

# CHAPTER 2: POPULATION, HEALTH AND HUMAN SETTLEMENTS

## The state of population in Rwanda

A country's population and how it is geographically distributed can influence the state of the environment through the rate of growth and household formation, access to basic services and infrastructure, age distribution and employment opportunities, rural and urban environment and wealth of natural resources. The impact of human needs on available resources, in the context of emerging economies, poses a strain on available public infrastructure, limited land and natural resources, for instance forests and water bodies.

With a annual growth rate of 2.9 per cent, the population of Rwanda is currently estimated at 9.2 million (2006) with an urban population of up to 17 per cent. The population is expected to grow to around 16 million by 2020 unless family planning, education and outreach strategies are intensified (ROR 2000). Rwanda is the most densely populated country in Africa, with about 397 inhabitants/km<sup>2</sup>. The government aims to reduce this to 2.2 per cent by 2012.

Population density is the key to understanding the impact of people on the environment in Rwanda. The ensuing rise in population density has put pressure on the physical environment and induced labour migration between rural areas as well as from the countryside to the towns.

The population is relatively young with 67 per cent of the total population below the age of 25 most of whom are unemployed (MINECOFIN 2003). This situation has created a high dependency ratio amongst the population. The success of future strategies thus lies in the youth who represent the majority of the country's active labour force.

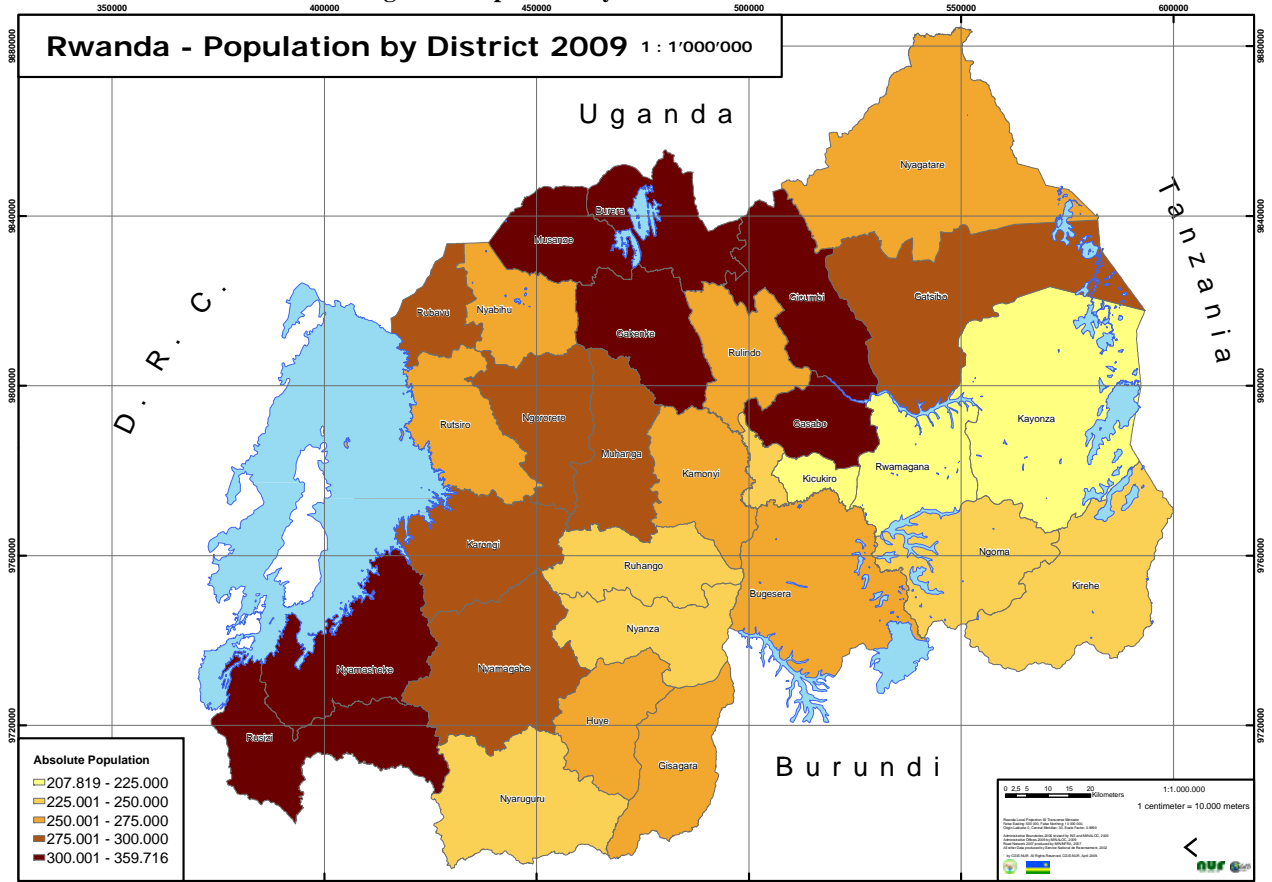
Since the livelihoods of about 90 per cent of people are inextricably linked to land, population growth is the underlying driver for the increased demand for natural resources. Growth rates are indicative of large scale in-migration, in this case mainly from the north and south to the north east in such of virgin lands for cultivation. This issue has been largely experienced in the former Umutara province, now part of Eastern province.

