

Assessment of Urbanization Effects on Environmental Security. Case of Nyarugenge District

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Abstract

Most safety concerns are generated by complex situations involving also environmental issues that result from the persistence of existing problems that do not receive enough attention on time. If the environmental problems are now somehow known, we still lack specific information on how issues are linked, how closely they interact, and what measures are most effective. Observation of the facts in the City of Kigali shows that the development of roads, sewerage system, and waste disposal is on an increase but the responsible to consider adverse consequences brought about by the activities undertaken seem to neglect some factors and as a result cause various damages that are interpreted as security threats. The objective of this study was to examine how urbanization affects environmental security of Nyabugogo and surrounding areas and how the steps taken towards urbanization can either preserve the environment or degrade the environment in the area. The researchers used qualitative approaches and primary data sources obtained through questionnaires, focus group discussion, observation and interviews and desktop research to discover the existing literature. The findings indicated more degradation that taking place, construction in risky areas, emissions from vehicles and fuel sources, water sources contaminated and wetlands are heading to extinction leave alone the less mobilization of communities towards environmental protection. Conclusively, urbanization has brought positive and negative effects towards environmental protections although more efforts are still needed to ensure that Kigali city conforms to international protocols about environment.

Key Words: Urbanization, Environmental Security, Environmental Degradation.

1. Introduction

Attempts to think about environmental problems in terms of national security began

in the late 1970s, motivated by concerns both to reduce the excessive focus on military threats from Cold War tensions and to address the specter of resource wars that

arose after the oil crises (Ullman, 1983). During the 1980s, the environmental security movement picked up steam, with the writings of environmental advocates (Mathews, 1989), and with the support of foundations, conferences, and the initiation of several major research efforts. Environmental security is an evolving concept developed with the consciousness of the need of societal and global environmental sustainability in the face of uncontrolled environmental degradation that is witnessed in different parts of the world. Therefore, it could be looked at as an offshoot of the principle of sustainable development with the unique aims of preserving the future of our environment for the use of the present and future generation.

Meredith, L. et al, (2016) is of the opinion that the concept of environmental security was muted as part of the struggle to achieve a decent society. This promotes a unique bond between urbanization and environmental security. Also, Marvin (1994) in his paper titled “Global Change, Environmental Security, and the Prisoner’s Dilemma’s” states that the overall objective of environmental security is to prevent or minimize human induced changes to the environment that degrade and disrupt it with

adverse consequences for current and future generation.

The expectations of most rural-urban migrants in cities and urban centers in most developing economy countries are to have improved lifestyles and comfortable wellbeing. This could only be possible if the cities and urban societies encourage human dignity alongside environmental sustainability. Therefore, the desire for human dignity and survival in every society may promote the rural-urban migrations in most developing economy countries.

Environmental security and sustainability of urban centers in most developing countries have been affected by weak projections and inadequate planning with management. Thus, with continuous urbanization the urban society is thereby, subjected to myriad of problems and hazards that impinge on its growing population. In many Nigeria urban centers, the environmental problems and hazards associated with urban centers and cities include uncontrolled erosion, uncontrolled flood, waste management issues, land contamination, water pollution, air pollution, biodiversity and ecological issues, ... (Oluwole, 2013). The degradation of the environment will be multiplied also because of increasing migration of population from country areas to towns

without having efficient infrastructure for the assurance of minimal social and medical standards. (Balabán, 2008).

REMA (2009) indicated that the results of human activities have aggravated the impacts of floods on people, and the physical infrastructure. In environmental terms, despite the high demographic pressure on land resources soil erosion from riverbanks and nutrient loading in water bodies such as the Nyabarongo river system and associated wetlands had been adequately addressed through education and popular participation of land users. There are marked unplanned urban residents hence the alteration of environmental patterns which drives later to direct consequences of environmental security in areas well outside their boundaries.

2. Materials and Methods

The study was carried out in the areas of Gatsata and Kimisagara (Nyarugenge district) surrounding the Nyabugogo river. This study area was chosen because first of all the river which is identified as a case study is located in the area and has also faced

environmental degradation issues due to urbanization and efforts to protect the environment leave out many environmental problems and insecurity has been identified in the region. This study is descriptive - qualitative and used the questionnaire and interviews as primary data collection tools as well as various textbooks, articles and online documentation to collect secondary data.

The target population included all the people living and working in Nyabugogo. The population of this study could not be determined in terms of quantifiable data and their accessibility could not be guaranteed as they include those who live in Nyabugogo but work elsewhere, those who work in Nyabugogo but live outside the region as well and another category of people whose address was not fixed but who spend a large part of their time in Nyabugogo.

The sample size was randomly determined and fixed to 80 respondents (table 1 below). The sampling technique used is purposive sampling.

