May Report:

OKWAGAANANA

Uganda, East Africa

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Year 2021-2022

Content

Introduction

Okwagaanana, or bringing people together, lies at the very basis of the cooperation between Academics for Development (AFD) and the Kidiki School in Namwendwa, Uganda. In the spirit of this vision, we want to continue to build upon the foundations created by the AFD students before us to make a sustainable and long lasting cooperation with the local community for those after us. Through this project, we truly believe that by combining our knowledge and experience, we will be able to tackle the many challenges that still lie ahead.

As Nelson Mandela pointed out:

"Education is the most powerful weapon which you can use to change the world."

These famous words are embedded in the DNA of the Kikidi School and are the means through which we plan on implementing our project. This year, the focus lies on conducting a number of interactive workshops that awaken a deep-rooted awareness about equality, human rights and mental wellbeing in Namwendwa. In addition, to combat the ever growing threats of the pandemic as well as the spread of other diseases, a rudimentary sanitary system is worked out for implementation during our six week stay.

At the core of the project are six eager students, motivated to have a lasting impact on the world. Believing that a diversity of skills is the key to achieving a meaningful project, the AFD team is composed of a variety of profiles with backgrounds in political sciences, (bio)engineering, biology, economics, anthropology and educational sciences. We trust that by joining forces, we will be able to put theory into practice and bridge the gap between ideas and action to leave a positive mark on the Namwendwa community.

From left to right: Karina, Michiel, Chaim, Nick, Katelijne & Esther

Chapter 1. Project Summary

1.1 Partner Description

After their trip to Uganda and more precisely, the village of Namwendwa, Jos Kuppens and Frieda de Lannoy fell in love with the country. During their first trip in 2006, they met Stephen and heard him talk about his plans for the future. He was strongly committed to make structural changes to improve the quality of life in the Kamuli district with the following philosophy: "I will make Kamuli shine". He talked about his plans for the Namwendwa Dairy Farmers Association (NDFA), about the Vocational Training Centre (VTC), the importance he attached to education and the importance of working with a vision: sustainable agriculture, food security, less manual labour, better hygiene, a higher family income, education for boys and for girls, et cetera.

Stephen was an example to many: honest, wise, decisive, a man with vision and with attention for everyone who asked him for advice. His vision: “A miracle solution does not exist, but small steps can and will change things a lot” (Okwagaanana, n.d.).

Jos and Frieda returned home, but his words, his decisiveness and his philosophy did not escape their minds. The following year, 2007, they returned and had a long talk with Stephen, asking if they could contribute to his project and that of his friends.

Since that year, Frieda and Jos have returned every year. They decided to support Stephen’s project and called their collaboration “Okwagaanana”. As a result, a Belgian branch of the already existing project was established. This branch is an autonomous sub-organization of the non-profit organisation Don Bosco and is run by volunteers only. It primarily obtains its funding through institutional sponsors, crowdfunding or third parties and collaborations with external partners.

“Okwagaanana" stands for “meeting each other” and it focuses on three initiatives in the village. The Kidiki Primary and Secondary School is one of them and this will be the primary focus in our project. The Kidiki secondary school wants to build a society of students and teachers participating and benefiting actively in the development of the school, of the community to achieve their full potential and better standards of living. The second initiative is the Kyebajja Tobona Women’s Group (KTWG). Its goal is to stimulate responsible and efficient microfinancing among the local women and to empower them in general. Third, the vocational training centre’s goal is to provide agricultural training for the local farmers (Okwagaanana, n.d.).

1.2 Initial Project Content

Uganda's educational system consists of multiple levels of accreditation. An educational institution can award legally recognized degrees for each level up to a specific year of study. The Kidiki secondary school is currently allowed to award legally recognized degrees up to the O-Level, which is equivalent to the fourth year of secondary education. Secondary education in Uganda consists of a total of six years of study. Only with the A-level accreditation can an educational institution award a degree for the fifth and sixth years of secondary education.

Obtaining an A-level accredited degree is of primary importance for Ugandan students, as this degree allows them to continue their studies at a higher education institution. Kidiki School's students face significant difficulties to access A-level accredited institutions in the region, thereby limiting the prospects for further education and a bright future. The steps that the school needs to take to qualify for A-level accreditation involve on the one hand further professionalisation of its teacher corps, which is supposed to be taken care of knowledge-wise (i.e. there are teachers available who have the right to teach up until year 6). On the other hand, amelioration of the working and living conditions for both staff and students is needed, an issue which AFD will try to tackle.

The living and working conditions have recently received a big boost through the construction of a water well on the school's property, which provides direct access to clean water. However, this change comes with some challenges, such as devising optimal strategies for hygiene and sustainable water use. A long-term solution in the form of an efficient and sustainable water policy is needed. In addition, the mental problems that already existed, and which are likely aggravated by the pandemic, need to be addressed.[1] By tackling subjects such as mental health and explaining them in all their facets, the aim is to arrive at long-term solutions that will benefit the entire community. The notion of self-sustainability is therefore crucial throughout the design and implementation of this project.

With our contributions, we at AFD will try to achieve effective and sustainable contributions for the Kidiki school and all those involved. We will try to jointly guide the school towards an optimal use and management of resources, as well as the professionalisation of the staff and raising awareness in the local community. This will be done in accordance with social and community concerns in Namwendwa. Local individuals, businesses, communities and other NGOs should all be considered as potential partners in this ambitious undertaking.

[1] Information from a call with Michael Walekaki, Director of Kidiki School on 19-11-2021

Chapter 2. Preliminary Research & Problem Statement

2.1 Local Context

2.1.1. Social Context

The Kidiki school is located near Namwendwa which is part of the Kamuli district. The village of Namwendwa has a population of 65.900 people. (Uganda Bureau of Statistics, 2020). In 2014 between 12.3 and 13.8% of the children between 6 and 12 years old were not in school (Uganda Bureau of Statistics, 2017). 6.3 to 8.9% of the population between 18 and 30 years old is not in school, nor has a job (Uganda Bureau of Statistics, 2017). Only 31.4% of the persons aged 18 and older were illiterate in the Kamuli district (Uganda Bureau of Statistics, 2017). Religion wise, in the whole of Uganda, 45.1% is protestant, 39.3% is Roman Catholic, 13.7% is Muslim and 1.6% has other religions. The remaining percentage was not religious in 2014 (CIA World Factbook, 2021).