Rwanda is administratively divided into five provinces to include Kigali City, 30 districts and 415 sectors. The population distribution according to the new provinces is shown in table 1 and figure 1 shows the population by district.

**Table 1: Population distribution per province**

Province	Population (%)
Kigali city	9.6
Southern	25.5
Western	24.1
Northern	18.4
Eastern	22.3
Total	100

**Figure 1: Population by district in 2009**



**Household composition and size**

Household composition and size provide information on shared infrastructure, economic resources available per dwelling, and growth opportunities per household. This allows estimates on potential impact on the environment.

The average size of households is 4.6 persons with a rural-urban ratio of 4.5:4.8. These figures show that the average household size does not differ so much in each case (NISR and ORC Macro 2006).

The impact on the environment in the rural area can be seen through absence of basic infrastructure and therefore the proliferation of alternative coping methods. In this case poor sanitation, encroachment on forests, poor infrastructure and social services are evident around the country. These lead to hygiene-related diseases, deforestation, malnutrition and poverty-related derivatives. In urban areas, the impact can generally be seen on existing infrastructure as there are more inhabitants per area.

**Fertility reduction**

Fertility is one of the principal components of population dynamics. Fertility reduction is thus a major thrust of Rwandan population policy. Slowing down population growth requires innovative measures, including the strengthening of reproductive health services and family

planning and ensuring free access to information, education and contraceptive services. The fertility rate is estimated at 6.1 children per woman (4.9 for urban women, and 6.3 for rural women) and the EDPRS target is to reduce this to 4.5 by 2012 (ROR 2007). Some of these measures include sensitizing the population about family planning and encouraging Rwandans to have a minimum number of children that they will be able to provide quality life.

The government realises that if a minimum quality of life for Rwandans is to be maintained, planned investment in social services and amenities will be required. This will only be possible if population growth is controlled in order to meet development targets.

## **Human settlement**

### **The state of human settlement**

Rwanda lacks a human settlement development framework. This has largely contributed to the expansion of unplanned residential areas in urban centres, poor land management, environment degradation and impoverishment of the rural population deprived of basic infrastructure and income generating activities other than agriculture.

The aftermath of the 1994 genocide rendered many Rwandans homeless and those who had earlier been deprived of their inheritance to Rwandan soils begun to return from exile. These ensuing factors introduced a new aspect that required interventions in human settlement. Ad-hoc measures included construction of settlements, makeshift camps, designs for ‘Tent Temporary and Permanent’ housing schemes, provision of service land for development in urban areas, stepping up on housing finances, government interventions in providing public infrastructure, services and amenities, among others. The challenge now is how to cope with emerging urban environmental problems with the present prevailing infrastructure.