Table 1: Respondents sampled

Type of respondents	Number of female respondents	Number of male respondents	Total number of respondents

Business community from Nyabugogo area	6	14	20
local village leaders	2	4	6
Community members	12	23	35
Police leaders	0	4	4
City of Kigali Urban Planning department	1	3	4
Muhima and Kimisagara sector officials	2	4	6
REMA officials	0	1	1
MINIRENA Staff	2	2	4
			80

The table was generated by the Researchers to clarify the number and type of respondents.

When collecting primary data; the questionnaire was administered to 50 respondents and was consisted of open-ended and closed-questions. In this regard, the questionnaire was only relied on intellectual and literacy competence of the respondents, as opposed to the interview method. For qualitative interviews, interviews were applied to 30 individuals organized under focus groups from community members chosen randomly and believed to have faced the insecurity issues caused by the environmental issues. This tool has been selected to allow researchers to collect data from many respondents at once and to collect a variety of information with the possibility of in-depth discussion of the theme presented.

3. Results and Discussion

Due to many activities and its strategic location many people flock to Nyabugogo and the surrounding areas have attracted many people leading to slums in the neighborhood.

From the interview with the Ministry staff and the REMA, they asserted that the Government through the City of Kigali has constructed some roads, terraces and water ways to address flooding during rainfall but most work is still ongoing if urbanization of this area is to be achieved. The sewerage system and garbage disposal have not been standard thereby making the environment unfriendly as some are dumped in the swamp thereby threatening the people’s lives who stay and those who have errands in the area of Nyabugogo. This is a security threat as diseases such as diarrhea, cholera, amoeba

and malaria are always the result of poor management of the environment of Nyabugogo area. The biodiversity is threatened as the cause of climate change emanating from poor use of the swampy areas around the place.

Urbanization from one of the respondents asserted that” Urbanization and development and many activities as a result of the strategic location of the area has caused the rise of slums that are inhabitable with poor hygiene and sanitation thereby causing diseases, prostitution, street children, robbers among others which has made the place insecure”. From this assertion, it is clear that urbanization of this area has attracted insecurity in the area and environmentally, the upsurge of the population due to the strategic location causes degradation of environment due to overuse and disposal of waste that automatically jeopardizes the security.

One of the business community members interviewed stated that “Some of the houses constructed in the swampy area and hence causes environmental degradation and affect the fall of rainfall due to degradation of the swamp and the wetland, the City of Kigali has issued warning to some people to demolish the said building so that they can save the environment. On the other hand

expropriation of illegal structures and payments to the owners of establishments in the swampy area is difficult due to financial scarcity”. This insinuates that the buildings that are constructed in places that affect the environment of the area are a danger to the inhabitants and those who transact different businesses in the area putting their security in dilemma. On the same point of financial scarcity, it was observed that the authorities have encouraged all other vehicles to move to Nyabugogo main taxi park yet it is established in the wetland and hence contravenes the rules of the environmental authority and the Ministry of Natural resources in particular. There have been budgetary constraints to relocate the taxi park yet it is not only affecting the natural swamps and wetlands but also increases pollution of the environment in the area. On the other hand, the community members insisted that the government should look at this issue critically and promote urbanization of the area through other strategies instead of the rudimentary ones that affect environmental security.

It was also observed that the surrounding areas are a risk to the inhabitants as the mushrooming slums didn’t consider the risk of disasters. The areas are hilly like Muhima and parts of Kimisagara sector and needs

urgent resettlement of the population around the area. The sector leaders informed the researchers that some areas are in high risk zones to both the environment and the inhabitants of the very areas and hence must be given alternative settlement. This is a difficult venture because it involves affecting the business of the area population and also the alternative habitats are not readily available leave alone the budget constraints affecting the sectors to undertake such programs. This is also coupled with the over population as a result of urbanization that is difficult to settle. The constructions didn't

consider the measures used while constructing houses in high risk zones.

3.1. Demographic considerations of Nyabugogo that affect environmental security

According to some respondents about 500,000 people transact their business and travels around Nyabugogo and the surrounding areas. The questioned people in Nyabugogo highlighted at the rate of 100% a noticeable rapid growth of the population and infrastructure as displayed in the following table.

Table 2: Cited indicators of demographic growth in Nyabugogo

S/N	Indicator	Number of respondents	Percentage
1	Movement of people	50	100%
2	Increase and variety of infrastructures	50	100%
3	Increase in types and number of services demanded and offered there	42	84%
4	Congestion of residential houses	50	100%

Source: Primary data, April 2018

This table shows the population living in Nyabugogo itself notes there is progress increase in the population, activities/services and residential buildings. This an important

characteristic of urbanization in the view point of a non-specialist in demography or in socio-economic fields. Whatever the case, such an increase is characteristic of urbanization in its sense of the influx of rural

dwellers into the urban areas in search of jobs and better living conditions.

