

Democratic Green Party Launched Research Findings on Water Pollution for the Nile Basin Area in Rwanda

The Democratic Green Party of Rwanda launched research findings on **Water Pollution** study on the Nile Basin area in Rwanda-Case study, River Nyabarongo on 16th October 2021. The study was done between April-October 2021. It was conducted by several party scientists headed by Dr. Jean Damascene Gashumba who was deputized by the Party's Environmental Commissioner, Jean Marie Vianey Mwiseneza.

Nyabarongo is the major and longest River in Rwanda, with a total length of 351 km (218 miles). It begins its course at the confluence of Mbirurume and Mwogo Rivers in South-western part of the country. Flowing north, then south-east and passes through Kigali Capital City. The city is rapidly expanding with increased population growth 4.0% per year (Nduwayezu et al., 2016) which results into anthropogenic activities such as Agriculture, industry, mining, household, car-garages and so on. This expansion has negatively affected water quality and wastewater management in the city. Therefore, there is elevation level in pollution which has been reported in Nyabarongo River which is major source of River Nile.

The main objective of the study was to produce a situational assessment report on the pollution of the water of Nile Basin and its associated Water ecosystems Basins in Rwanda, whereas the specific of objectives are the following:

- Identify the major source and type of water pollution in Nyabarongo River.
- Find out the effects of Nyabarongo river pollution on ecosystem around the river
- find out challenges with regards to the protection of Nyabarongo River.
- Find strategies and policy recommendation for the protection of Nyabarongo River.

Causes of water pollution in Rwanda:

- **Mining waste:** The water draining the mining sectors of Rutongo and Gatumba pollute River Nyabarongo and Nyabugogo swamp by sediments of clay and sand which they transport over long distances. It is this considerable mineral load which partly gives the brown water color that is characteristic of several rivers in Rwanda. Mining and quarrying produce massive rejects which appear in nature in the form of enormous lots of earth and rocks.
- **Household waste:** There has been an increasing concern about household waste collection and treatment. Solid wastes, rubbish, garbage and sewage are being produced everyday by city residents and this is also one of the main causes water pollution.
- **Agricultural waste:** Rejects from agricultural waste and poor methods of farming leading to soil erosion have dramatically polluted river Nyabarongo.
- **Industrial Waste:** The industrial effluents and by-products are directly discharged in the water bodies. These industries have been responsible for water pollution through their chemical discharges. The textile industry, the iron industry and Kabuye sugar factory are one of the main pollutants.

- **Car garage waste:** They are many different chemical substances and processes used at an auto mechanic workshop, which are potentially dangerous both to the environment and to the health of human beings as well as animals. It was clear from the results of the analytical studies of the physicochemical parameters and heavy metals determination of both soil and groundwater from auto- mechanic villages that there is a high degree of contamination and pollution. This expansion has negatively affected water quality management in the city, especially wastewater management. Elevated levels of pollution have been reported in some of the major rivers passing through the City of Kigali, such as Nyabugogo River and Mpazi River. The Nyabugogo Swamp feeds into the Nyabarongo River and is major outlet of the City of Kigali and it receives all the wastewater from City.

Research Findings on Source of pollutants:

- Household wastes are 45.6% (n=41),
- Industrial wastes 15.6% (n=14),
- Car-garage 13.3% (n=12),
- Crop harvesting 7.8% (n=7),
- Wastes from livestock 6.7% (n=6)
- other sources that actually lead to pollution in Nyabarongo river at the rate of 11.1% (n=10)

DETAILS OF RESEACH FINDINGS AND EFFECTS AND RECOMMENDATIONS

1. Major source and type of water pollution in Nyabarongo River

Table 1. Major source and type of water pollution in Nyabarongo River.

