Waste and Water: Context and new knowledge

By Tshepo Sibiya, Kedibone Ntobeng & Christina Mothupi,
Itumeleng Youth Project

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Who are we?

Itumeleng Youth Project is a community-based project, based in the Ga-Mampuru area (Boschkloof), which falls under the Greater Tubatse Fetakgome Municipality. It iss situated in Burgersfort. Our members Christine Mothupi, Kedibone Ntobeng and Tshepo Sibiya took part in the Changing Practice Course.

Introducing our Change Project

Our change project is focused on Ga-Mampuru village, which falls under the Greater Tubatse Fetakgome Municipality and is situated in Burgersfort, between the borders of Limpopo and Mpumalanga. Our project addresses two main issues: the problem of waste, especially from disposable nappies, and the problem of lack of drinking water, for which we look at the quality of the drinking water and at the water purification plant.

What are the main questions guiding our action research?

Our project has formulated different sets of research questions, one for the challenge of managing disposable nappies, one for the quality of the drinking water and one for the water purification plant. Kedibone is focusing on the nappies waste problem and has identified the following research questions:

1. Why is there no waste collection in most rural areas in Fetakgomo and Greater Tubatse Municipality?
2. What are other plans or solutions for disposable nappies and domestic waste in rural areas?
3. Who should be held responsible for disposable nappies that are in dongas and rivers?
4. Who should collect waste in South Africa?

The clean drinking water research questions are divided in two sets of questions. The first is on the water purification plant:

1. Why has the water purification plant stopped several times?
2. What other plans does our local municipality have when the water supply has stopped?
3. Who is responsible when the water supply has stopped?
4. Who is responsible for maintaining the plant?
5. When water supply has stopped who is responsible for telling the community, and how do you update the community?

And the second on the quality of drinking water:

1. How clean is the water underground; there are many minerals underground?
2. How do they clean the steel tank to ensure that the water always remains clean from dead animals inside the steel tank?
3. Who is responsible for making sure the community has water in all sections?
4. As it's community water and it comes from underground, do they test it regularly?

Our project addresses two main issues: the problem of waste, especially from disposable nappies, and the problem of lack of drinking water, for which we look at the quality of the drinking water and at the water purification plant.

What is the context? What has already happened?

Kedibone researched the history and background of the nappies waste problem. This is what she found:

In 1973 the Mampuru-clan and community members were forced to move from Brakfontein (magagamatala) to Steelpoort (Boschkloof). The population was not that extensive and people did not have much domestic waste, as they were using mainly traditional customs which do not produce as much waste as Western customs, such as using disposable nappies. In the 90's, mining started and the population increased as there were jobs. People could now afford disposable nappies, but were still not discarding them in the streets or dongas. The belief in witchcraft was too strong. Some threw them in toilets, not knowing that they don't degrade. From about 2000 onwards, more people started to use disposable nappies. They now realized these did not decay, and most people decided to throw them away far from people.

In 2006 the Lion smelter phase one started and population increased again – bringing with it taverns and renting rooms - but there was still no dumping site. People and taverns then started to use the river banks as dumping site and the river as waste transporter. In 2011 phase two started, which attracted even more people and problems such as school drop-outs, teenage pregnancies and illnesses increased. And so did the waste; it was now everywhere, in dongas, next to people's yards, on river banks.

Itumeleng Youth Project (IYP) did a door-to-door awareness campaign and a cleaning campaign. After having introduced the change practice challenge of disposable nappies to Bophelong home based care, IYP was invited for a disposable nappies cleaning campaign, first in that section, then on the river banks. Ahead of the campaigns, we engaged with the municipality for collection of the waste, but in spite of their promise, they did not come to collect.

Christine, in her research of the water purification plant, describes this local history:

The history of Ga-Mampuru goes far back. In the 19th century the paramount Chief Sekhukhune (grandfather of the present chief of the area) of the area now known as Boschkloof fell out with Chief Mampuru (grandfather of the present chief Mampuru) and the latter left for Brakfontain (Magagamatala), which is now Middleburg area. Later in the 19th century, white settlers arrived and they drilled a borehole for domestic water. They also built a weir of packed stone to divert river water for irrigation. This fed into a 12 km long earth canal, serving the night storage ponds, from which the farmers distributed the water to their land. By the early 1970's, the land was used for citrus farming. But in 1973, the government bought out the citrus farmers and removed the Mampuru people from Brakfontain to settle them in Boschkloof. The borehole came under pressure due to this population increase. It collapsed and people started to use the canal for drinking purposes. Around 1985, floods damaged the weir and the canal. The local department of agriculture and environment conservation then built a concrete weir, lined the canal and built a purification plant at its end. An electrical pump pumps up the purified water to the reservoir, from where pipes distribute water to stand pipes and individual households.