A note is that with such high percentages of people living or working in Nyabugogo who by their single sight notice a remarkable increase of the population, services and buildings is a sign that there is the process of urbanization in the area. On the other hand, the sector officials informed the researcher that the roads have been paved well in most of the areas that were impassable and posing a risk to environment of the swampy area and the security of the vehicles that ply their routes from the taxi park of Nyabugogo. The number of travelers has also increased connecting to outside countries and the countryside of Rwanda.

On the same angle of investigation, interviewed authorities of Muhima and Kimisagara Sectors as well as the Director of environmental regulation and pollution control confirmed these features as linked to urbanization of Nyabugogo. Though the nature of the area of study could not allow to provide precise numbers of the population with density because Nyabugogo as such is not a separate administrative entity, available data show that in Nyabugogo there is progressive urbanization.

Indeed, administrative authorities interviewed reiterated there has been a considerable influx of people which resulted into need for improvement of infrastructures. These include new roads, waste water and rain canalization linking to Nyabugogo River, new and specialized markets, water supply points, and commercial buildings. These have been done but as quick fixes that cannot address long term problems that are in comparison with the increasing activities in the area and the population of the area. Some of the roads are narrow and constructed in areas that were supposed to be preserved by Rwanda environmental management authority. Some of the structures were erected before the inception of this REMA and hence there is need of the total overhaul of the constructions that were made to be compliant to the standards of the environmental authorities.

Among other cited infrastructures are the building known as “kumashyirahamwe” which was built to serve a number of small and medium traders who could not find conducive places where to conduct their business; the mini market built to host former on-the-road traders usually referred to as “abazunguzayi”. These are features of the demographic related situation of Nyabugogo along the period of study. On the sex

demographic characteristic, it was not clear as some revelers like prostitutes flock the area at night to enjoy the booming night life in the area and the travelers are moving at night and it was not easy to access the manifests from bus operators but the researcher was informed that the buses have steadily increased in the last couple of years and the bus companies are coming up all the time to ensure that they absorb the increasing number of travelers. It was noted that most of the petty traders in the area are females and males conduct big business. When travelers increase in number it also increases migration from rural areas and the pressure on environment is increased.

The banks were also seen as a feature as most branches of the banks found in Rwanda are established in the area and hence need for security risks to be minimized and environmental hazards to be mitigated to save the increasing customers. Other offices have found Nyabugogo convenient there since most clients are easily found in the area due to the strategic location.

The local leaders informed the researchers that there is no suitable sewerage system in the area and most of the human wastes find itself in the swamps thereby pausing an environmental threat and a threat to human security in terms of diseases that arise due to

poor sanitation and hygiene. The swamps and their waters have become brown in color and loss of natural sources of water is experienced which is expected to worsen and increase problems on the environmental security in the area. On the other hand, most of the people are ignorant of environmental friendly measure to undertake or some have financial constraints to implement those thereby pausing security risks as a result of this urbanization.

According to King (2004), climate change is the most severe problem that we are facing today - more serious than the threat of terrorism. He added also that when there is too much rural urban migration and coupled by the scarce resources to cater for those who have migrated to towns, unemployment sets in as it is in the area where the majority wait to get manual jobs, disposal of waste is not managed well sewerage management is having challenges, aggrieved population is increasing due to the problems they are facing like poor accommodation, climate change, loss of rains, food insecurity, impassable roads and these problems at a later stage find themselves causing political problems even unrest.

3.2. Variation of activities in Nyabugogo throughout 2010 to 2017 that affect environmental Security

The advent of the new population to Nyabugogo was accompanied with introduction of new jobs and new activities. Respondents among the inhabitants of Nyabugogo provided the following:

Table 3: Activities linked to growing population according to respondents

S/N	Emerging sectors of activities	Number of respondents	Percentage
1	Soft services	37	74%
2	Commissioners in business	50	100%
3	Manpower associations	45	90%
4	Security companies	42	84%
5	Undetermined labor	50	100%

Source: Primary data, April 2018

In this table only newly introduced sectors of activities were referred to as resulting from the increase of the population in Nyabugogo were referred to as marginalized labor all the people whose specialization as daily activity is known. Instead, they are found standing at remarkable public places waiting for any opportunistic occupation as a source of their income on which they rely for living. It was discovered from the business community that manual jobs are common in this area as most of the people searching for employment are not professionals but include manual laborers on mushrooming structures, in construction of roads, canals, trenches, luggage loaders and luggage lifters. The motorcycles and special taxis are common in this area as they are waiting for those clients who disembark from the main taxi park and those who have bought their merchandize either from Nyabugogo or from outside the country with the buses that ply their business outside the country but departing from the main park.