		Frequency	Percent	Valid Percent
Valid	Crop harvesting	7	7.8	7.8
	Livestock	6	6.7	6.7
	Household waste	41	45.6	45.6
	Industrial waste	14	15.6	15.6
	car garage waste	12	13.3	13.3
	Others	10	11.1	11.1
	Total	90	100.0	100.0

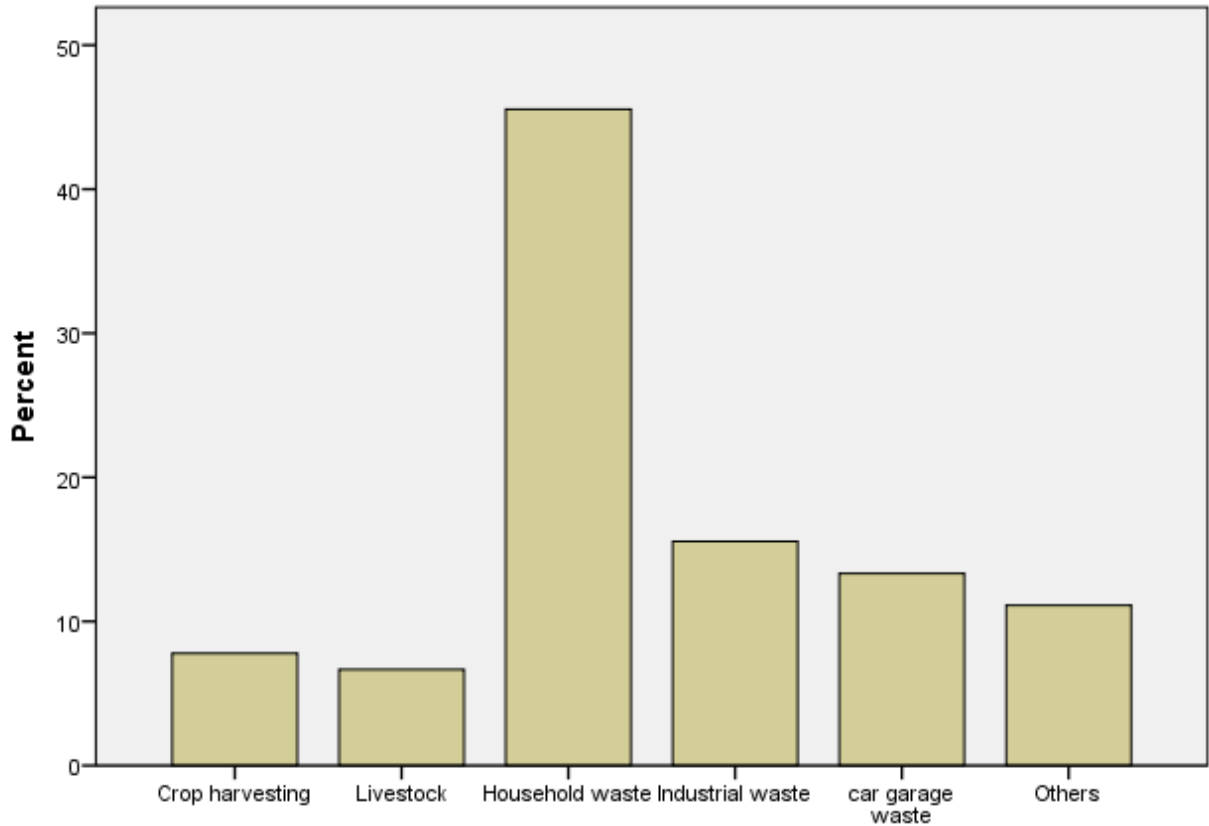


Figure 1: Major source and type of water pollution in Nyabarongo River

1.1. Households waste

Household waste, composed of mainly of: rubbish, garbage and sewage are being produced everyday by City residents surrounding Nyabugogo swamp and the proceed waste is directly rejected in the ravine that leads to Nyabugogo swamp.

The data revealed that majority of the household waste are being generated highly than other means of activities that contribute to waste generating. The higher the waste generated the greater the probability of polluting water bodies nearby. Most of the respondents agreed that household waste leads to greater water pollution in Nyabarongo river at a rate of 47,8%.