COVID-19 also hit Uganda in March 2020. This caused the schools to go into lockdown and closing off social life. The response of the government to COVID-19 was quick but affected the whole society. The first case was reported on 21st of March 2020. Nevertheless mass gatherings were already suspended three days before then and schools closed on March 20th 2020. When the first case was reported the borders closed and just a few days later all public transport was stopped for fourteen days. From this moment on Uganda was in a lockdown which started small, but slowly most sectors were included in (Ministry of Health, 2020). They also set up a response team, and due to a wide variety of testing possibilities the pandemic is closely monitored (The Global Fund, 2021). Schools opened again in January 2022 and social life is slowly getting back to normal.[2]

The Ugandan government has put mental health on its agenda as a serious public health and development issue already since 1996 (Kigozi et al., 2010). Almost 4.6% of the population has a depressive disorder and 2.9% lives with an anxiety disorder. These numbers make Uganda one of the top six African countries in depressive disorders (Kagaari, 2021). At the moment, 9.8% of the gross domestic product is spent on healthcare (which equals about US$ 246 annually per person), nevertheless only 1% goes into mental health care (Kagaari, 2021). The World Health Organisations estimated the amount of mentally ill people who do not get treatment at 90% (Molodynski et al., 2017). The situation has worsened due to COVID-19, people could not interact with their loved ones and there have been restrictions on burial traditions and rituals (Kagaari, 2021). Also for the Kidiki school the impact of COVID-19 has been felt, due to the lockdown more students have dropped-out. According to the local partners the drop out from the students also caused worsening effects for some

[2] Call with Michael Walekaki (director of Kidiki School) on 19-11-2021

students. They said that some students got into trouble and were sent to prison, and also girls have dropped out because of pregnancies and marriages [3] Between August 2020 and January 2021 there have been 3.570 teenage pregnancies in the Kamuli district (Taremwa, 2021). This number has increased due to Covid-19 and during 2020 overall there has been a 20% increase in teenage pregnancies in the Kamuli district (Taremwa, 2021b).

Figure 1: Facts and figures about the situation for women in Uganda (2015)

Women's rights are still often neglected in Uganda. The legal age for marriage is now 18 years, however arranged child marriages still happen in rural areas. Besides this, polygamy is still legal, while the wives in these marriages are not protected by law (FIDH, 2012). The divorce bill that was adopted does not apply to Muslim marriages, it does not prohibit polygamy or payment of the 'bride price'. There are several other bills which are under discussion: the sexual offences bill for example. Two other acts have been adopted: the domestic violence act and the prohibition of female genital mutilation act, implementation of these acts is however limited (FIDH, 2012).

In the region of Namwendwa there are currently 28 schools of which only four are secondary schools.

[3] Call on 19-11-2021 with Michael Walekaki, director of Kidiki School

Of these schools only two have A-level accreditation, with 97 villages that depend on these schools, this number does not provide all the students with the possibility to do their A-levels (Musoke, n.d.).

2.1.2. Technical Context

From a hygienic sight, the situation in Uganda still faces a lot of challenges. Many families are disconnected from major sewage systems, with only 19.8% of the population having access to basic, safely managed sanitation. Still 5% of the population performs open defecation, posing major threats to public health. Furthermore, only 56% of the populace has access to basic or safely managed drinking water, either from groundwater or water treatment facilities (WHO, 2020). This low access causes one of the three main childhood killers in Uganda, diarrhoea (UNICEF, 2015). Even though numerous NGOs like UNICEF are active in improving these areas, the numbers remain grim. The need thus arises for not only improved implementation of water infrastructure, but also sensibilisation about basic hygiene to prevent the spread of diseases.

In Namwendwa, the municipality where the Kidiki School is located, access to safe water increased to 69% (*Uganda Water Supply Atlas*, 2021). Most of these access points are created by deep bore holes into groundwater reserves. The majority of these supplies are also communally managed, meaning pumps most often break down due to technical issues that aren't repaired. In February last year, Kidiki school finally gained access to a locally installed water pump connected to the local groundwater. This allows improvements to sanitation and water accessibility.

Water and waste management in Uganda is handled by the National Water & Sewerage Corporation. It operates in 258 towns across the country, being active in 95 of the 135 districts in Uganda. It operates a total of two major sewage treatment plants (National Water and Sewerage Corporation, 2021). Its focus lies mostly on ensuring the country's water connections, as its current sewer network is quite limited. While their water distribution network stretches over 20.353 km of piping throughout the country, the actual implementation of a sewage system is limited to only 704 km of piping concentrated around cities (National Water and Sewerage Corporation, 2021). As the Kidiki school is not connected to any local sewage system, implementations of new sanitary operations should go hand in hand with adequate treatment to handle any wastewater produced.

2.2 Problem Statement

Obtaining accreditation at the A-level (until the 6th year of secondary education) is the main goal of the Kidiki school. The most important needs to qualify for A-level accreditation, as stated above, involve professionalisation of the teacher corps and improvement of the working and living conditions for

both staff and students. The achievement of those needs is connected to our goal: improve both physical and mental health in the school (AFD, 2021). On the one hand, physical health is connected to hygiene, easy access to water, a proper water distribution system and wastewater treatment. On the other hand, mental health may be regarded as an umbrella term which includes anything COVID-19 related, violence, women's rights and learning loss, but also other mental health related issues.

Currently, an efficient water management and hygiene plan for the Kidiki school is not yet available. There is a high demand for a concrete, efficient and sustainable water supply planning for showers, toilets, dormitories, kitchen and agriculture. This would lead to a significant increase in hygiene in these areas. Especially during COVID-19 outbreaks, the installation of water points for hand washing are necessary. Furthermore, the school wants to implement a sustainable water use policy and program with possible infrastructure works. The water distribution system needs to be combined with workshops or training to sensibilise the staff and pupils towards personal hygiene and sustainable resource use (AFD, 2021). Additionally, this valuable water source should be protected at all costs from pollution by for example percolating excrement from latrines.

Moreover, COVID-19 has magnified existing problems and created new socioeconomic challenges. Many students have been denied education for almost two years. The learning loss, but also other consequences of COVID-19 such as mental well-being, should not be underestimated. Therefore, together with the teachers of the Kikidi school, we want to revive the pre-COVID-19 workshops and update them on contemporary social problems.

2.3 Power literacy field guide

After our first report in December, we noticed that our cooperation was not optimal. The meetings that followed with our partners from Kidiki SS made this clear. They were not in favour of all the proposals in our report. After pointing this out at a meeting, we changed our approach. What followed was first and foremost more meetings, but also clear communication and more follow-up. We also advocated involving our partners more in the design of our project, something we had not done before, albeit unconsciously.