On the other hand, the presence of these laborers has given rise to restaurants, bars and hotels to ensure that the services are brought nearer to the end users. The professionals are found in the banks, forex bureaus, bus agents and insurance companies that have established their offices in this area to tap the needs of the increasing customers. According to the community members, they indicated that these activities have made the area booming even at night and for business purposes.

Coupled to the above, the researchers found out that, security is always tightened although lapses are always witnessed and police presence is visible in the area and private security companies have taken up security measures but on environmental security there seems nothing is being done either due to negligence of lack of professional skills in management of environment. Most urbanization activities are growing up without recourse to standards of environmental security.

Findings indicated that there are several effects of urbanization on environmental security such as emissions from industries and main taxi park that pollute the environment and human survival is affected and this is coupled with the noise pollution. Further emissions are from fuel and energy sources and unplanned business areas and these all affect the environmental security as they are not considerate of preservation of security of environmental and the rate of degradation is not well halted. Although some positive like emerging health centers, garbage collection centers, schools and employment opportunities shave been witnessed

3.3 Environmental insecurities experienced in Nyabugogo due to laxity of authorities in planning and projections.

Apart from water and food security that are being affected by urbanization, it also has its impact on community security in diverse ways. It affects mostly the environments of many parts of Nyabugogo destabilizing its ecology in various ways. Such includes its pristine nature and its enduring biodiversity.

This has continued to create differential gaps between the rural and urban communities. Community ecological security and quality urban life are hindered by inadequate waste management. Urbanization, industrial and socio-economic development with population

growth is changing the compositions and patterns of wastes in Nyabugogo. This is because, the urban consumables determine the nature and types of urban wastes which invariably decides the kind of impacts they will have on the environment.

According to the respondents from the community members and the local authorities, the waste management is inadequate as there are a few companies and vehicles transporting the wastes to Nduba processing plant and hence this has affected the wetlands and has increased poor sanitation and hygiene levels in the area which would in the end further affect the ecological status of the areas around Nyabugogo and lives of the people who work and those who stay in Nyabugogo and other areas around.

Solid wastes sometimes thrown on some streets in most areas of Nyabugogo depict challenges in waste management. Solid waste technology in some of the areas where casual labor is continuously done at most times has its processing and end points in uncontrolled dumps. There is a lot of dumping of waste and garbage in areas of Nyabugogo that is difficult to control thereby affecting the environment and at night, still it's difficult to control all the people and their illegal activities especially concerning dumping.

According to MINIRENA (2013) these uncontrolled dumps are seen in most of the cases surrounded by residential houses giving out landfill gas and obnoxious odors to their surroundings. Uncontrolled air pollution has socioeconomic, physical, chemical and health implications to urban dwellers. Furthermore, there can be noted increase in concentration of pollutants in the air in because of high congestion caused by increased in the number of automobile vehicles plying the roads of this area. Indeed, with a wide range of variety of activities and high circulation of people there is a great number of vehicles. Consider even that there is the main car park which serves for both internal circulations in Kigali and in provinces.

The result is an increasing health risk on human population of Nyabugogo. This is of course a situation this place may share with other places of Kigali. The risks of pollution are ever increasing with the multiplication of the number of vehicles in the area and motorcycles yet the urbanization measures to mitigate the population and the waste control have not doubled with the doubling population and the urbanization activities thereby posing serious security threat to the environmental but all emanating from the poor planning and the slow pace of implementation of measures to conserve the environment.

Other respondents indicated that “Nyabugogo due to its strategic location has attracted small scale factories and industries that emit a lot of gases and chemicals which spoil the environment and these factories and industries are established in the surrounding wetlands and there is no control to ensure that their activities do comply with environmental standards, the garages and washing bays are common in this area and have been put in place to respond to the needs of the people who increase in the area and this has affected the environment of the area of Nyabugogo greatly”.

From the above empirical data gathered it can be argued that unless these industries are shifted in other secure areas, the environmental degradation pace is likely to increase and this is because the urbanization has not considered these factors and address them with the urgency it needs. The officials in the environment department and sectors have to implement all standards to save the environment and move the pace of urbanization with the pace of environmental protection.

3.3.1. Change in the roles of Nyabugogo marshland and wetlands that affect environmental security

The interview with the director of environmental regulation and pollution control revealed total distortion of the role expected

from Nyabugogo marshland as associated with urbanization. First and foremost, urbanization brought in new needs in terms of space for living and working, which implied creation of new host spaces. In this respect, the main car park was built in a totally flooding area of the Nyabugogo marshland. This has caused noise pollution of the area due to multiplying vehicles, population density and increasing small scale industries. These are major problems that cause environmental insecurity.