When mining started, the population increased again. New sections were formed and water demand rose, while the water infrastructure did not increase. Everyone is now looking for clean water from the purification plant and illegal connections started to occur. Pipes started to leak, water waste was high, and water supply was less. The water purification plant stopped supplying the community with water, because it could not manage the whole village alone. The community looked for ways to survive: some fetch water from the canal, some from the Tubatse River, which is quite far. Then, tragedy happened. People died and others were hospitalized. The community started to strike for water delivery and better water supply. They then built two steel storage tanks and renovated the water purification plant and installed new pipes. The community regained access to water.
In 2016 the water purification plant stopped again without a proper explanation to the community of what was happening. In June 2017 Itumeleng youth decided to engage with the plant workers to find out why water supply has stopped. Unfortunately, there was no explanation to the organization and they referred us to the ward committee members. After engaging with ward committee, three weeks later the water purification plant again started to supply the community with water.

Tshepo's research into the quality of the provided water describes this local history and background – it starts with the tragedy that hit the community (which had been drinking the water from the canal meant for irrigation due to a lack of drinking water) in 2009. One morning, 13 people died and hundreds were hospitalised after drinking this water. The Health Department stated it was cholera, but there are many doubts about that (can cholera strike in 1 day?). After this incident, the community mobilized and organized a protest in which they burnt down houses including the councilor's home and house. That's when they built two steel storage tanks on the Lolo Mountain, which were to supply all 9 sections in GA-Mampuru with water. One existing borehole (drilled by the company who uses the harvested stone for

tombstones) was used to fill the tanks, but it produced so much water, that is was soon used to fill one of the storage tanks in Dipolateng. They then drilled a new borehole in New Stance. The tank in Dipolateng must supply 4 sections; the second tank must also supply 4 sections (one section is supplied by two tanks). Four taps were installed for each section, but that soon proved not enough, as some people still needed to walk far to get their water. These people installed illegal pipe connections to their street and from their street to their yards. This put a lot of pressure on the system, as it was not designed for such intense use. Also, the area is on a slope, which means that the water supply is not evenly distributed: the lower section gets all the water, while the upper and middle sections get nothing. This situation created conflict between the four sections. The two upper sections cut the supply to the two lower sections, whose residents then started to rely on the canal and the nearby river again for their water. These communities engaged with the water purification plant to get water supplied to their sections only.

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Building a knowledge network

In her research into nappies waste, Kedibone found and used these sources of information:

Government

The Greater Tubatse Fetakgome Municipality was approached by Kedibone at the Burgersfort local municipality offices and she spoke with the supervisor of waste management. Kedibone remembers: "We had not made an appointment, because often when you do that, people just postpone until you give up. We just arrived and introduced ourselves and our project. At first, she was not willing to give much of her time, but in the end, surprisingly, we sat with her for an hour. These were our questions and the answers we got:

Q: What are the municipality's plans regarding disposable nappies that are in dongas and rivers in rural areas?

A: "*The municipality doesn't have plans for rural areas and they will never have plans, because it is a national and international challenge. You as an organisation are supposed to come up with solutions and plans, because you are doing research."*

Q: How can the municipality help the community on how to manage their waste not only disposable nappies and domestic waste?

A: "*The community must be the one to know how to manage their waste because they are the ones who generate waste."*

Q: What is the support that municipalities can give a CSO or NPO that is helping the community to manage waste?

A: *"The Municipality has rules and regulations. They don't have a program of waste collection in rural areas and they don't have budget for rural areas around Greater Tubatse Fetakgomo Municipality."*

Q: Why don't they don't have programs for rural areas?

(That's where conflict started. Apparently, she did not like **why**-questions.)

A: *"You people from rural areas you think you will get everything because you fell under the G.T.F Municipality."*

We said the municipality must give us service delivery in our areas. That's when she got angry and said: *"is this an interrogation, interview or investigation?"* She even said that we must put politics aside and follow the protocol. Municipalities have a protocol to follow concerning rural development, such as house number, household income and street planning. She mentioned Mashifane Park around Burgersfort, which is a new section in Burgersfort, and is in the process to have waste collection from the municipality. Our concern was that Mashifane Park is a new section around Burgersfort and they are planning to collect their waste. What about the communities that have been there for years before Mashifane Park without waste collection?

