

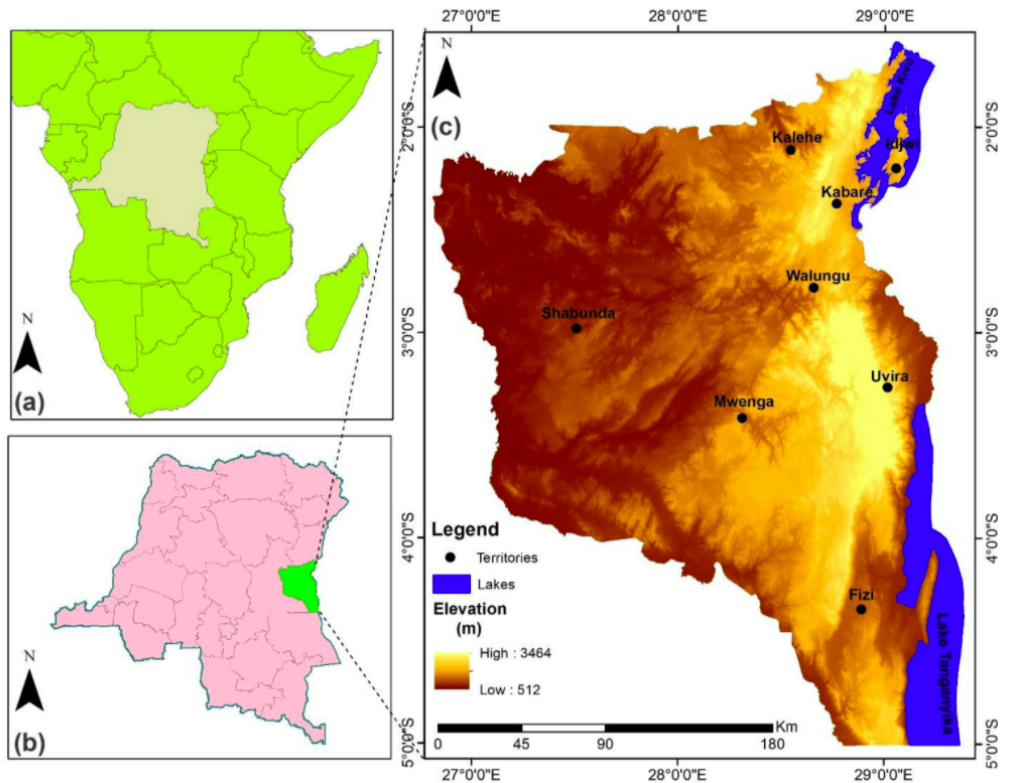
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 Walungu South Kivu, Clean Water and sanitation

Water shortage crisis : Proposal to reuse local water for human consumption with a single product in Walungu South Kivu

Imagine if you had to walk miles every day on foot, taking hours to days to survive every day. Water is the main element of humanity's greatest need, which is the most valuable resource in this world. Water in the Democratic Republic of Congo suffers from poor water supplies in the country. It is one of the poorest regions of the continent and one of the most rebellious in the world. The Congo has a population of approximately 89.56 million people. Most of Congo is located in urban areas, the forests are the main source of production in the country. Its forests are among the largest and richest in the world. However, there are few rural areas compared to urban areas (Greenpeace. (2017).

Felix Antoine Tshilombo Tshisekedi is the country's president, he is Congolese by birth. He represents the oldest party in the DRC, which has been in government recently. The president is a diplomat and is involved in various democratic and socialist groups. The capital of South Kivu, Walungu, is one of the twenty-six provinces of the Democratic Republic of Congo. South Kivu was created in 1989, when the former province of Kivu was divided into three parts South Kivu, North Kivu and Manemia. South Kivu has approximately 2,344,000 inhabitants and in the Walungu region 368,857 inhabitants.

Figure 1. Map of the study area (a) The location of DRC in Sub-Saharan Africa, (b) Twenty six administrative provinces of DR Congo; and (c) Map of South Kivu.



Luc Cimusa Kulimushi, Pandurang Choudhari, Leonard K. Mubalama & Gedeon T. Banswe. (Volume 12, 2021). GIS and remote sensing-based assessment of soil erosion risk using RUSLE model in South-Kivu province, eastern, Democratic Republic of Congo, *Geomatics, Natural Hazards and Risk*. March, 2022, de Geomatics, Natural Hazards and Risk Sitio web: <https://www.tandfonline.com/doi/figure/10.1080/19475705.2021.1906759?scroll=top&needAccess=true>

The main topographical features of the country are plateaus, large jungle mountains and some valleys. It is observed that a large part of the country are basins that are in the center of the Congo. On the other hand, the region has a tropical climate with high humidity, rarely notice the seasons of the year because it is always equatorial. The state of Kivu both north and south has an equatorial climate, the north is a little drier, compared to the warmer south. At present, Kivu is generally suffering from man-made environmental conflicts caused by exposed compounds such as methane and carbon dioxide (*Sánchez, 2022*).