He further asserted that “ Marshlands are always for the growing of vegetables, and cereals and horticulture but the one of Nyabugogo is used for construction of buildings that have affected the ecological state of the area and leading to death of aqua life and the green nature or flora expected of a marshland and plans for rectification of this dilemma are not forthcoming because of the budget issues alongside insufficient skilled personnel and which location should the activities be relocated since the area is densely populated and very strategic whereby if tampered with, the activities will be halted and this affects the economy of the country”

It can be argued from the above assertion, that there is a dilemma in conservation of environment and the pace of urbanization which is more important to the City of Kigali

which aims to implement the development master plan. A lot of efforts must be directed to this urbanization without affecting the environment because environmental security if not well managed through preservation of the river, marshlands and the wetlands hence the future of the country is in jeopardy as many problems associated with environment will affect the inhabitants of the area and the ecological features and it is hard to change the direction of degradation if it was not given due diligence.

According to REMA (2005), Nyabugogo marshland was initially reserved for serving as the reservoir of water from up hills and for ecological protection. With rapid population growth has recalled for building new infrastructures, which has affected the setting and the initial plan of the Nyabugogo marshland. As quoting tangible examples the main car park which was constructed in total wetland area of Nyabugogo. Although, the officials seem to know the effects of urbanization to environmental security, there seems to be no or less efforts done to ensure that it is protected. It is not protected and hence poses a danger to environmental security if it is not checked as the structures drain the waters from these natural sources and constructing them itself is an encroachment on environment as local ways implemented as opposed to

internationally accepted standards in the environmental protocols and those recommended by the different environmental conservationists.

This is one of the greatest problems when the institution charged with protection of environment behaves as if its hands are tied, and which may originate from its budget allocation and lack of sufficient qualified staff to implement the strategies enshrined in the attributions set in the organic law that put in place the institution of REMA.

3. 3.2. Water and sanitation raising issues that affect environmental security

The respondents further stated that adequate water for consumption and sanitation are prime ingredients that determine satisfactory water security. It is the determinant of urban health security. Water security is a veritable part of environmental security. It interconnects most of the components of environmental security. In line with this discourse, water security is examined alongside urbanization in Nyabugogo as in the same vein of potable water for consumption and the threat of water related risks such as in flooding and water borne diseases. The water is not secure since it is contaminated by waste disposal in the river and floods from the hilly areas. It is also noted that sewerage system of Kigali find itself in the

Nyabugogo River and the same water is used for other purposes making it unsafe for those people who use it and drop the remaining water again in the River.

Uncontrolled urban population growth has encouraged the decay of existing infrastructure and hampers the development of adequate standard infrastructure that is friendly to environment. Local authorities interviewed insisted on poor rain water management and harvesting from houses which are built in a more or less uncontrolled way. Some of the structures were constructed on permits that were issued by less experienced people and with little technical know-how on environment aspects.

Another respondent argued that “Flooding as an unavoidable and recurrent security risk has crept in as it destroys the nature of wetlands and swamps and the death of aqua life and flora in general. This is coupled with the threats of environmental challenges which include climate change. Though, flooding is now recurrent especially the downside part of Nyabugogo mostly during the raining seasons of the year. It destabilizes the environmental security in the area affecting the security of life and properties. Incessant rains during the rainy season lead almost every year to flooding caused by the overflowing of the bank of

Nyabugogo River itself and of protected water lines constructed to lead water from houses in various places to the river”.

Accordingly, the local Authorities and the Rwanda Environment Authority (REMA) asserted that this situation has every year led to displacement of people from their homes and loss of huge properties and sometimes deaths. They indicated that increasing urbanization along the Nyabugogo River floodplain is responsible for the problem of flooding that has been experienced in recent times along the river floodplain. These deaths could have been avoided by good planning of the urban authorities and good activities by the users of the swamps and wetlands of Nyabugogo area.

The buildings established do not have proper water harvesting ways and purification of this water is not done by the city authorities at least in a designated water treatment plant and which is environmental friendly. The trenches and canals established in the area of Nyabugogo by the urban authorities have less capacity to harvest the rain water and control the flow of water without posing security threats to the inhabitants of the area.

It should also be noted that local authorities interviewed and the community members established indicated that the many people residing in the slums around Nyabugogo area

and those looking for manual jobs in the area have less capacity to drink safe waters in the area and only resort to the untreated water that in the end causes diseases thereby affecting the levels of mortality and infant mortality leave alone the life expectancy of the people from the surrounding areas. On the other hand, there are a few health posts around the area to address the problems emanating from this unsafe water from flooding and the river and the trenches and canals that were put in place to control the flow of water that is contaminated and emissions from this water affect evaporation process.