She said: *"If you are going to ask me why-questions again, I will refer you to the top floor of the building to meet the politician, because you came here with your politics mind."* We said that we are not here

with politics we are here with concerns regarding our community. She said: *"I don't talk to communities."* It was a heated argument which took a long time. She even said: *"I don't care, because am not staying around here. I am from Polokwane and I have waste collection where I stay."* She also said that no one has the right to waste collection in municipality areas without municipality approval."

But we must have waste collection. When we had our disposable nappies cleaning campaign around the Ga-Mampuru river banks and dongas, we did not have collection of those bags full of diapers.

From this conversation and the engagement with our local municipality Kedibone described they learned that the service delivery is poor. Most people who work in the municipality offices are not willing to help the rural areas, because most of the workers live far away from Burgersfort.
Another problem is the access to information: if you want information from the municipality you must go through someone you know. If you are a new person, you won't get help. Making an appointment is pointless, as they will run away from you or hide. We also learned that when going to our municipality you must be prepared and know your rights and your position. The municipality did not cooperate with us and they didn't answer our questions properly.

We also learned that there is a lack of consultation between the rural communities and the municipality. The departments don't share information and they don't expect the community to visit and ask questions. But IYP and other organisations must engage with the communities by helping each other on how to manage domestic waste and disposable nappies, as the municipality is not doing it. They advised us to register as a company dealing with recycling. That shows us our municipality looks at waste management as a business, not as service delivery.

NGOs/CSOs

Award's associate director Derick Du Toit is in charge of the NGO's programs in rural areas. He's a great source of information on rules and regulations. He can help us contacting manufacturing companies of disposable nappies and with recycling companies.

We've learned that there are companies that can help us with illegal waste, and that we can partner with concerning domestic waste and disposable nappies. We've also learned that we must have action plans and a position when engaging with the municipality or other institutions; we must also know our data and statistics of our community: who has babies that wear diapers?

Media sources and documents

Internet site by Azim B. Pathan (lawyer) and LLM student from Nagpur spoke about how waste on the ground, in streets and in dustbins, can be a great threat to the environment, to public health and the health of municipal workers collecting the waste, as is the improper handling of domestic waste. With

the lack of solid waste collection and with improper disposable techniques, disease and death of all sorts of animals may occur. It also affects water bodies, which may cause diseases in humans.

Management of disposable diapers *(www.smallfootprintingfamily.com/danegr-of-disposablediaper)* taught Kedibone that disposable diapers are the third largest consumer item on landfills and represent 30% of non-biodegradable waste.

Use of cloth diapers informs about how a new disposable nappies creates 2.3 times more water waste, uses 3.5 times more energy and uses 8.3 times more non-renewable raw material, such as oil minerals. Disposable diapers contain sodium polyacrylate and can cause rashes due the material used and to bacteria and ammonia accumulating in the diapers. Cloth diapers are just as effective as disposable ones. The new ones clean easily and are environmentally friendly, but you do have to wash them. Introducing them would in South Africa would involve encouragement and workshops explaining the benefits, because they are less easy to use.

Documentary on https://www.health-e.org.za spoke about how most rural areas face the same challenge, which is illegal dumping of disposable nappies. It causes conflict between neighbours, they can become smelly and are a health risk. In our experience some mothers are burying or burning the nappies, and others are throwing them anywhere.

Documentary by dutta sk, upadhyay vp, sridharan u showed us that waste is not a South African problem. Every country battles with hazardous waste. Sometimes it gets imported for recycling or reprocessing, but not in South Africa, we have to export it.

Christine and Tshepo found and used these sources of information for their research into the quality of (ground) water and the water purification plant:

Government

The Greater Tubatse Fetakgome Municipality has not been easy to engage with. We wanted answers about the borehole that the municipality uses to supply the community with drinking water: is the water suitable for drinking and do they check if the water is clean? After meeting with the supervisor of waste management, we wanted to talk to the local Department of Water and Sanitation, but they were in a meeting. We only received the contact numbers of the receptionist, not of the local DWS office. We tried to phone several times, but the phone is either not answered, or they tell us the people we want to talk to are not around. We kept trying and in the end, we were told that they don't have information for us, we must speak to our local councilor, Ephraim Hlatswayo. We know that is useless, as he doesn't like us and doesn't want to engage with us. We tried to contact him many times, but he's not available to us. We then decided to just visit him at his home, but he was at work in his regular job at Glencore Mines. So, who is serving the community when he is at work?