In addition to these practical measures, we looked for tools to support us in this and ended up with the power literacy field guide by Maya Goodwill (2020)[4]. This guide offers tools for examining the power dynamics present in the design phase of a project and becoming aware of them. Goodwill calls it developing power literacy: developing interpretation skills and knowledge to be able to come to a more holistic understanding of the subtle as well as already obvious power dynamics. It is about sensitivity and self-knowledge about one's own power and privileges in the design phase and

[4] To see the complete guide, go to: https://www.power-literacy.com/field-guide

converting this into action based on one's own values (Goodwill, 2020).

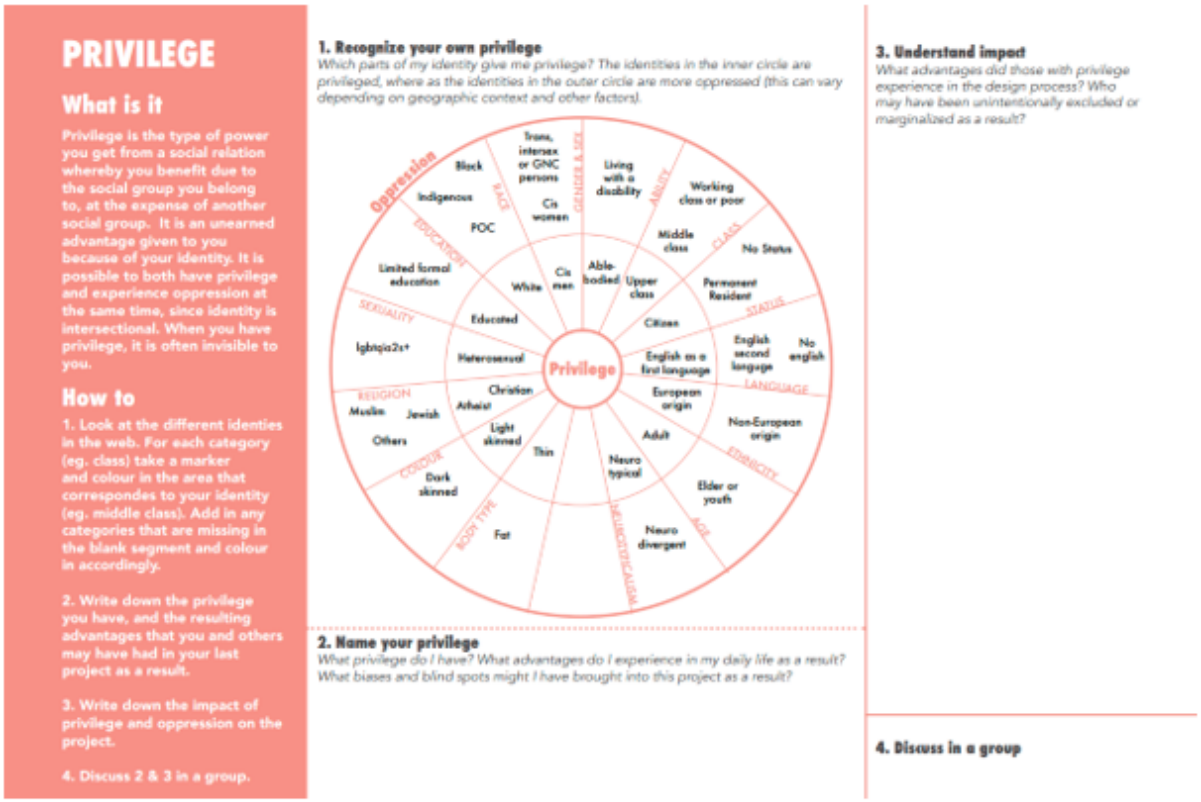


Figure 2: Goodwill, M. (2020) A Social Designer's Field Guide to Power Literacy, p.17.

The guide consists of two major parts. Part 1 deals with the different forms of power that can occur and provides a common language to talk about this. Part 2 covers guidelines and tips for installing power checks at different points in the process. Since the design process that precedes the actual implementation in the summer is almost at an end and using it for this phase is no longer feasible, we will use the guide during our stay in Namwendwa. The design process will continue in the summer and adjustments will certainly be made. The guide is constructed in such a way that it allows one to use the parts one needs.

The reason we chose this guide is simple. We want fair and equal cooperation in the best possible way. We know that power dynamics cannot be reduced to zero, but we can do our best to become aware of them and try to minimise them. For the sustainable development of our project, with the future in mind, this seems to us equally important. Finally, this guide could also provide tools for further cooperation within Okwagaanana and possible other collaborations in the future.

Chapter 3. Development and elaboration on research questions

3.1 Health & Hygiene

After the December report, it became clear that a definite direction had to be chosen to ensure the project's successful implementation and feasibility with the local context and resources. Some ideas were put on the back burner, while others were built on further to work out the practical details as well. These choices are explained in the following part.

First of all, it was decided that the water distribution and reuse system with wastewater treatment facility was unfeasible to install in a way that the quality of the project could be ensured. It would be a too ambitious undertaking that is hard to prepare for remotely as the lack of a solid blueprint or plan of the school grounds means a lot of guesswork would be involved. The school itself is still heavily involved with this project, and we will do our best to work together with the teachers and director during our visit to lay a successful foundation for this plan so that future AFD teams can elaborate further on it in a way we could not. As the current way of treating wastewater is to simply run it into the ground, installing flushable toilets without proper waste treatment support would be a surefire way of ruining the school grounds.

This semester, a lot of the focus was moved towards the Ecological Sanitation or ECOSAN latrine implementation. It not only provides a clean, odourless toilet for the pupils, but also a valuable source of nutrients which can be used as a potent fertiliser. This fertiliser could increase crop yield and thus revenue for the school, bringing us closer to the goal of achieving A-level accreditation. The implementation and possible risks and positives have been extensively discussed with the school itself. Although ECOSAN has been implemented extensively in Uganda through the NGO 'JoinForWater' in collaboration with the implementing partner NRDI, in the Namwendwa region it is not yet used. This means the school can serve as a beacon towards the rest of the community, as the adoption of ECOSAN technology relies heavily on the acceptance of the community towards the concept. It can have a big impact on the spread of the ECOSAN knowledge and technology if a key figure in the community endorses it.