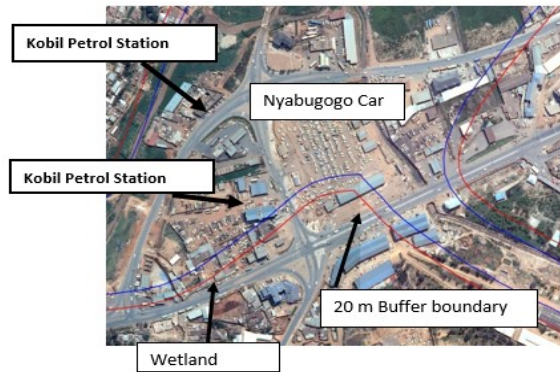
They further indicated that if the surrounding marshlands could have been used profitably the waters harvested could have been used for irrigation of the horticultural business and vegetables that have double advantages of preserving the marshlands and wetlands and also for financial motives from the sales of these agricultural products that have been replaced by the illegal and environmental unfriendly activities that are caused by the urbanization of the City of Kigali.

3. 3.3. Flooding situation affecting environmental security of Nyabugogo

The respondents argued that Nyabugogo has been revealing a fully wet and flooding place at all the time over years due to being a swampy area and a wetland although some reductions

are being witnessed due to the illegal human activities and urbanization that has not considered measures to preserve environment security. The flooding was claimed to be greater during rainy periods but Nyabugogo is in its nature wet and swampy. REMA based on a scientifically proved map to show the wet zones of Nyabugogo.

Figure 1: Map of Wet zones of Nyabugogo



Source: REMA, Directorate of environmental regulation and pollution control, 2016

From the above diagram, it is indicated that the roads and other physical features both natural and manmade have caused environmental degradation and the security of environment is seen to be debilitating due to the inadequate measures put in place to address the environmental concerns. The increasing population and increasing activities due to the strategic location of the area indicates that the rate of environmental protection does not

compare proportionately with the rate of urbanization and population density.

There is also negligence according to the local authorities of the communities around to ensure the proper use of the set infrastructures by the urban authorities through pouring waste in the river and the swamps that impede the flow of waters and sanitation of the water reservoirs in the Nyabugogo area. It can be argued that if this trend is not reversed the environmental degradation is destined to cause more environmental security problems than those earlier identified and the price to be paid is huge basing on the increasing dangers of the climate change and desertification as international protocols must be protected since they were domesticated by the government of Rwanda.

It was further argued that improper management of wetlands, swamps and the river Nyabugogo has started affecting the rainy seasons and they are no longer accurate as they used to be and this causes prolonged heat and drought and scarcity of water as natural sources of water and evaporation are steadily getting extinct. The trenches and gullies built are not sufficient and are narrow to handle the flow of un-harvested water from the river surrounding areas that are mountainous and hilly but not well protected and are vulnerable to people's

lives and property without forgetting the environmental safety.

Coupled to the above, the respondents indicated that changes in rainfall don't only affect Nyabugogo areas but the entire country and hence if seasonal rains have reduced and the available ones are unreliable, food security levels are seriously affected and hunger is the result which is part of the indicators of human security in the negative sense. When hunger strikes due to failure to preserve the environment, chances are minimal that the trend can be reversed and if human security is not guaranteed from the perspective of environmental protection, it can lead to spillovers to other sectors.

3.3.4. Environmental security and Security of people and their goods

The concern was about possible environmental related security issues that could have emerged due to the setting linked with urbanization features of Nyabugogo. It was discovered that during rainfall, some merchandize is lost in floods and some roads become impassable to people and accidents become the order of the day. Since people who are doing business can't stop to look for money through commercial activities, then environmental steps are not given much consideration like waste disposal in the river and management which is irregular,

contamination of swamps, marshlands and wetlands that if not protected pause an environmental disaster all emanating from a few steps done in urbanization.

Figure 2: Photo on Risky workplaces observable in Nyabugogo



Source: Photo taken by the researchers, May 2018

This photo displays the feature of rapid urbanization resulting into scarcity of land for construction of infrastructures. Such a building designed to host big numbers of people, as a bar-restaurant with night club, being built along the shore of a water line is a security constraint to the environment. There is high risk to have this water line which is not even protected get damaged and the building fall with all assumed consequences it may cause. The building therefore doesn't comply to the standards and lives can be lost due to the fact that the rate of urbanization is not up to the requirement of safe construction and safety of people and their properties. It can be argued that this is not the only building with such worse characteristics

but it is a common phenomenon in the whole area of Nyabugogo.