After this failed visit, we decided to go back to the purification plant, to ask plant workers about the policy of the plant: why does the water supply stop and what is their plan when it stops?
Plant operator supervisor Florina Makgoma said that the purification plant is using cables in pumping the water from the river. Most of the time when it fails, community members have stolen the cables and the plant then needs to be fixed. When there is less water in the river, the pump mostly pumps up sand and it blocks, which also causes the plant to stop. She also told us that the water purification plant and the canal are separated. The canal is now controlled by the irrigation schemes and the water purification plant by Sekhukhune District Municipality, which is now responsible for maintaining the water purification plant. The water purification plant must serve only two sections: Ditenseng and Ditantakeng. Ms Makgoma checks if the plant workers are doing their jobs, if the chemicals they are pouring into the water are well measured and what the status of the water is.

We've learned that the plant workers are doing their jobs, it's the community who does the mess by stealing the cables. We also learned about how things work in the plant. We learned about the chemicals chlorine and florin, and we now know that it is the pressure of Tubatse River that breaks the pump. The water purification plant can help us by giving community notice if there is any change in the plant.

We've also learned that the local government is there, but not to serve the community or the rural areas. They only seem to care about the money they receive from the mines and other companies. The communities are far removed from the local government offices, who seem to feel they are not their problem. We're very concerned that they don't seem to have plans for the rural areas, and don't seem to want to engage with the community at all. They take you from pillar to post and you will have to try and find out things by yourself. The councilor in our community is no better. We've learned that he is no longer interested in community work, but only in his work at the mines. He does not look after the interests of the people in his community, only his own.
The local municipality has to deliver the services that they are required to, but they just don't do that. They will only tell you about the protocol they have to follow.

Mr. Phaswane Shy, water consultant in Polokwane, can help our project with his knowledge and expertise in water infrastructure and water quality. He can help us by increasing the service reservoir storages and by providing elevated storage to ensure water supply to high lying areas. He can also assist with installing water meters in yard connections, to encourage people to use water responsibly. We will have a training project for a steering committee and water committees to operate and maintain the water infrastructure.

We've learned about water meters and about elevated storage of water, we also learned the formula for water is H2O. We understand that the projects can create jobs in the communities, and promote health hygiene.

Media sources and documents

"Is all groundwater safe enough to drink?" by the ***World Health Organisation (WHO)*** *(htpp://bwa.co.za/the-borehole-water-journal)*, explains that depending on the host rock, groundwater will have different chemicals in it, which will determine whether it is safe to drink or not. Ground water can also contain many salts, metals and organic chemicals which are essential or harmful for human wellness. The physical quality of groundwater mainly affects the taste, odour and appearance. You can't always judge it by seeing, smelling or tasting it. Human activity can cause ground water pollution, for instance harmful substances from dumps and landfills. A reputable laboratory must analyse samples of water after a borehole has been drilled.

"Mines, stockpiles, tailings and spoil contaminants in drinking water", by T.L. Pedersen (*htpp://extoxnet.orst.edu/fags/safedrink/mines.htm*), talks about how run-off from mines and stockpiles pose a threat to drinking water sources, due to the release of salts, metals and acid drainage into the water. Removal of these elements is very difficult, as they may adhere to small soil particles. Gold, copper and uranium mines pose a serious threat to surface and groundwater. Rural water supplies close to mines may be at risk of pollution. Public water supplies are normally monitored for certain metals and acid concentration, but private supplies are often not monitored.
We've learned that mining can pose a big threat to underground water and that all water in these areas should be monitored by regular testing and the results should be disclosed, so the public and private owners know.

Howard Perlman wrote (http://water.usgs.gov/edu/groundwater-contaminants.html) about contaminants of ground water, which can be mines, but also human activity. Inorganic contaminants, such as chromium can pose serious health (liver and kidneys) and other effects. It enters from old mining operation run-offs and leaches into groundwater, or is a fossil-fuel combination and waste incineration used in metal-plating and as cooling-tower water additive. Organic contaminants are plasticizers, chlorinated solvents or benzo, which enter from improper disposal, leaching run-offs, leaking storage tanks and industrial run-off. This can cause cancer, damage to the nervous system and reproductive organs and the liver.