This leads to the next project to be implemented during our stay. In collaboration with the school, we have decided to implement last year's agriculture and irrigation plan during our stay. In combination with the extra fertiliser obtained from the ECOSAN latrines, this would serve as a major source of income for the school. Additionally, the students can take home the concept of the robust irrigation system to implement it with their families so they can then also grow crops during the dry seasons.

Finally, several water tests of sources in the community will be carried out during our stay. We will also work together with the teachers to set up a basic water distribution system using GIS©, a geographic information system that allows the creation of blueprints and maps.

3.1.1. Drip Bucket Irrigation

Last year, the project focused on developing an irrigation system for the school to enable the cultivation of cash crops all year round and consequently provide a stable income flow which is a crucial step towards A-level accreditation. After discussion with the local partners, it was agreed that drip bucket irrigation is the most adequate irrigation system and the set up of such a system is shown in Figure 3. A bucket, connected with drip lines, is placed at a set height above the ground so gravitational force pushes water through the drip lines. For the practical details of the irrigation system, we refer to last year's May report.

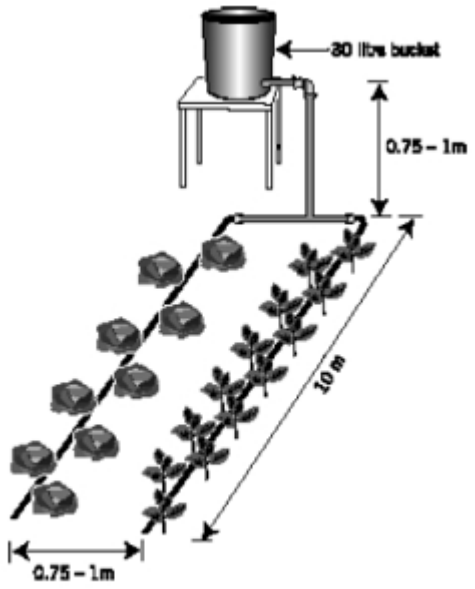


Figure 3: Set up of a drip irrigation system (Sijali, 2001)

The drip bucket irrigation system is labour intensive as the buckets need to be filled manually. By installing a pump towards the future, the work involved in pumping up water from the well can already be minimised. The biggest advantages of a drip bucket irrigation system are that it is low cost and easy to implement and repair. Most importantly, it is especially interesting for the school as it can have an educational purpose. Practical lessons around the irrigation system can be organised and due to the low-cost and low technical complexity of this particular system, it can be feasible for pupils to also implement this irrigation system at home.

The team of last year was not able to travel to Uganda due to travel restrictions because of COVID-19 and consequently the implementation of the irrigation system could not be realised. We plan to carry through with last year's plans and realise the system this summer because the local partners are still highly interested in the implementation and because we as a team also believe in the positive impact of this idea.

We will work with a 'do-it-yourself'-kit developed by Waterboys (U) Ltd. for smallholder farms in Uganda. These kits include all the material to set up the system and one kit per 10-20 m^2 is needed (depending on the plant spacing). The field that the school intended for agriculture is 60 by 30 metres. To keep the work for this summer feasible, we plan to realise the irrigation system at 50 percent of the field, thus using 40 kits. If this irrigation system can live up to the desired impact, the school can implement the system also on the rest of the field, potentially together with the students as part of a practical class.

3.1.2. ECOSAN latrines

3.1.2.1 Introduction

Ecological Sanitation or ECOSAN is more of a concept if anything. It tries to lower pollution and water usage by seeing human waste as a resource. It promotes health in the immediate area by allowing for a safe place to dispose of human waste, a carrier of disease. It also avoids contamination of groundwater with these diseases by building a closed-off system above ground and tries to recycle nutrients from human waste to serve as fertiliser for crops. For years now, it has been applied all around the world by numerous organisations like DWSS (Department of Water Supply and Sewerage), Wateraid or JoinforWater. The latter is an organisation also active in Uganda and tries to increase access to water and sanitation.

As discussed in the December report, ECOSAN latrines are a great way of reducing waste and increasing crop yields by recovering nutrients from human urine and composted faeces. The implementation of these latrines on a testing scale will not only lead to a more hygienic waste management, but also more revenue for the school as they can utilise the waste to great effect on their fields. An added benefit is that ECOSAN latrines also prevent the groundwater from being contaminated with human faeces, although through discussion with the school's director we determined that the region has a low water table. Through the testimonies of numerous NGOs such as JoinForWater, the most vital part for the successful implementation of ECOSAN toilets is the acceptance of the community. To this end, Kidiki School can serve as an example to the region to allow for the spread of the technology throughout the community.

The ECOSAN latrine project in Uganda first saw its introduction in 1996 as a way to provide sanitation facilities in areas lacking easy access to safe water and sanitation, as they do not pollute the groundwater. Uganda currently holds over 30.000 units of Ecosan latrines from households to public institutions and schools. The application of the produced fertiliser has also led to an increased yield of bananas, maize and other crops.

3.1.2.1 Concept

The basis of ECOSAN latrines rely on the separation of urine and faeces from the get-go. As urine usually is sterile and does not carry disease, it is much easier to use. The faeces do carry disease, but by adding lime or ash to the mixture, the disease-bearing pathogens die out over the course of several months. This happens due to dehydration of the mixture, which makes the faeces too dry for pathogens to survive. It is because of this reason the urine and faeces must be separated. Toilet paper will not get degraded in these drying types of latrines. It must therefore be collected separately and burned.[5]

This is why a second option is used for our ECOSAN proposal. As toilet paper is directly discarded into the latrine in the school's case, a second type of ECOSAN latrines based on composting can be used. Here bacteria break down the organic materials like faeces and toilet paper. The moisture is not a problem in this case, but enough aeration is for degradation. This can be achieved by installing a vent pipe. For proper functioning, kitchen waste, wood shavings or other organic material should be added 4-5 times the amount of faeces present to allow for decent composting. These can be scattered after someone has finished using the toilet. It should also be occasionally turned over to provide good air to the mixture. After emptying, the collection chamber should be filled with a basis of kitchen waste or wood chippings to provide a proper carbon food basis for the composting by bacteria.

The urine and faeces are separated from each other by the installation of a specially moulded squat pan, shown in the following Figure 4.

5 https://sswm.info/sites/default/files/reference_attachments/WATER%20AID%202011%20Construction%20of%20Ecological%20Sanitation%20Latrine.pdf & http://www.ecosanres.org/pdf_files/EcosanStoriesInUgandaBooklet2011.pdf

Figure 4: An example of ECOSAN separation pans moulded with mortar.