### **The future of human settlement**

Under Vision 2020, the development of human settlements will be planned and development inspired by concentration of infrastructure and urban utilities (ROR 2000). The EDPRS flagship ‘Vision 2020 Umurenge’, provides a development framework that sectors should follow during infrastructure planning and deployment to ensure sustainable development (ROR 2007). Many districts are already incorporating this framework into local planning.

Many urban neighbourhoods currently have inadequate provision of basic infrastructure which poses a very big environmental health challenge to local governments. The current human settlement policy addresses in part the planning needs for sustainable growth, promotes the grouping of development to facilitate infrastructure provision and promotes the role of the private sector in sustainable development of urban centres. For instance in urban centres, new areas have been opened up for urbanization, housing supply programmes implemented, and a decentralization framework defined to ensure proper urban management by local administrative structures.

### **Rural-urban population issues**

A distribution study of the population by geographical location shows that population density is highest where urban areas or trading centres and social infrastructure exist. The population living in urban areas increased from 16.1 to 16.5 per cent between 2000 and 2005. In absolute terms this is an increase of almost 300,000 people (see table 2).

**Table 2: Change urban rural population structure in 2000 and 2005**

Stratum	EICV1		EICV2	
	Estimated population	Share (%)	Estimated population	Share (%)
City of Kigali	663,000	8.3	703,000	7.4
Other urban	618,000	7.8	865,000	9.1
Rural	6,683,000	83.9	7,893,000	83.4
<b>Total</b>	<b>7,963,000</b>	<b>100</b>	<b>9,460,000</b>	<b>100</b>

Source: NISR 2007

Comparing the age distribution, it is observed that there are more infants in the rural area than in the urban area. This implies that rural-urban migration is actually on the increase whereas fertility rate is higher in the rural areas.

In 2003, when the Vision 2020 document was published, the urban population was estimated at 10 per cent, recent statistics from the National Institute of Statistics puts it at almost 17 per cent in 2007 (NISR 2007). It is not clear whether the urban growth is related to economic development strategies or rural-urban migration. Both have a specific effect on the environment. Urban growth for economic development provides additional amenities on top of what already exists and this reduces physical pressure on the environment. Rural-urban migration may pose a situation where minimal amenities are being shared by a larger population. In Rwanda urban growth may present both situations. An expanded urban population is normally accompanied by increased consumption, increased amount of wastes and pollution.

The major reasons for rural-urban migration are the search for convenient access to services, infrastructure, amenities and employment. Eighty three per cent of the population in Rwanda is rural with 53 per cent of them women (NSIR 2006). In the urban areas, this trend is reversed with more men than women. This suggests that there are more men migrating to urban areas than women. This is especially true for young men between 16 and 30 years who migrate for jobs, education, and the city experience.

In order to control rural-urban migration, the Government has resorted to adopting strategies that bring services, infrastructure and amenities to the people. Not only is this enshrined in the Rwanda constitution, but has also been translated into the Decentralisation policy, Vision 2020, EDPRS, Vision 2020-Umurenge and other policy documents.

### **Urban centres**

There are about 18 urban centres in Rwanda. The major towns include: Kigali city, Huye, Nyamagabe, Rusizi, Karongi, Musanze, Rubavu, Muhanga, Byumba, Kibungo and Kayonza. Others include: Nyagatare, Kabuga, Nyanza, Ruhango, and Rwamagana

Rwanda does not have a specific definition of an urban area. The District Development Plans describe urban areas in specific districts in terms of growth points or trading centres. In this report trading centres will be used as a category of urban centres as they constitute growth points along major transport corridors and highways.

Currently there is unprecedented population growth in urban areas. Like in most developing countries, the demographic dynamics in urban areas have a similar pattern. Rapid urbanization attracts the rural settlers to migrate to development growth points. Rwanda has

not been an exception. There is a marked increase in the number of urban poor as seen in the growing number of destitute in towns and cities. This pattern leads to informal settlements on land that is considered unsuitable for development (hills or valleys) with almost no amenities or basic infrastructure available. This exerts further pressures on the already inadequate infrastructure in urban centres threatening the urban environment. The need for urban facilities is therefore very high as is the need to control the rate of rural-urban migration.