The land in that part of Congo is fertile for agriculture. The people are divided into different jobs, usually the men are not at home and are engaged in smuggling mineral products illegally. These groups are armed because of rebellions throughout the country. The elderly and women are the main farmers in these lands. The family with the Congolese are generally headed by single women, the family members are approximately 3 to 5 persons. The population suffers from many homeless children with 52% of children under 15 years old. Their food methods are cultivation, so they consume cassava, potatoes, taro, plantain, tomatoes, etc. Children work from an early age to help their communities or are stolen from the armed groups of the rebellions. (*Kelly, J. T., King-Close, A., & Perks, R. (2014)*).

During the last few years health has had a great impact on communities throughout the country, we have noticed a radical increase in malnutrition, dehydration and many other problems from children to the elderly. This problem has led to many lethal diseases, especially lack of hygiene due to lack of water management and lack of government resources. In the provinces of the country like South Kivu the association of "global health action" made an article that published together with the collaboration of the university of Umea Sweden, in which the severity of the problem was analyzed, providing tables of results of The levels of health care need were obtained from a combination, summary and categorization of the World Health Organization's Disability Assessment Program 2.0. This article is very interesting and important because it helped me to be able to analyze in detail the problems caused by the lack of purified water. (*Malembaka, E. B., Karemere, H., Bisimwa Balaluka, G., Altare, C., Odikro, M. A., Lwamushi, S. M., ... & Macq, J.. (2020)*).

The current situation in South Walungu Kivu is serious for many reasons, but the most important is the lack of clean water and food. Respectively, the whole country needs clean water resources because in recent years diseases have been the main cause of death in its population, due to lack of resources and climate change. Kivu is located in the Republic of Congo, which is facing governmental problems, especially rebellions, increased insecurity in

the communities, destruction of urban areas, kidnapping of children to adapt them to armed groups and rape of women by men.

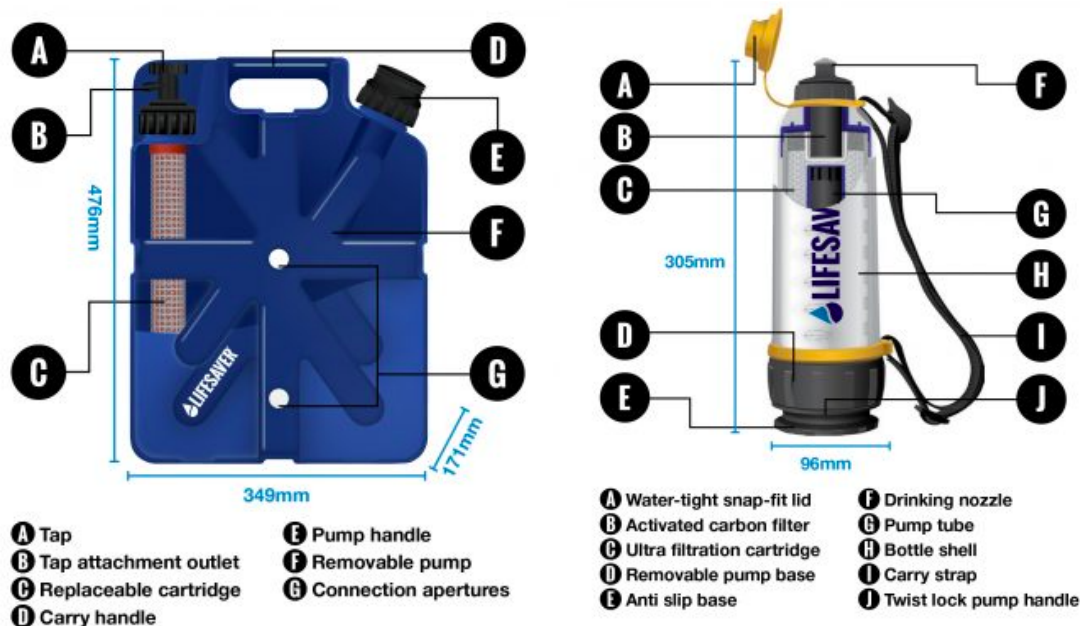
The trends are not improving due to the conditions we live in today, our first factor is climate change, there are not enough natural resources, droughts will continue to increase due to global warming, and in a few years water will be the most important factor on planet earth. This trend contributes to the lack of human awareness by not doing the actions that we should do, this has increased and affected Kivu by not having a good minister of clean water. Lack of clean water has increased many deadly diseases that affect all ages.

