the local distributor roads to the primary distributor roads, is proposed

iii) Minor access

The plan proposes a 10m minor access or service lines in commercial plots.

iv) 6 meter reserve foot path is proposed

Special attention should be given to areas with higher development densities in locating buildings within parcels to create adequate setbacks for off street parking and for landscaping that should be integral

with the grouping of residential buildings. Pedestrian pathways should provide an off-the-road access to local centres, schools and playfields. The plan proposal have been made in a way as to minimize the need for demolishing and acquisition of developed land by retaining, more often, the general alignment of the existing road network. However proposals have been made for new road networks within the residential neighbourhoods and minimal road widening. Second, the proposal will involve minimal disturbance to adjoining property from passing traffic by proposing a 10m building line of which 5m is a tree planted strip especially along the National Trunk road that traverses the town.

Commercial and Public Purpose

It is expected that the plan will be implemented with primary schools, play grounds and local shopping areas closely associated with the neighbourhoods as the catchment area. The aim would be to minimize the travelling distance by the users of these facilities. One local shopping centre consisting of 5–10 shops is proposed for each neighbourhood and one local market to be located at every local shopping centre. Specifications for land requirement should be as per the ratio of population.

Education Facilities

There are existing primary and secondary schools whose positions have not been changed. However, due to increase in population in the future, an expansion of the same will be necessary. Provision for expansion has been proposed and depending on the need other new schools can be established in accordance with the population requirement in each neighbourhood. The distribution of nursery schools should ideally follow the same distribution pattern of primary schools. It is desirable they be located on major pedestrian routes in order that the catchment of pedestrian population should not cross major roads. Children between the ages of two to six (2–6) years represent 14.8% of the total population in Kenya (RoK, 1996); therefore, one nursery school of 150–260 children is required for a population of 2500 people. At recommended densities for low income housing, the nearest school would be within easy walking distance of 250m–300m. In medium density residential areas facilities should be available for dropping and picking up children by car without obstruction on the main vehicular flows on feeder roads and ideally nursery schools should not front roads.

Residential Neighbourhoods

A residential neighbourhood is a spatial planning unit which is adequately provided for in terms of basic community facilities and is bordered by principle through roads. Residential areas are seen as integral parts of the overall built-up area (dwelling plots) together with day-to-day services, recreation and

communication network. Housing constitutes the most important land user in Ahero. The plan proposal in Ahero, therefore, is aimed at creating a favourable environment for the residents. The table below shows the proposed standards to be observed.

Table 1: Residential Categories and the Types of Proposed Housing

Zone	Type of housing development	Minimum permissible plot size (Ha)	Maximum permissible plot coverage (Ha)	Comments
O ₁	High Density Residential	0.125	0.25	Flats and maisonettes allowed
O ₂	Medium density Residential	0.5	0.25	Maisonettes only allowed
O ₃	Low density	1		One unit per plot permitted wholesome water required

Residential specifications proposed in the Table 1 above should be considered alongside these proposals:

- i) Landscaping schemes for streets (linear-scaping) public open spaces in each housing cluster as well as schemes to encourage private properties landscaping
- ii) Introduction of area housing types and cluster arrangements that will ensure a high degree of privacy for residence, provision of variety to reduce monotony
- iii) Street definition of standardized width, proper house lot access, sidewalks, and adequate parking spaces
- iv) Street lighting schemes for safety and aesthetics
- v) Proper design for all new proposed community service centres in the area

Industry

A zone for industrial area has been proposed in Ahero town, which is going to provide a fair level of employment necessary to maintain the economic well being of the structure plan area. These will basically be light industries, labour intensive and compatible with the residential land user. They should be the type of industries that are not noxious, producing limited noise and smoke and have limited waste water discharge. Rice milling plants (factories) should fall in this category of industries. Others are repair workshops, carpenters, small tin smiths, re-use industries, large laundries, dry cleaning depots, printing, packaging, food industries and furniture making, and others. The area has been separated from other land uses by road reserve and by a green area on the residential border to create a buffer. To ensure that there is strict control on industrial development all applications for industrial establishment should pass through the Physical Planning Department for screening.

Open Spaces

A riparian reserve has been created along River Nyando from where it enters the town boundary till it exits the town boundary downstream. This zone is on both side of the river to protect the river from encroachment. A proposal for a golf club and a high class hotel is given so that the environment along the river can be conserved. This will also serve as a recreation area.

Recreation Areas

These areas are proposed as parks, stadium, buffer zones, green and gardens and are expected to be developed to provide some or all of the opportunities such as areas of visual relief screened from surroundings, areas for setting in quietly with scented gardens, colour gardens, flowers and shrub displays, small enclosures, and so on.

Public Utilities

This area is proposed for sewage treatment ponds, solid waste dump site and cemetery.

Implementation of the Plan

The plan if implemented will depend on co-operation, initiatives and partnerships between Ahero Town Council, local communities, Non-governmental Organizations, Ministry of Works and Housing, Ministry of Lands and Settlement, Ministry of Local Government, private sectors (local and international development partners) as proposed in Table 2 below.

Table 4.4: Agencies and their Roles in the Implementation of the Plan

AGENCY	ROLE
Commissioner of lands	Acquisition of land zoned for public utility
Ahero town Council	a) Enforcing the approved planned areas b) Develop and maintain roads c) Provision of services(water, electricity, sanitation, housing) d) Environmental education and the need to adhere to the development plan e) Provision of schools, playfields and other community facilities
Physical Planning Department	a) Interpretation of structure plan b) Provision of advisory services on all aspects of physical development plan c) Vetting of all development proposals
Provincial Administration	a) Organize forums for educating residents and publicity of environmental planning b) Organize and involve communities in development and maintenance of community facilities
Ministry of Public Works and Housing	a) Standardization of the entire works involving infrastructure, e.g. roads, houses
Residents and community	a) Undertake individual property development as proposed by the plan b) Participatory roles in all aspects of development of community facilities and other interest in the town's development
Non-governmental Organizations	a) Working with communities on environmental issues b) Implementation of tasks involving communities
Development partners (Local and international)	a) Provide technical assistance and financing.

CONCLUSION AND RECOMMENDATIONS

By and large Ahero town is in deplorable state in terms of environmental management. There are no proper measures in place to adequately cater for solid waste management, the storm drains are blocked and the houses are unplanned. It has also been noted that Ahero town water supply system is inadequate to meet the growing urban demand while the nearby Nyando River is heavily silted and contaminated with wastes of all kinds. The town has neither a sewer system in place for safe disposal of sludge and wastewater or adequate housing in terms of types of rooms and space.

To arrest the current situation in the town, there is need to come up with a plan which will address the current challenges and guide future development of the town. Towards this end, the author recommends the adoption and implementation of the proposed Plan by the Ahero Town Council in collaboration with all the concerned stakeholders. The Plan is immediately annexed.

Furthermore, the Town Council needs to control development of structures, which were found to be erected outside the existing development plan. The council also needs to adopt with appropriate adjustments the proposed Ahero Town development plan prepared by the author to immediately start controlling haphazard development.

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