**Informal settlements are sometimes located in inappropriate areas such as near highways. They have no access roads and limited social amenities.**



Photo credit: REMA

### **Settlements and access to services**

In 1996, the government passed the national human settlement policy. It came to be known as the Imidugudu concept. The rationale was to focus on group settlement and in so doing, solve the problem of land scarcity and environment management at the same time.

In urban areas there are no master plans or land use plans to guide development. Although the government has been trying to address these issues infrastructure and service provision is still wanting. Some of the issues include: lack of adequate water, electricity supply and sanitation systems, inadequate garbage collection methods, poor drainage, poor roads, inadequate public transport network and insufficient housing supply. Waste management is also a big problem.

**A view of some of the Imidugudu houses built in 1996. This estate, with a total of 300 homes, is in Kabuga sector, 15 km from Kigali.**



Photo credit: IRIN

Sanitation facilities in urban areas do not meet urban standards. For instance in 2006, only 5.4 per cent of urban households had flush toilets (NISR and ORC Macro 2006). Storm water drains and evacuation systems are very poor and often consist of simple channels made by the people. Most of the drains in the cities are inappropriate and cause further problems due to their conception and construction. Though there is a system of collection and transport of solid wastes, there is no waste segregation system and the management of dumping sites is still a serious problem. Untreated industrial effluents are released in the environment in their raw state without treatment.

In rural areas, in 2006, 70.8 per cent of households had traditional pit latrines while 24.1 had the ventilated improved pits (VIP) (NISR and ORC Macro 2006). There is need for hygiene promotion and construction of improved latrines at family and public level. Though there is a demand for such sanitation facilities, the population doesn't have adequate financial means to provide required sanitation standards.

Environmental sanitation is an essential factor contributing to the health, productivity and welfare of people especially those living in urban areas. It is identified in Vision 2020 as a key element underlying health and human development. The programme also identifies environmental protection and the improved management of human settlements as key factors to support rural and urban development.

### **Environmental health**

Environmental health is aimed at developing and maintaining a clean, safe and pleasant physical environment in all human settlements, to promote the social, economic and physical

well-being of all sections of the population. It comprises a number of complementary activities, including the construction and maintenance of sanitary infrastructures, the provision of services, public education, community and individual actions, regulation and legislation.

The objective of Vision 2020 is to have a satisfactory state of health for both urban and rural population - without being exposed to pollution; to have all swamps cleaned up with a view to reducing the presence of malaria vectors in particular; for each town or development pole to have a unit for the treatment and disposal of solid wastes; and for households to develop awareness and practice minimum hygiene and sanitation measures.

Due to the inadequacy of excreta treatment and management systems in urban areas in the urban poor, in particular, are faced with public health problems, environmental pollution and aesthetic degradation. Research in 2006 showed that 19 per cent of urban households used spring water and 12 per cent draw water from uncovered public wells (NISR and ORC Macro 2006). Such water resources are easily contaminated once wastes are indiscriminately discharged untreated into the environment. Such contaminated waters sources may put people in urban and peri-urban areas at risk. Though washing water may not necessarily have to comply with drinking water standards, contact with waters carrying heavy pathogenic loads could potentially lead to the transmission of enteric infections. Water from open drains and streams within the urban or peri-urban perimeter are often used by farmers to grow vegetables for the urban market. The use of untreated waste water for irrigation brings with it substantial occupational and consumer risks. Used domestic water mainly from septic tanks, latrines, animal waste and refuse-infested drinking water can cause diseases such as typhoid, cholera, gastro-intestinal infections and dysentery. Indeed polluted waters and poor sanitation is responsible for about 80 per cent of the disease burden of Rwandans (ROR 2008).