Accordingly, it was discovered that the water line also constitutes a source for some people, whose jobs are not permanent, to extract sand they sell to people who are building their houses and to make cement blocks for construction. Really, such activities are a danger to the environment since it is destruction of designed and built ways for water to flow towards the Nyabugogo River. Therefore, water levels of River go down and it is hard to recuperate it as the upper soils find their way in the water and hence affecting its naturalness. The river provides the water resource to brick making and sand mining that are to respond to the urbanization needs and the desire by the manual laborers to gain income from the available means of that water line. On top of that such verandas attract those homeless people and street children to have them as accommodation and whenever they conflict, fighting among themselves is always the result and the injuries and sometimes the deaths are witnessed in those areas and these are connected to the fact that urbanization didn't consider the requirement of environmental security.

From the above data collected, it is important to note that human activities impacting on environmental security negatively. Building up

from the assumption that poverty may exacerbate environmental degradation, therefore the increasing poverty situation in a society determine environmental security measures which in most cases are minimal.

The findings indicated that the Urbanization in Nyabugogo and its surrounding areas have had challenges related to the sewerage system, disposal of waste, poor planning of roads, trenches and canals, water safety and sanitation. These are challenges that have a security element as many people who have migrated to the area don't find easy accommodation and places of their work, the constructions done are not compliant to environmental measures set up by the environmental authority, diseases have occurred and due to unsafe water and sanitation some diseases have not been cured and hence lowering the life expectancy of the people.

This is collaborated with the report of Kigali City, 2013, that stated that challenges related to urbanization occur and they include the lack of a centralized sewerage system; unplanned housing; informal settlements on fragile hill slopes and other high-risk areas; a lack of parks and green spaces; unmanaged storm water that eroded usable land, caused flooding and endangered human life as well as private and public infrastructure and non-rehabilitated wetland areas

3.4. Challenges of Urbanization on environmental security

Most of the planned urbanization projects that consider environmental protection take long to be implemented due to financial problems. According to the respondents, they indicated that the road system in the areas doesn't consider environmental protection yet it was planned in the road projects due to the financial constraints.

They further indicated that in developing countries, the roads have flyovers and bypass nature of roads that protect environment to a great extent but in the case study area it hasn't been implemented due to the financial constraints. Furthermore, horticulture farming and expropriation of sub-standard structures hasn't been implemented due to financial problems and hence these challenges only work to limit environmental conservation.

The urbanization is also affected by the challenge of skilled personnel to implement urbanization that considers environmental security. In all the sectors visited that are around the River Nyabugogo, the researcher didn't find specialized personnel in urban planning and environmental protection. These were only found and interviewed at the city of Kigali. The system is not streamlined at all levels. This has led to provision of construction permits without

due diligence to aspects of environment, the sectors have land officers who deal with the problems of environment which they surely have less competence to undertake.

The respondents also pointed out that the environmental laws are not enforced well as the Rwanda National Police has a simple department in the Criminal investigation department which is not well streamlined to all levels and hence there is a discrepancy on what must be implemented by all law enforcement up to village levels. The officers at the Police stations to the level of the village have less knowledge on environmental issues and hence there are gaps towards enforcement of environmental preservation laws.

The disaster management ministry and institutions have not done their work well because some respondents indicated that some houses in high risk zones of Mount Kigali that were earmarked for demolition haven't been done and expropriation is ever postponed. This has worked to increase environmental degradation and due to number of migrations to the urban areas identified increase, it also increases human activities that don't consider environmental protection. As the population density increases the human activities increase and some of the structures and business infrastructures put in place haven't increased to

absorb the increasing numbers of people. Therefore, poor projection challenges have been witnessed and have worked to degrade the environment and slow the pace of urbanization.

It was also discovered that the demographic increase in the population of the area is not at the pace of protection of environment and hence degradation of environment is associated with the low pace of urbanization and the measures adopted to conserve the environment.

The respondents indicated that the City of Kigali has faced change of leaders unexpectedly that doesn't take much time to implement their planning. It was indicated that some leaders when they come to power work only to implement their programs instead of continuing with the plans of their predecessors but due to fear to be associated with a leader who might have left leadership on wrong grounds like resignation, it only affects the issue of urbanization progress as more plans are ever new and some don't consider environmental security. This has slowed the programs of urbanization that put into consideration environmental security.

4. CONCLUSION AND RECOMMENDATIONS

4.1 Conclusions

Environmental security and sustainability of urban centers in most developing countries have been affected by weak projections and inadequate planning with management. Thus, with continuous urbanization the urban society is thereby, subjected to myriad of problems and hazards that impinge on its growing population.