1.2. Agricultural waste

The growth of crop production has been achieved by Nyabarongo river surrounding communities through the intensive use of inputs such as pesticides and chemical fertilizers. The trend has been

amplified by the expansion of agricultural land, with irrigation playing a strategic role in improving productivity and rural livelihoods while also transferring agricultural pollution to water bodies because it is done without respecting soil erosion control and other ecosystem protection measures. Nyabarongo's landscape is consisted with many hills and mountains with occurrence of soil erosion that leads to the river and consequently results into water pollution. In fact, water scarcity is a major threat for rain-fed agriculture depending on type of crops grown. The over-exploitation of plant and animal biodiversity in water bodies is also an issue impacting negatively on the services of the swamps. Rwanda Environment Management Authority states that the reduction of vegetation cover leads to evaporation of water by direct radiation, a reduction of the function of sediments retention and flood control, a gradual erosion of biodiversity (REMA, 2005).

This research ranks the agriculture water pollution at second place at a rate of 24.4%.



Figure 2. Waste from agricultural activities around Nyabarongo

1.3.Industrial waste

The industrial effluents and by-products are discharged in the water bodies. A number of industries in the Kigali City wetland system include the textile industry, the iron industry which manufactures iron sheets, paint factories and the Kabuye sugar factory among others. These industries have been responsible for water pollution by the chemical discharges from the industries. The pollutants are for the most part toxic to humans, animals and water in some instances and also interfere with the

environment by polluting soils (High levels of Zinc were detected in the river after Kigali going downstream. Zinc causes a wide range of medical problems to the human body including birth defects, loss of smell and organ damage. “The level of zinc is undetectable upstream of the Nyabugogo River and starts to increase especially after the Kabuye sugar refinery factory where the highest peak of zinc level all along the Nyabugogo River is located,” reads the study. The acidity of Nyabarongo river was also found to be unusually higher.

The industrial waste is ranked at 3rd place in polluting Nyabugogo swamp at a rate of 10%

1.4.Mining waste

The water drainage from mining sectors of Rutongo and Gatumba pollute Nyabarongo river and Nyabugogo swamp by sediments of clay and sand which they transport over long distances. It is this considerable mineral load which partly gives them the brown color that is characteristic of the rivers in Rwanda. Mining and quarrying produce massive rejects which appear in nature in the form of enormous lots of earth and rocks. Erosion from rain water transports the mineral residue towards the valleys where streams are filled and covered by the residue which may be toxic to biodiversity (Rwanda Environment Management Authority, 2008).

The quality of Nyabarongo River was found to be deteriorating due to washing of minerals, mining in rivers that feed it, dumping mineral waste left-over soil and discharging waste water into the river. Companies such as Rwanda Rudniki Company, AFRISSET, AFRICOME INTERNATIONAL Ltd, SOREMI Intego, and Cyamazima Berthe, all sent mineral waste left-over soil to Nyabarongo River near Nyabarongo hydro power plant located in Mushishiro sector, Matyazo cell. Apart from the poisonous chemicals, mining companies are also aiding the massive loss of top soil which is channeled into Nyabarongo River. It is part of the reason Nyabarongo has a distinct brown color.



Figure 3. Mining operators at Nyiramusenyi River flow into Sebeya River

1.5. Car garage waste

There are many different chemicals, substances and processes used at an auto mechanic workshop, which are potentially dangerous both to the environment and to the health of human beings as well as animals. It was clear from the results of the analytical studies of the physicochemical parameters and heavy metals determination of both soil and groundwater from auto- mechanic villages that there is a high degree of contamination and pollution. It has been observed that various pollutants including the heavy metals and oil and grease build up to very high concentrations in the soil, and thereby percolate into the groundwater, thereby posing great hazards to people who consume the water, and also great hazards to the soil. The soil quality becomes compromised, thus posing challenges to groundwater due to seepage during the raining season. This not only affects the human population that depends on such water, but the soil fauna is equally decimated.