### **Health indicators**

Health indicators could be better. In 2006, infant mortality was estimated at 86 for every 1000 live births and the under-5 mortality rate was 152 per 1000 children born. This was a significant decline since 2000. Maternal mortality remains high, at 750 deaths for every 100,000 live births. However, this has declined considerably since 2000 when maternal mortality rate was 1,071 for every 100,000 births (NISR and ORC Macro 2006).

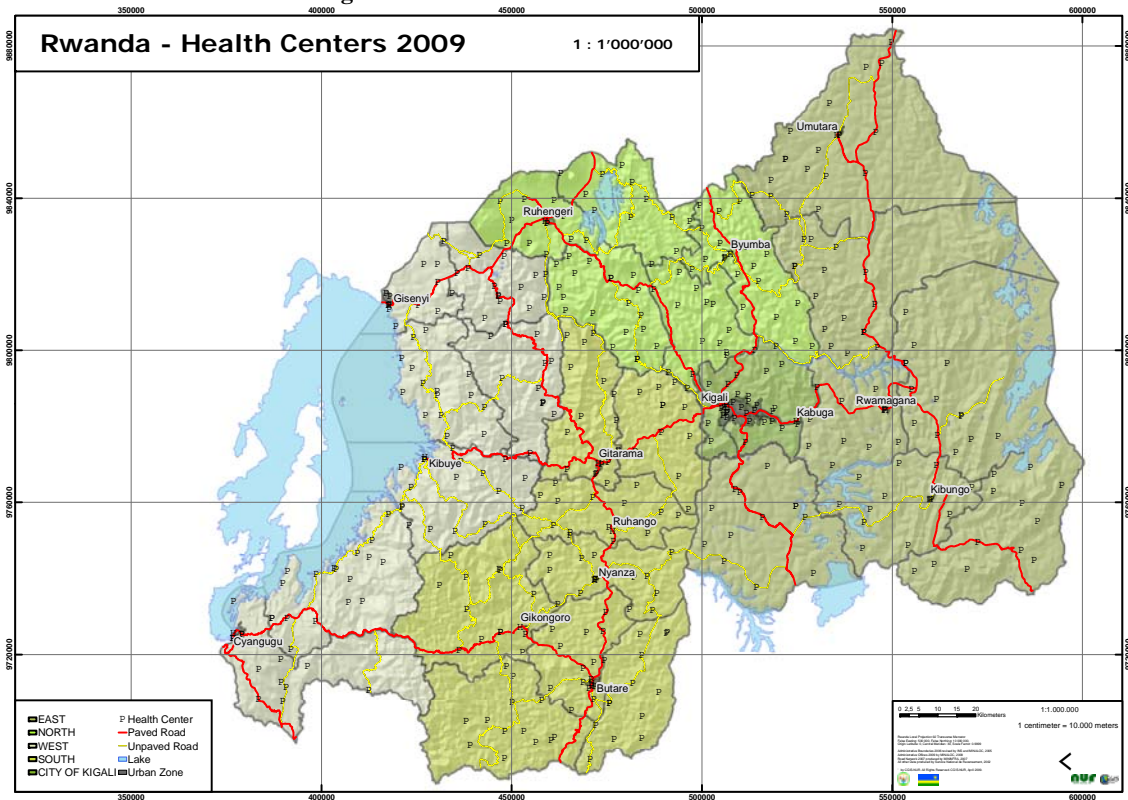
There are also other gradual and long-term diseases that may affect general health and well being. This does not only affect the social and economic life of productive population, but is additional expense on the government health budget.

Urban air pollution resulting from dust particles and vehicle emission is increasingly growing; and there is no recorded framework to combat health implications. During the dry season, there is a marked increase in air borne diseases due to dust particles emission; this is particularly challenging since it calls for heavy investments in physical infrastructure. Vehicular emissions are also growing in the urban setting. But there is a lack of documented information on this issue.