"On site sanitation" (https://en.m.wikipedia.org/wiki/groundwater_pollution) speaks about pit toilets being another source of groundwater contamination. This can happen when pathogens and nitrate in the liquid which then infiltrates the ground, depending on the population density and hydrogeological conditions. This can be a problem if a nearby water well is used for drinking water. With increasing populations, this is a problem or will soon become a problem.

Water purification in the large scale municipality in Switzerland *(internet)* states the following: "Water purification is the process of removing undesired chemical, biological containing, suspended solids and gases from water. The goal is to produce water fit for a specific purpose. Most water is

disinfected for human consumption (drinking water). The method includes a physical process such as filtration, sedimentation, and distillation, biological processes such as slow sand filters or biologically active carbon, chemical processes such as flocculation and chlorination and the use of electromagnetic radiation such as ultraviolet light."

"Purifying water may reduce the concentration of particular matter including suspended particles, parasite, bacteria and virus. The standards for drinking water quality are typically set by governments or international standards. There is a simple method of purifying water which is boiling or the use of a household activated carbon filter but these are not sufficient for treating all the possible contaminants that may be present in water. According to a 2007 WHO (World Health Organization) report, 1.1 billion people lack access to an improved drinking water supply, 88% of 4 billion annual cases of diarrheal disease are attributed to unsafe water and inadequate sanitation and hygiene, while 1.8 million people die from diarrheal disease each year."

Important for South Africa to have access to purified water, by Tony Marchesini (www.h2o.co.za) states "It's never been more important for South Africans to have access to purified water. Our dams are drying up, many of our provinces are facing water shedding and level three water restrictions are becoming the norm. But many people don't realize that water shortage compromises the quality of water. They just believe a shortage means there is less to go around. Unfortunately, this is not the case, as the water becomes scarcer, the more polluted it becomes and the more it need to be treated which escalates the chemical you consume. "

Our rivers are polluted with hazardous waste and disposable nappies are all around. Mines are polluting our rivers, sewage drainage leaks into the rivers and therefore it is important to purify our drinking water.

"Is chlorine safe in drinking water?" by Testerson (https://watertestingkits.com) states that chlorine is a poison, according to the US Environment Protection Agency (EPA), but it is safe in small amounts in the water. This taught us that chlorine has an advantage and a disadvantage: it kills bacteria in the water, but it in large quantities it can cause harm to humans. Therefore, it is important that all purification plants have workers trained wel in measuring chemicals like chlorine for cleaning the water.

Water purification plant by Ann Welters (htpps://www.livestrong.com/waterpurificationplant) describes the following: "Water purification plays a key role in ensuring access to safe drinking water. Safe drinking water positively impacts the health of the community. The water analysis involves looking for several kinds of contaminants, including unsafe level of organic, inorganic, microbial and radiation contaminants."

"Water from lakes, rivers or the ground passes through a screen as it enters the water treatment plant. If ground water is used, screening may not be necessary since the water has passed through layers of the earth.

Treatment plants works add another chemical which cause tiny sticky floc to form. Those flocs attract dirty particles making the eventually heavy enough to sink to the bottom of the water tank as coagulation. Water passes through layers of gravel, sand and perhaps charcoal, which serve to filter out any remaining particles of often about 1 foot deep and the sand layer about 2⅓ feet deep."

Learning from new knowledge

We've learned that over a million people lack access to drinking water and that there are people dying from diarrheal diseases. We didn't know that.

We've learned that purifying water is important, considering the state of water pollution happening around our area. There is lots of mining river pollution. It is important to purify water to remove undesired chemical, biological containing, suspended solids and gases from water. There are methods to use which are physical, biological and chemical. Also, there is a method that is easy to use, that is boiling water and using an activated carbon filter in the household. However, these are not sufficient for treating all the possible contaminants that may be present in water.

We've learned that it is important to know all the steps in the water purification process.

And we've learned that underground water needs to be tested regularly in mining areas. Simply because we don't know when the water can be contaminated by the chemicals they are using underground for mining. But also human activity can contaminates underground water.

We've learned that over a million people lack access to drinking water and that there are people dying from diarrheal diseases. We didn't know that.

We've also learned about the catchment management initiatives, such as improving drinking water quality. There are things that generate a change in legislation like agriculture and industrial development. As we are the community, we have to contribute to its implementation and ensure that is more effective.

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