2. Effects of Nyabarongo river pollution on ecosystem around the river

Table 2: Effects of Nyabarongo river pollution on ecosystem around the river

		Frequency	Percent	Valid Percent
Valid	Diseases	72	80.0	80.0
	loss of fishes in the river	14	15.6	15.6
	Hunger	2	2.2	2.2
	None	2	2.2	2.2
	Total	90	100.0	100.0

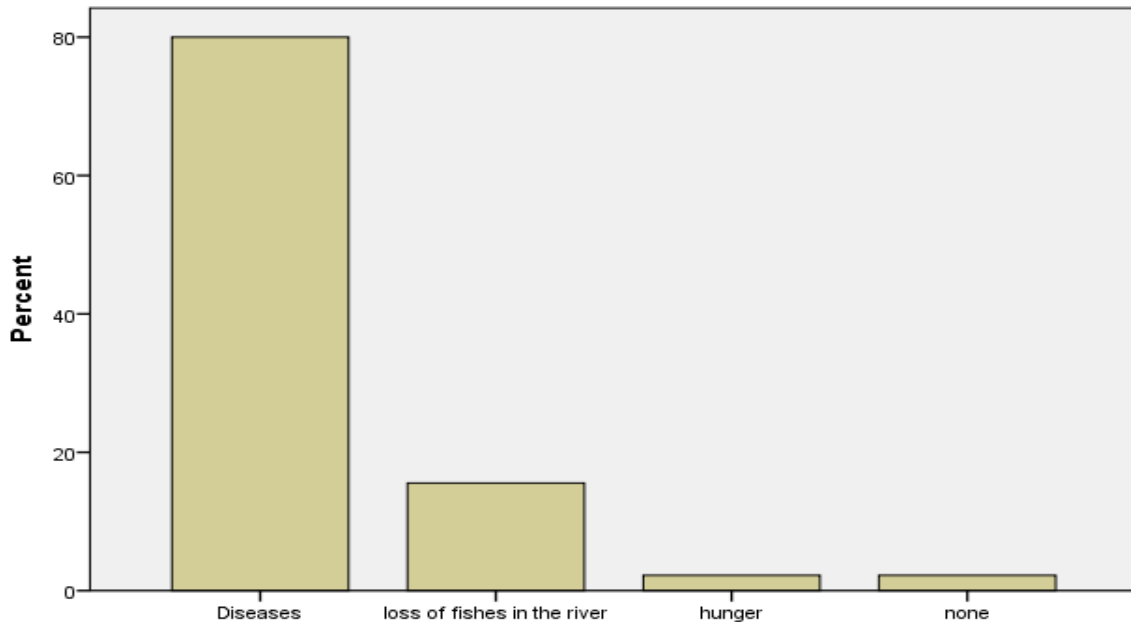


Figure 4: Effects of Nyabarongo river pollution on ecosystem around the river

According to the findings in the table above, effects of water pollution in Nyabarongo is mostly;

2.1. Diseases that infects people who use it where it is rated on 80%

Many respondent during our research confirmed that diseases arise due to Polluted water from Nyabarongo river. Generally, when water exceeds the auto purification where it is unable to be

purified it is taken as polluted water and this may cause some diseases such as Cancer due to heavy metals that may be found in the river but also microbes in the river cause different water borne diseases like diarrhea and cholera. But there is no assessment yet done in the clinics or hospitals showing the extent to which people are being affected or sick because of using contaminated polluted water of Nyabarongo river.

2.2. Loss of fisheries in the river

Oil spill creates a great concern as a big quantity of oil goes into the river and does not dissolve with water; thus opens trouble for local marine wildlife such as fish, birds and sea otters. The effluents and waste water from domestic outlets, municipal sewage, canning industries, food processing units also affects microorganism that are within water bodies. This contaminant is also accountable for endangering water birds, plants and unfavorably disturbing the usual activities. Loss of fisheries in the river was rated on 15.6%

2.3. Hunger

Nyabarongo took more of the soil due to rain and presence of soil erosion, this impacts the productivity on the cultivated land due to degradation of soil. The lower the productivity the lower the living standard of one’s family, as well as the entire country will be affected.

3. Challenges with regards to the protection of Nyabarongo River.

Table 3: Challenges with regards to the protection of Nyabarongo River.