HIV prevalence is estimated at 3 per cent of adults. Rwanda is now striving to take the necessary precautionary steps so that increasing rates of infection do not erode the impressive gains made in the last five years. Some of the achievements include national campaigns to reduce the stigma of HIV and the accompanying discrimination and the establishment of Voluntary Counselling and Testing Centres (VCTs). There are now 234 health centres with

Voluntary Counselling and Testing (VCTs) and the treatment of people living with HIV has increased. Seventy two per cent of pregnant people living with HIV are estimated to be receiving a complete course of anti-retrovirals (ARVs). However, concern remains in several areas including: low condom utilisation among youth and groups at higher risk of HIV exposure, the rural versus urban ratio of HIV prevalence and increasing transmission amongst married couples and the cultural norms associated with this. Figure 2 shows the distribution of health centres around the country in 2009.

**Figure 2: Distribution of health centres in 2009**



Map production: REMA

### Waste management

Waste water and solid waste management in Rwanda takes different forms: from public toilets to selected area based sewerage management plants. The technology employed varies from site to site depending on the terrain, newness of neighbourhood and level of urbanization, among others. The concept of providing public toilets, especially in commercial or public areas is so under developed and poses a hygienic challenge.

Generation of solid, liquid and gaseous wastes has been increasing at the same level as industrial development. The complexity of wastes, along with the rising socio-economic development, has introduced large portions of non-degradable wastes to the environment. These include plastics, scrap metals and other goods.

Data on waste generation, source of waste and quantities disposed in existing sites are not available. A certain amount of the total waste generated in urban centres is collected and disposed of at the designated disposal sites. The rest of the waste, composed of chemicals



including heavy metals, salts, detergents and medical wastes, is either dumped in unsuitable areas or disposed off in rivers that traverse the urban centres and other wetlands.

In the rural areas, the district development plans are emphasizing that each household (100 per cent) should have a well managed dumpsite by 2012; these are the same targets in the EDPRS. For urban areas other than Kigali, information was not available regarding how solid waste is disposed however; key district informants mentioned burning and localized dumping areas.

**Solid waste is often disposed of in unsuitable areas such in this wetland in Gastata**



Photo credit: REMA

### **Environmental challenges in Kigali**

Kigali does not have a development master plan and there is thus a lack of consistency in the physical development of the city. Commercial areas, low, middle or high class residential areas have evolved in a built up areas that are unplanned. As a result, environmental and sanitation issues such as solid waste, excreta disposal, industrial effluents have become problematic. Table 3 shows how Kigali has expanded and grown over the last 17 years.

In 1994, the available public utilities were projected for a population of only 200,000 people. Today Kigali is home to approximately 1 million people all scrambling to live on the minimum water, energy and social facilities. In fact over the past 17 years, Kigali has never had enough amenities to serve its ever growing population. The provision of basic infrastructure has always lagged behind the expansion of the city and its inhabitants. This has led to urban sprawl and an environment that is characterized by erosion, uncontrolled dumping of solid waste, raw excreta disposal to open environment and accruing pollution and health hazard problems.

**Table 3: Growth of Kigali over the last 17 years**

Years	Total number of people	Total area of the city (km <sup>2</sup> )	Population density (No. of people/km <sup>2</sup> )
1991	140,000	112	1,250
1996	358,200	112	3,198
2001	605,000	314	1,927
2006	870,127	730	1,192

Source: City of Kigali 2008

#### ***Solid waste management in Kigali***

The city authorities, in conjunction with private sector participation, have done their best to collect solid wastes from their points of generation in the bid to keep the Kigali free of solid wastes. However a big challenge still exists at the points where the solid wastes are finally disposed of. These disposal sites (already overflowing) are currently non-sanitary, posing serious risks to human health and the environment and their proper handling is currently beyond the capacity of the City Authority.

Currently the city has an overrun dumpsite at Nyanza in Kicukiro District and is currently investing in studies to propose a sanitary landfill that meets all engineering requirements. The Nyanza dumpsite has many layers of covered wastes, and is now methane gas hub. Urgent attention is required to address this area before any catastrophe occurs. Processing of the potential energy reserve would provide some urban energy solutions.