A backside hatch that allows access to the faeces composting chamber is present and should be aimed to the North to catch as much heat from the sun as possible, as this allows for optimal heating and drying of the compost, stopping smells and flies from growing. The panel on this side can be made of metal painted black to absorb the most heat. Two latrine compartments form one unit together, as when one of the composting compartments is full, the other is used for six months to allow for proper composting of the first tank.

3.1.2.1 Tasks

The ECOSAN latrines require quite a bit of maintenance and proper usage to function. The urine tank must be emptied monthly. Depending on the type of latrine chosen, the regular addition of organic material and mixing of the compost must be carried out to allow proper degradation, as well as the half-yearly emptying of the compost tanks when started up. In the case of a composting latrine, the aeration pipe should be checked for blockages. Also someone should refill the ash/lime/sawdust used to cover the pile after usage. The toilet bowl should also be cleaned regularly, but be careful to not use too much water for this. These tasks are critical to the proper functioning of the latrine. Finding a person to perform these tasks could be tricky, as there might be a large taboo around this topic. This is why the needed sensibilisation will also be carried out in the community.

The collected urine should optimally be used at three different stages in the planting cycle: before planting, after 25-30 days and after 45-50 days. For fast-growing crops like potatoes, only the first two cycles are necessary. The application should always be combined with compost. The urine should be used as ⅛ combined with ⅝ of water for application. This should of course also be tested to determine the optimal application for the local environment.

3.1.2.1 Collaboration & Design

The tricky part about ECOSAN latrines is that they require the community to follow strict guidelines on proper usage to make sure they operate successfully. The school made contact together with Frieda, our partner from Belgium, with a school where ECOSAN toilets had been implemented for years. The ECOSAN toilets there were one of the teacher's passion projects and to his testimony, the field's yields flourished when applied with recovered nutrients. However, after he left the school, the system fell in shambles as the toilets were no longer properly maintained and used. This stresses the need for continuous support from the teachers and students, as well as implementing workshops to explain the workings of the latrines.

After discussing the concept with the school, contact was made with the NGO JoinForWater, which has experience with ECOSAN latrines in Uganda. Through them, a collaboration was started with Mutegeki Collines, an ECOSAN engineer working for the Natural Resources Defence Initiatives organisation (NRDI). He works together with the Ministry of Water and Environment to spread ECOSAN technology through the country and is currently working on a construction manual for ECOSAN latrines[6]. He supplied us with help for the design and materials to construct the latrines. He has also agreed to educate the local stonemasons in the art of ECOSAN latrine building. First, an initial two-module ECOSAN toilet was worked out and a material list was put together to determine the budget with the aid of the WATERAID 2011 ECOSAN latrine construction guide (WaterAid, 2011). The concept for the 2-stage latrines is illustrated in the following pictures of Figure 5 and a materials list and budget can be found in the budget chapter.

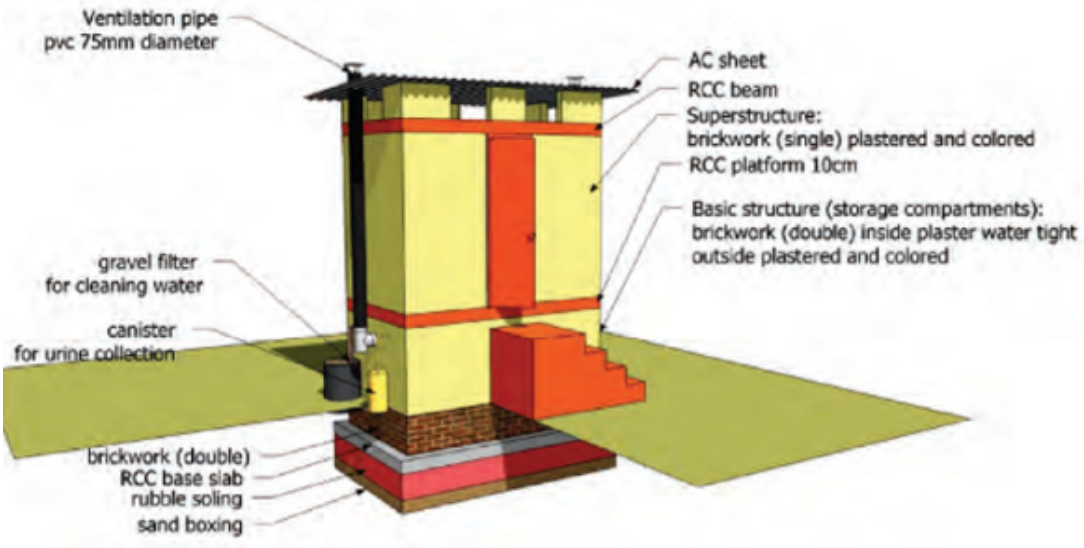


Figure 5: blueprint of an ECOSAN latrine.

[6] Information gained through contact with Mutegeki Collines.

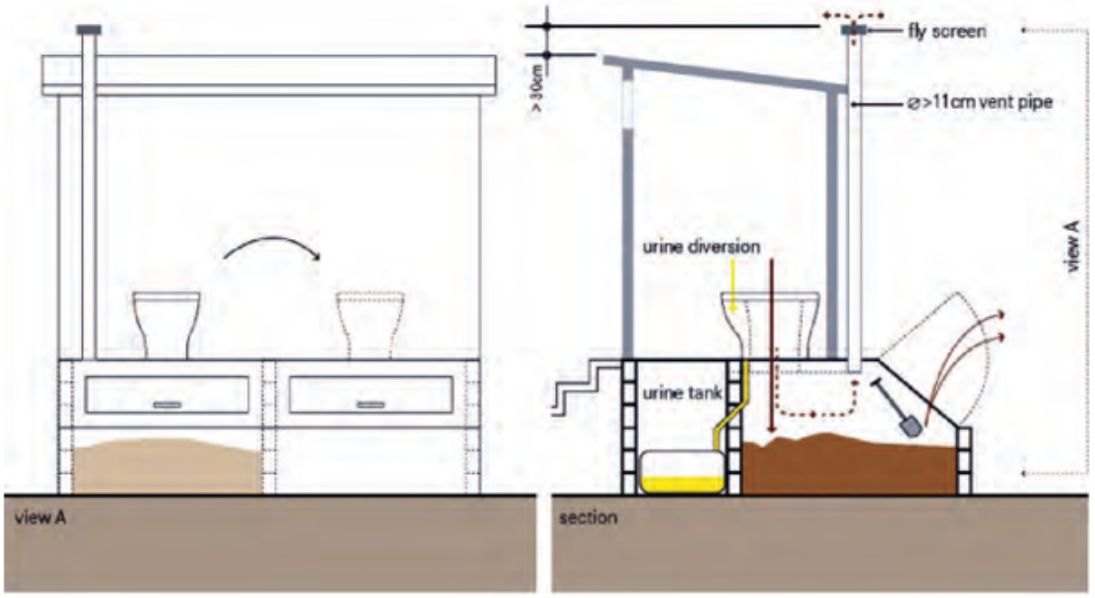


Figure 6: Various design sketches for a two-compartment ECOSAN latrine.