Water is essential due to the high temperatures that can be reached; the communities in rural areas suffer from lack of water and they walk daily for water miles away from their land. This generates several serious health problems, as they are risking their lives to fetch water for their own survival or to provide for their families. This problem affects all ages. Due to the lack of water, dehydration has been their first enemy, children are mainly the victims of this chaos that damages their growing organism and when they do not drink enough water daily, they can faint to the point of death. This problem affects everyone because they do not have in their hands the most important and primordial natural resource. Therefore, without clean water, chronic diseases break out and affect all age groups, including crops and livestock. In South Kivu, the provinces actually suffer from contaminated water that is ineffective for human consumption and hydration of plants and crops.

My proposal is for the Democratic Republic of Congo, specifically for the state of South Kivu, Walungu community where one of the main problems is the lack of drinking water. My proposal is to reuse wastewater that is no longer functional, convert it into drinking water to increase the quality of health, especially hydration.

My goal is to make it easier for this community to get water avoiding waste of time. This option is very viable because there is no need to move from one place to another and increases the options for a better life. These products are easy to apply. According to Michael Pritchard the creator of lifesaver in (2007) said that "The LifeSaver bottle is a microbiological water filter that uses ultrafiltration technology to filter viruses, bacteria, cysts and parasites from contaminated water sources. LifeSaver technology filters bacteria to a minimum of Log 6 (99.9999%), viruses to a minimum of Log 4 (99.99%) and cysts to a minimum of Log 4 (99.99%), as specified by NSF protocol 248". The product is called Lifesaver, it consists of a cylinder and canisters made of nanotechnology that takes dirty water and converts it into potable water in seconds, it has a capacity to convert 6000 liters (*Company Lifesaver. (2020).*

Figure 2. Representation of the use of the two nanotechnological products



Company Lifesaver. (2020). Lifesaver. march, 2022, de Icon Lifesaver Sitio web: <https://iconlifesaver.com/product/lifesaver-solo-emergency-preparedness-pack/?v=0b98720dcb2c>

The Lifesaver company has different packages that they sell, the first products they released are the most economical, the bottle is designed for only one person and the box is designed for a family of approximately 4 to 5 members, the costs vary depending on the amount of bottles and boxes you are going to buy, in this case you would be buying bottles for only a quarter of the population and the rest would be boxes for the families. The cost of 1 lifesaver is approximately \$190 USD, the cost of the case costs approximately \$330 USD.

Actually "The Europe Peace Foundation " is working right now improving the quality of life of the population and covering basic needs such as drinking water in Walungu. The Europe Peace Foundation is different from other foundations because of its incredible futuristic concept of supporting the most needy communities. They work to combat several essential services with health, where your country does not care. This organization is successful because of its mission to always make health a priority. It is also internationally recognized for working closely with the local participation of countries in conflict. These organizations can support my work with resources, money and general volunteerism. However, the EPF is the only aid agency in South Kivu with a program designed to combat the increase in health (*Peace programs 2017*).

On the other hand, the government would have a great role in working on the initial plan that can access permits, authorization, concessions, extension of taxes and in general be a facilitator of the project.

In addition, Michael Pritchard, inventor of these nanotechnology products, has made it clear that this product will help various foundations with the price by deriving the amounts and will go to the communities that need it most like South Kivu. My two plans are 1) work with the Europe Peace Foundation and the official UN program that would be funded by a type of trade with the country to be able to sort of barter mineral resources. 2) The financing will be provided by the United Nations Development Program (UNDP) and the World Bank will provide the resources to implement the product in this community. They play an important role because the government supports them in order to increase their economy for their own benefit to the country and can be sustainable thanks to the financial agreement we would make to carry it out. The motivation to combat dehydration in Kivu is much greater than the cost of the project we will carry out.

In conclusion, it is in your hands to make a change and it starts by raising awareness in the countries that need it, providing hydration and sanitation tools to combat this fight against dehydration. The Lifesaver product is a great alternative cost effective measure in its adaptability and sustainability in order to replace people's journey to fetch water, and the problem of unhealthy water. Although the product is not implemented in large communities like Walungu, the product is not well known at the moment but it could improve the quality of life of others and fix the lifestyle of all generations.

Walungu is a very poor and needy place, its inhabitants live in abject poverty, they suffer from water, food and disease problems. This could be avoided and prevented if people had access to clean water. The right to water is universal, that is why I am going to implement the product Lifesaver that would help all people with clean water, avoid trips out of their community and above all to have health. This issue is of great importance because more than half of humanity does not have access to running water. Lack of water is the biggest enemy of society and public health.

It is expected that in the near future there will be many conflicts around the world over drinking water resources. The Lifesaver is different from other nanotechnology products because it is an innovative product that does not consume electricity or batteries, is environmentally friendly and easy to use. My plan is very concrete for the goal I want to achieve is to be able to reuse water and further increase health and convey a powerful message to new communities so that they can realize the importance of water and also the part of educating to reuse and make the best use of things. The remedy is that the solutions begin with actions not with words.

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