#### ***Liquid waste management in Kigali***

Kigali has neither a central treatment facility for sewage nor a system of sewers. There has never been any strict sanitation policy in the past - only individuals deciding what systems to use based on their financial abilities.

Septic tank systems with soak pits is the most used technology by the urban-rich, while those who cannot afford them resort to the traditional deep pit-latrines despite their impact on ground water resource especially in an urban environment. Almost all the septic tanks are emptied and desludged separately when full. House owners employ private companies to do the desludging for a fee. Some septic tanks are not accessible by the desludging vehicles so manual methods are employed. The sludge in urban areas is not appropriately treated and is usually disposed off in an unhygienic way in a dumpsite. Sewage from large installations like schools, hotels, prisons and hospitals are disposed of daily untreated and indiscriminately into drains, ditches, open urban spaces or even the Nyabugogo swamp. This swamp has become the de facto dumpsite for all municipal wastes including those from industries that may be hazardous or carcinogenic in nature.

The emerging practice is to encourage real estate developers to provide central sewerage systems for their housing units. An example of this application can be seen in two estates in Kigali: Vision 2020 at Gaculiro in Gasabo district with a waste treatment plant and Nyarutarama Estate at Nyarutarama in the same district with stabilization ponds. Most of those new central systems are mechanical and might become a source of problems in the future if a sustainable solution is not found.

Today, efforts by the city and stakeholders, have managed to produce a conceptual master plan, with strategic details and physical development plans still to be developed. In addition,

a draft sanitation master plan has proposed with sanitation management technologies. It takes into consideration the fact that the physical landscape of Kigali will not allow the establishment of a unique city sewerage central system.

## Strategies to improve settlements and human welfare

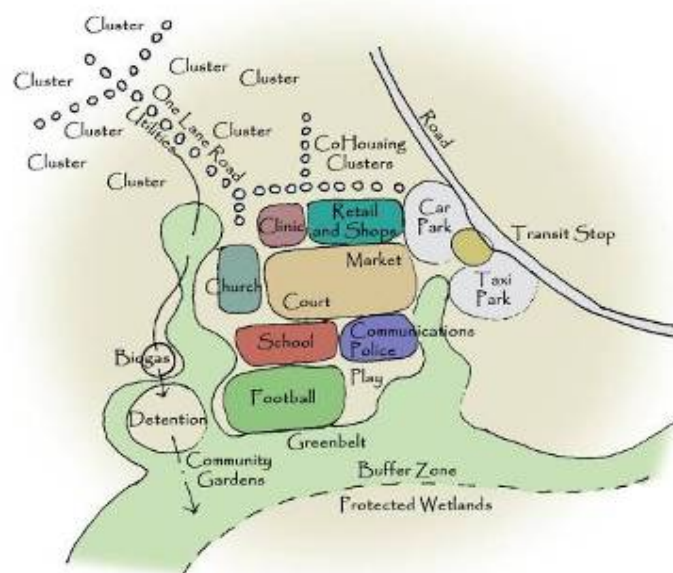
### Land and urban planning

The current laws governing settlement planning date as far back as 1981 (*Loi sur l'aménagement urbain et du territoire loi No 4/81 of 29<sup>th</sup> January 1981*). Although still in use, it is outdated since it does not take into consideration contemporary policy like decentralization. Further, in practice it is not followed and there are hardly any implementing decrees for it.

At national level, a land use and development master plan is under development under the stewardship of MINIRENA. However other ministries have also embarked on sector specific master plans even before the completion of the land use and development master plan. The irrigation master plan; and the land use and agriculture master plan are some examples.

Kigali has recently concluded a conceptual master plan for the next 50 years. In this master plan, the proposed approach to development is the community centre approach. This approach will enable provision of shared services to a greater population in an environmentally sustainable way. It also includes innovative technologies such as a collective bio-gas unit which can generate energy from waste. Figure 1 is a conceptual view of the master plan drawn after discussion with the staff of the City of Kigali. Some completed plans include the Rwamagana master plan which was concluded in 2007. There are also master plans for administrative areas of Kibuye, Gisenyi and Cyangugu that existed before the 2006 administrative changes.