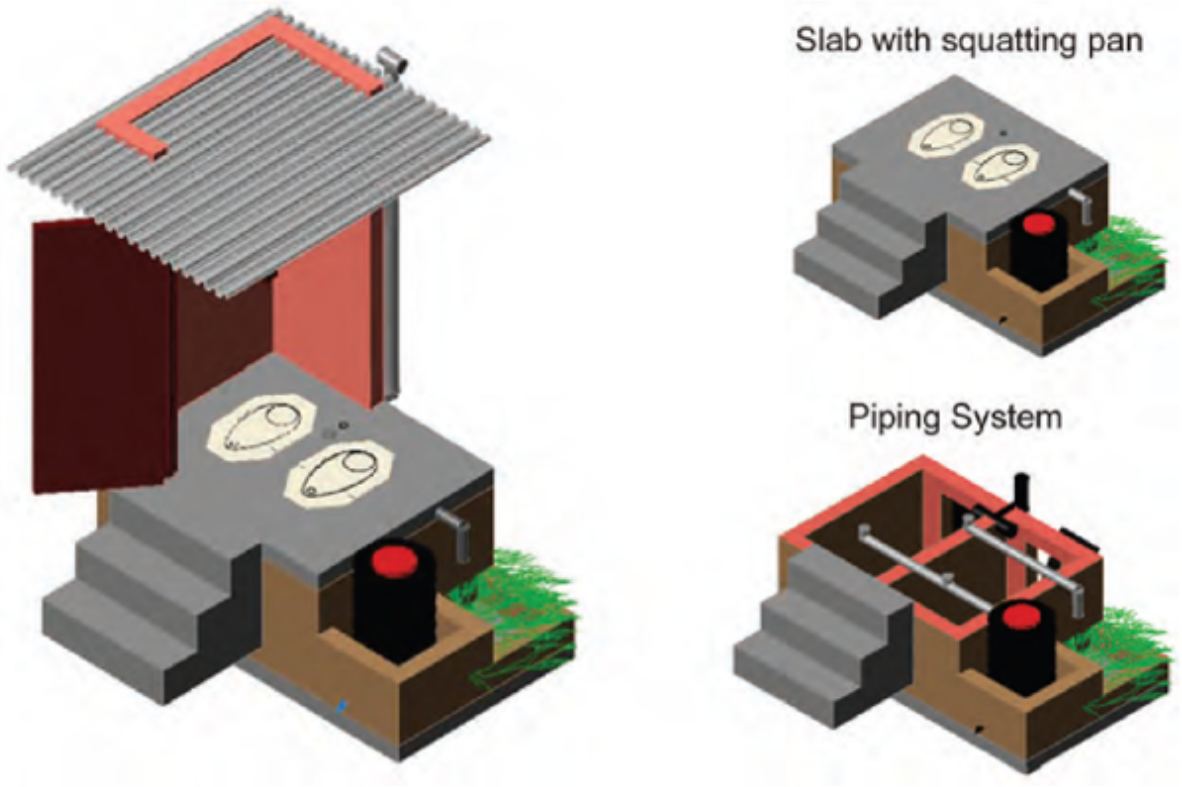


Figure 7: Various design sketches for a two-compartment ECOSAN latrine.

The different important components for the latrines are the following:

1. Ecosan pan: separate hole for urine and faeces.
2. Toilet seat cover: to prevent smells from escaping and flies from breeding in compost

3. Faeces collection tanks: Two square compartments built above ground where the toilet is built on top. In case of the composting toilet, the collection tank should stretch out until behind the latrine so more sun hits the hatch and heats the compost. The chamber should be built of poured concrete or a sealed block construction as it is vital no rainwater leaks inside.
4. Vent pipe: PVC pipe of 75mm diameter with roof on top. Should feed air to collection tanks and rise above the roof of the latrine. One for each compartment.
5. Urine pipe and collection tank: 50mm PVC pipe from urine collection hole in pan to collection tank for urine. Urine tank around 100L but should be tuned for emptying around every three weeks. The tank should have an airtight cover. Multiple jerrycans can also be used for collection, but this requires a more active replacement approach. It makes handling easier though.
6. Faeces emptying door: one for each of the collection tanks with an aluminium/steel hatch painted black.
7. Roof: Corrugated iron sheet.

Secondly, a more elaborate ECOSAN design was supplied by WASH engineer Mutegeki Collines which was constructed for Buhara and Buhinga primary schools in Uganda. These latrine blocks consist of a 4-stance ECOSAN toilet with a washroom attached. A material list for the construction of this design was also worked out. It was ultimately decided in collaboration with the school that we would build a basic two-stance ECOSAN squatting latrine for girls, to serve as a test project before further implementations are made. A construction plan to aid in the building of the latrine was made and a material list/budget and design sketches can be found in the Annex.