		Frequency	Percent	Valid Percent
Valid	Inadequate financial resources	22	24.4	24.4
	low skills and knowledge	21	23.3	23.3

Not interested	46	51.1	51.1
None	1	1.1	1.1
Total	90	100.0	100.0

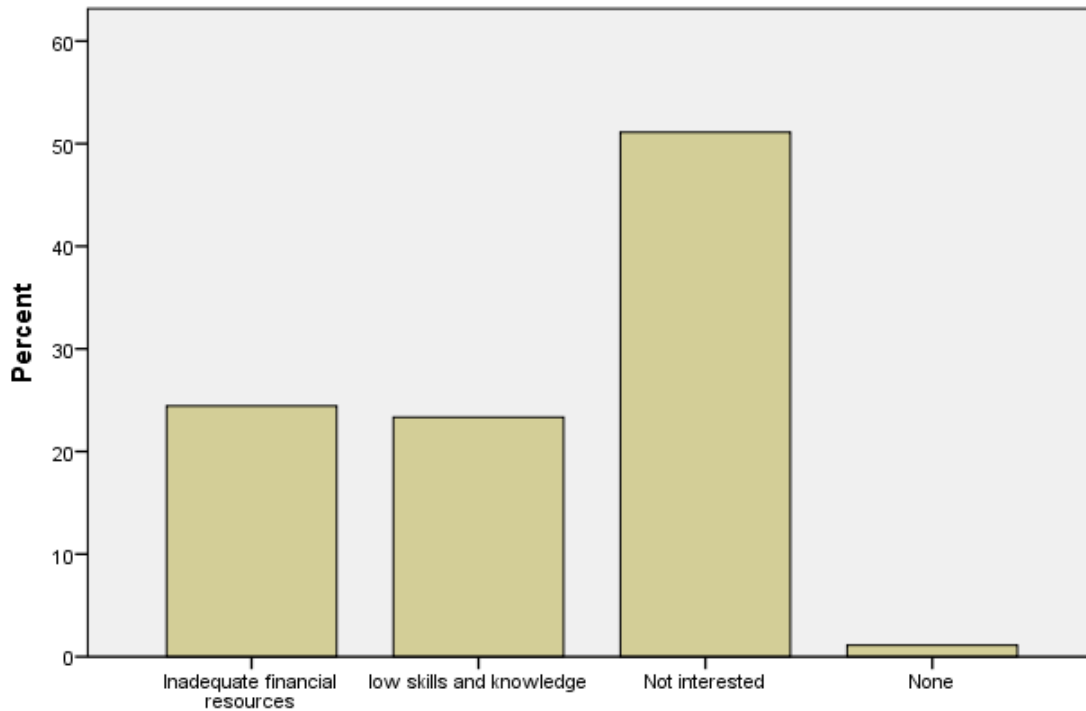


Figure 5: Challenges with regards to the protection of Nyabarongo River.

Most the people in the local community are not involved in the protection of the river as it was revealed on the rate of 51.1% whereas others face the problem of financial issue 24.4%, while other part of interviewee said that they face a challenge of low skills for river protection 23.3% and few number of interviewee 1.1% said that they do not face any challenge in protection of Nyabarongo river.

Recommendations to:

- The government:
 - ✓ Establishment of catchment management plan in maintaining the river basins
 - ✓ Digging terraces and planting trees where necessary, this may not be necessary to plant not only around Nyabarongo river but also anywhere else nearby water body.

- ✓ Law enforcement: implementing the law concerning the maintenance of all rivers in common: the interval of ten meters to the river is considered as buffer zone of that river, no one or any activity is allowed to be done in that area unless it is concerned with environmental management of that area.
- ✓ Inspection: including the punishment to people and activities that are done illegally and in destroying environment.

- **Local Communities**

Through different communities there is a need of being familiar with environment and to be aware of conserving it. This will be the benefit for them and for the nature specifically to Nyabarongo river' water quality

- **Further researchers**

Further research is needed to provide more data about the pollution of Nyabarongo basing on each causal agent for its pollution.

- **Executive authorities (decision makers)**

The executive authorities have to work together with local communities in order to increase awareness and provide full information to them.

Also, Executive authorities have to collaborate with scientists (researchers) as well as taking into consideration what have been found and published by the researchers.