**Figure 1: A conceptual view of the community centre approach to developing the proposed Kigali city master plan**



Source: City of Kigali 2008

### **Implementing the human settlements policy**

The national human settlement policy adopted in December 1996 focuses on urban planning, restructuring of unplanned residential areas in towns and the regrouping of the rural population. The implementation of this policy made it possible to address emergency situations, including the construction of numerous housing units that were required between 1995 and 2001. During this period more than 265,000 houses were built under the resettlement programme mainly in the regrouping settlement centres or *imidugudu* (ROR 2004b).

### **Improving environmental health and sanitation**

High priority has been put on environmental sanitation as well as the development and implementation of environmental health standards. Efforts are also being made to put greater emphasis on environmental sanitation in the allocation of development resources. The 5-year district development plans now include targets for environmental health. Notable is the goal to increase to 100 per cent, household ownership of proper latrines by 2012, 100 per cent ownership of unique household solid waste decomposing dumpsites by 2012, sensitization of population on proper hygiene, and an increase in access to drinking water, among others. In addition to these targets, the district development plans spell out an infrastructure development plan, including energy and water supply, for the next five years that reflects national strategic plans.

The Ministry of Natural Resources has adopted immediate measures to address this situation. Improved toilets or EcoSan systems are being piloted in selected urban areas to provide public toilets. In Kigali, the public toilet situation is appalling and the district mayors are defining a framework to provide these facilities. As recently as October 2008, Nyarugenge district of Kigali had installed a few public toilets in selected areas. These are being established in partnership with the private sector. In the rural areas, the district development plans include plans for construction of public toilets.

Generally, the surroundings in Rwandan urban centres are clean. This cleanliness is the result of the existing general cleaning programmes adopted by residents and local government. However there is a need to establish an effective legislative and institutional framework for waste management including urban solid waste management. Waste management provides an opportunity for the involvement of the communities but also can be an investment opportunity for the private sector.

### **Institutional reform**

The water and sanitation sector has been undergoing reforms to better streamline results-oriented practices. The water and sanitation policy document of October 2004 provides more information on water and water supply than on sanitation. Clearly, the sanitation sector is under documented. The management of sanitation sub-sector policy is currently the responsibility of the Ministry of Natural Resources (MINIRENA) and the service development and provision was recently transferred to the Ministry of Infrastructure (MININFRA). A National Water and Sanitation Authority, with the mandate of distribution of potable water and installation and management of sanitation infrastructures has just been created by the government

There is institutional conflict regarding responsibility for environmental health and sanitation. Environmental health is the responsibility of MINISANTE although the implementation

framework is defined under REMA. Waste water and solid waste management are being handled by decentralized governments and the role of MINIRENA in providing sanitation facilities outside Kigali is clear. The implementing structures and laws thus have to be harmonized to clarify the situation.

## **Conclusions and recommendations**

Rwanda has a young but fast growing population. The population was 9.2 million in 2006 and is expected to reach 16 million by 2020 unless family planning, education and outreach strategies are intensified. With a population density of 397 inhabitants per square kilometer, Rwanda is the most densely populated country in continental Africa. The ensuing rise in population density has put pressure on the physical environment and induced labour migration between rural areas as well as from the countryside to the towns.

Rwanda's overarching challenge is how to meet the needs of an ever growing population, who depend on natural resources for virtually every provision – energy, water, housing, transport, and employment. Integrating environment and sustainable natural resources management principles, is one of the underlying strategies of the Population Policy which was reviewed in 2008. As population pressure is one of the key drivers of environmental degradation and poverty (REMA *et. al.* 2007, ROR 2004a), the implementation of the population policy especially aspects that address high fertility rates, gender and reproductive health, migration and human settlements, constitute important triggers for sustainable natural resources management is important.

In this regards, the EDPRS prioritizes the planning and development of improved rural and urban human settlement consistent with the contemplated sustainable land use and environmental protection scheme (ROR 2007). This will allow the issues of land use and environmental health to be addressed.

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