Table 1: *An in depth construction plan for the ecosan latrine of Kidiki School.*

	CONSTRUCTION PLAN ECOSAN LATRINE KIDIKI SCHOOL	
STEP	DESCRIPTION	CHECK
1	**PREPARATION**	
1,1	**Site clearance:**	
	clear site of plants and bush	
1,2	**Excavation:**	
	Dig out 250mm deep area of 250x200mm	
2	**SUBSTRUCTURE**	
2,1	**Foundation laying:**	
	Lay 100mm thick gravel bed and cover with 50mm sand, make sure bed is densely compacted and even	

2,2	**Plain concrete of mix 1:3:6 in;**	
	Pour 100mm thick foundation slab well compacted with a vibrator/rammer and cured to the satisfaction of the supervisor	
2,3	**EXTRA foundation work depends on how it is usually handled on site**	
3	**SUPERSTRUCTURE (Front should face south so sun hits hatch)**	
3,1	**Collection chamber construction:**	
	Build 150 mm thick brick wall for chamber construction up to a height of 1000 mm, leave room at back for installation of hatch and at side for urine diversion tube	
	Leave room between both collection chambers for 75mm PVC urine pipe	
	Back side should stick out about 10 cm on bottom, finish brick construction with mortar smoothing.	
	First metre at the front of the building should be used to construct stairs. Finish stairs out of mortar	
3,2	**Toilet floor construction**	
	Precast toilet floor out of mortar: 1400mmx2000mm. Mould ECOSAN pans in mortar and leave space for faeces hole and for 75 mm urine diversion pipe. Also leave a hole for 100mm vertical PVC pipe to provide air to compost.	
	Run urine pipe from front holes of ECOSAN pan at angle towards the outside collection tank 100L min.	
3,3	**Hatch placement**	
	Place metal hatches at back holes of collection chambers. Size 1mx0.9m	
3,4	**Construct toilet building:**	
	Build up two separate cabins 140x200cm up to a height of 240cm. Leave room for 2 70 cm doors.	
	Install 2 70x200cm doors	

	Run 10cm PVC pipe up to above roof from top of collection chamber to serve as aeration pipe. Install rain cap on top so water does not leak in through the pipe.	
3,5	**Build roof:**	
	Build wooden pitched roof frame at 12° and finished with corrugated iron sheet 240x220cm	
4	**FINISH AS DESIRED**	

3.1.3 Water quality

To guarantee the quality of the drinking water and the water used for agriculture, water safety plans are needed to provide a reliable framework for small communities with the focus on a cost-effective management of the water supplies. A suited step by step approach from the WHO can be followed to set up a water safety plan (WSP) for small communities (WHO, 2022). Since the Kidiki school wants to implement a water distribution system in the long term, it is best to start with a WSP. For this year's project, we won't be able to already construct pipe lines for a water distribution network since we try to focus on the ECOSAN latrines, the implementation of the drip bucket irrigation system and mental health awareness. Nevertheless, we would like to set the start to implement this water distribution system in the long term.

In general, the greatest risk for drinking water is the contamination with disease-causing microorganisms (WHO, 2012). Verification of microbial water quality should be based on the analysis of faecal indicator microorganisms. The organism of choice is likely to be *Escherichia coli* or alternatively, *Thermotolerant coliforms*. The monitoring of specific pathogens is only needed when there would be a waterborne outbreak or to prove that a WSP has been effective. The presence of *E. coli* is sufficient to provide evidence of recent faecal pollution and that the water is not potable (WHO, 2022).

Testing is a very important aspect of verifying the drinking water safety. However, solely relying on water quality testing has certain limitations. For example, testing the water quality can be costly and cumbersome, it often takes time and not all important information can be extracted from a water quality test. Besides, if the test indicates a water quality problem, It might be that it is not clear which actions the community should take to solve this quality problem. Ideally, a complementary approach like a WSP is needed to lower the risk of contaminants entering the drinking water supplies (WHO, 2012).

Implementing a water safety plan (WSP) has several positive impacts. In the short term, it will improve day-to-day risk management and the operation of the water supply. In the long term this will lead to consistently safer water. A water safety plan consists of six different steps (Figure 8) that can

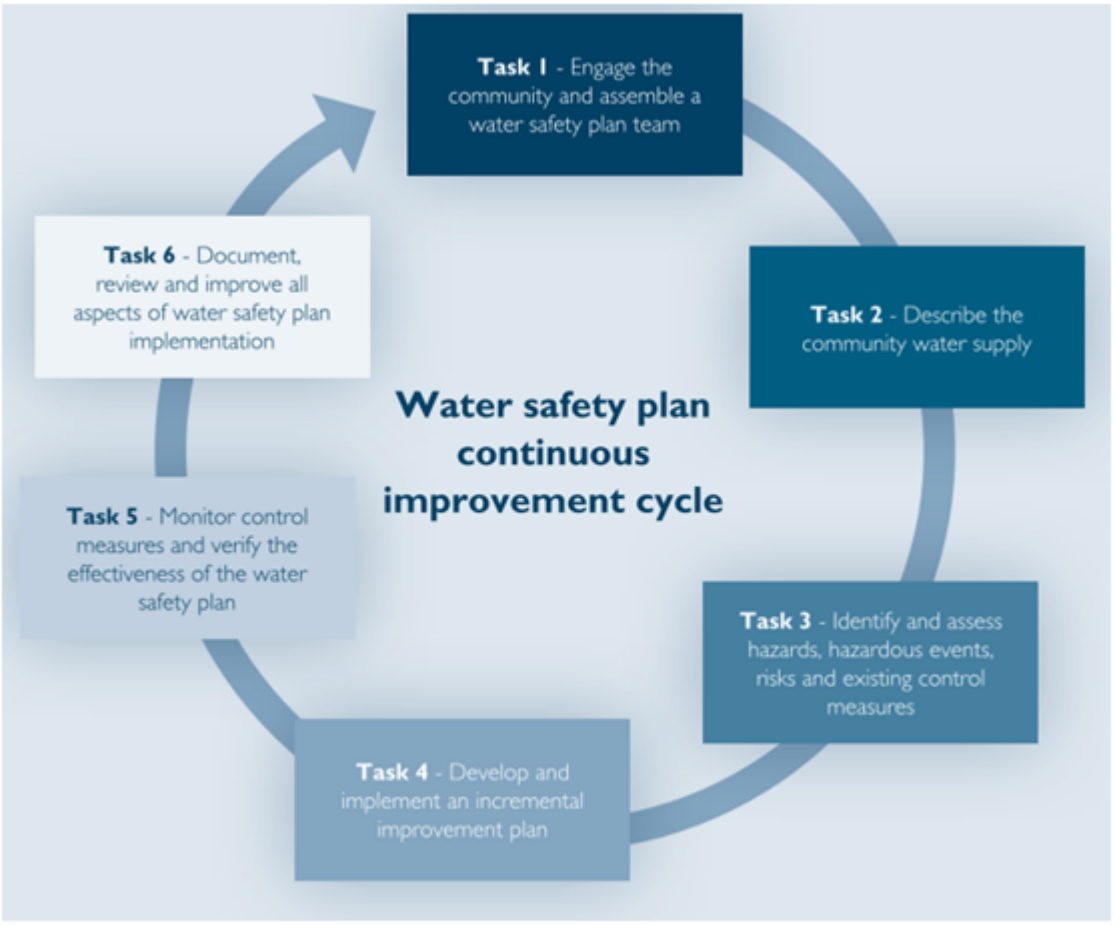


Figure 8: The six tasks to develop and implement a water safety plan in a small community water supply.

be repeated cyclic (WHO, 2012).