In Rwanda, the environmental problems and hazards associated with urban settings include uncontrolled erosion, uncontrolled flood, waste management issues, land contamination, water pollution, air pollution, biodiversity and ecological issues.

The planning, administration and management of urban conditions and requirements in Nyabugogo area have proved to be mostly less controlled by the local authorities and are an aspect or sometimes enclave of some of the community. The local administration entities expectedly the closest to the rapidly growing population are at many times saddled with inadequate funds and capacity for city management. This has resulted into creation of uncontrolled agglomerations which end up being destroyed to the expense of the owners who took the risks of building without license due to challenge of those that gave permits for

construction having not done due diligence. This leads to the situation whereby Nyabugogo is saddled with myriad of urban challenges, environmental hazards and problems. These problems may generate tensions and societal threats that may at times require urgent attention of the government because of its human and environmental insecurity undertones.

The concept of environmental security is designed to encourage sustainable management of global and local environmental issues in order to achieve global societal sustainability and peace. Therefore, its principles promote better living conditions for mankind and its other living components in every society. Therefore, its analysis for urban setting is essential in determining its security, safety and sustainability.

4.2 Recommendations

The study always must be having research questions it intends to answer so that it helps future researchers to have a starting line and the Police makers to ensure that the identified problems are solved. Therefore, following the collection and analysis of data about the research study, the research recommended the following:

The study recommends that emphasis should be given to environmental security in the national policy thrust of Rwanda in general and specifically of Kigali city and the master plan of Nyabugogo in particular and suggests the formation of all-stakeholders self-inclusive urban environmental governance for the management of urban centers growing all around the country.

It is recommended that all sectors around the area should have professionals concerned with environment and urban planning such that the identified problems can be solved before it is too late for the environment to be degraded.

The trenches and canalization of waters in Nyabugogo and surrounding areas should be expanded to accommodate the expanding human activities and settlement of people.

The government should acquire finances to provide decent accommodation and expropriate the slum dwellers and construct modern markets in the area

The main taxi park which attracts most of the businesses and the people who ply their trade in the area should be shifted to an environmental friendly area so that the swamps and wetlands where it is constructed can be preserved and protected to mitigate climate change

Agriculture of rice, vegetables and horticulture should be promoted in the swamps and the wetlands as they can fetch a lot of income for the people as well as contributing to climate preservation and environmental security.

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REFERENCES

Balabán, M. (2008), Environmental degradation as a Security threat. Available at:

https://www.researchgate.net/publication/229049258_Environmental_degradation_as_a_security_threat

Kigali City, (2013).The City's 2007-2009 Strategic Issue Papers. Kigali. Available at:

<http://www.masterplan2013.kigalicity.gov.rw/downloads/Docs.pdf>

King, D.A. (2004). Climate Change Science: Adapt, Mitigate, or Ignore?. Available at:

<https://science.sciencemag.org/content/303/5655/176.summary>

Marvin. S .S. (1994), “Global Change, Environmental Security, and the Prisoner’s Dilemma’s.

In: Journal of Peace Research, vol.31 (3) available at:

<https://journals.sagepub.com/doi/abs/10.1177/0022343394031003006>

Mathews, E. K. (1989). The Environmental Impact of Suburbanization. In Journal of Policy Analysis & Management. Vol 19 (4) . Available at:

<https://ideas.repec.org/a/wly/jpamgt/v19y2000i4p569-586.html>

Meredith L.et al. (2016), Local Perspectives on Environmental Insecurity and Its Influence on Illegal Biodiversity Exploitation,

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0150337>

MINIRENA (2013), Kigali. State of Environment and Outlook Report 2013. Kigali

Official Gazette of the Republic of Rwanda Special number of 8/4/2005: Organic Law N° 04/2005 of 08/04/2005 Determining the Modalities of Protection, Conservation and Promotion of Environment in Rwanda

Oluwole, A. (2013), Implications of Urbanization on Environmental Security in Developing

Economy Countries. In Journal of Sustainable development in Africa. Available at:

https://researchgate.net/profile/oluwole_Akiyode/publication/249083650

.REMA (2005); Rwanda state of environment and outlook report. Chapter XI P policy

analysis And option for action. Available at:

<https://rema.gov.rw/soe/chp 11.php>

REMA (2009), Rwanda state of environment and outlook report: environment and economic Development. Available at:

<https://www.rema.gov.rw/soe/summary.pdf>

Thomas F. H.D. (1994). 'Environmental Scarcities and Violent Conflict': Evidence from Cases.

In International Security, Vol. 19.(1)

<https://www.jstor.org/stable/2539147>

Ullman, R.H. (1983). "Redefining Security" in: International Security, vol 8 no 1. Summar 1983.

Available at:

<https://muse.jhu.edu/article/446023/summar>