The first task is to engage the community and assemble a water safety plan team. The WSP team can be of importance to identify the community's aspirations and needs for water supply, to balance water supply needs against competing community-level priorities, to gain local knowledge and experience, identify resources within the community, initiate contact between the community and other stakeholders and raise awareness within the community to protect and improve their water supply. In order to set up a WSP team, it is crucial that the community understands the benefits of the WSP approach. Eventually, the members of the WSP team will be responsible for developing, implementing and maintaining this WSP (WHO, 2012).

The second task is to describe the community water supply. This can be done by creating a complete map from the water source to the water supply points. This map could be very valuable to identify hazards and potential impacts on water safety. The map is connected with a description of the water

supply system: from catchment from the rain or abstraction from the well, treatment (if applied), to storage and distribution, to the consumer. On one hand, a catchment map should include human activities and land uses (e.g. agriculture, sanitation), those may contribute to microbial or chemical contamination of the ground water from the well. On the other hand, a treatment map should contain details on the treatment processes, for example where specific chemicals are added. Next to the mapping, general information should be gathered to describe the water supply and management, such as relevant water quality standards, suspected changes in source water quality relating to weather or other conditions, land uses in the catchment, purpose for water supply, details relating to the treatment, distribution and storage of the water (WHO, 2012).

Table 2 shows an overview of relevant water quality standards according to the WHO, including pH, electrical conductivity (EC), total dissolved solids (TDS), turbidity (TUR), nitrate ($NO3^-$), nitrite ($NO2^-$), iron (Fe), manganese (Mn), residual chlorine (Cl), total coliform (TCF) and faecal coliform (FCF) (Addisie, 2022). Total coliform refers to a group of related bacteria that share several characteristics and are commonly found in the environment such as in soil and the intestines of animals. Total coliform bacteria themselves are not necessarily harmful to humans, but their presence indicates the risk of other, more harmful pathogens present in the water (Palintest, 2022). On the other hand, faecal coliform bacteria belong to coliform bacteria but are specifically associated with human or animal waste, for example E. coli (EPA, 2016).

Table 2: *Physicochemical and bacteriological parameter standards in drinking water sources (Addisie, 2022).*

Parameter	**WHO standards**
pH	6.5-8.5
EC (µS/cm)	400-1200
TDS (mg/l)	1000
TUR (NTU)	5
NO3- (mg/l)	45
NO2- (mg/l)	3
Fe (mg/l)	0.3

Mn (mg/l)	0.2
Cl (mg/l)	0.25-0.5
TCF (CFU/100 ml)	0
FCF (CFU/100 ml)	0

The third task refers to the process of hazard identification, which includes identifying actual and potential dangers and their causes. There are three different steps to do this: look for signs of hazards and hazardous events, identify hazards and hazardous events and assess risk associated with hazards and hazardous events. Table 3 shows the potential signs connected to possible hazards,how to identify them and assess existing control measures. In order to identify hazards and hazardous events, a sanitary inspection form could be used. This is a checklist of quite simple observational questions giving an indication of the potential hazards (WHO, 2012). A sanitary inspection for the borehole with hand pump, household water storage container, rainwater harvesting tank and for the ECOSAN toilets is provided in the annex (CAWST, 2013).

Task four is to develop and implement an incremental improvement plan. Therefore, the WSP team must start from the significant risks determined in the previous step to require additional control and list possible measures. Possible measures are: eliminating or reducing contaminants in the source water, removing particles and chemicals from the water or killing/inactivating pathogens or preventing contamination during drinking-water storage, distribution and handling. Next, based on the chosen control measures, an improvement plan should be developed.

The fifth step is to monitor control measures and verify the effectiveness of the WSP (WHO, 2013). Water quality is extremely important for drinkable water, but also for water used in agriculture. There is a need for a low-cost, portable, simple test method which doesn't require highly skilled analysts or additional equipment and materials. Besides, it should be performed onsite in low-resource settings (WHO, 2012).

For this project, we chose to first use the *water quality test kit of ITS Europ*e since this test gives a good overview of 16 parameters: pH, total alkalinity, total chlorine, total hardness, free chlorine, chloride, nitrate, nitrite, copper, iron, presence bacteria, hydrogen sulfide, presence lead, presence pesticides and heavy metals. (ITS Europe, 2022). This test includes most parameters of the WHO and could be a good start to identify potential risks. To test the water on a regular basis, we chose to test the water with the *mWater Test Kit*, a presence/absence test for *E. coli*. This test is recommended by the *Ugandan Water Project*, a non-profit humanitarian organisation that helps to provide safe and accessible drinking water and other WASH (water, sanitation and hygiene) resources. Their mission is

to implement relational solutions that help Ugandans sustainably pull themselves out of poverty (Ugandan Water Project, n.d.). The mWater Test Kit is really simple and gives the primary indicator for water quality: the analysis of faecal indicator microorganisms. Each test kit can test 100 ml drinking water and 1 ml water for recreational use (cooking, cleaning, bathing, etc.). This presence/absence test is prefered because tests that look at the most probable number sometimes give a false sense of accuracy. The instructions for the mWater Test Kit can be found in Annex IV.

Finally, the last step is to document, review and improve all aspects of the water safety plan implementation. Instructions that describe the steps or action to be taken during normal operating conditions and additionally for emergency conditions as well, should be written down. Furthermore, it is important to have an efficient and regular review on the WSP and to update its whole cycle. Supporting activities such as training programmes, education of community members, communication protocols, record keeping… are also part of this final step. Eventually, to review the whole plan, the WSP team should return to the first task and go through the whole cycle again. Once the team has run through the whole cycle, the tasks will be easier and take less time to complete.

Table 3: *Signs that may signal acute or chronic health-based and aesthetic issues caused by contaminated water supplies (WHO, 2013).*

3.2. Education & Well-being

3.2.1. Survey results and discussion

In February we did a survey among the students of the Kidiki School. We will discuss the most important results. In total 60 students filled in the survey, nevertheless not all filled in all the questions. Besides this, the possibility of misunderstanding the questions is always plausible, although we provided as much information as possible.

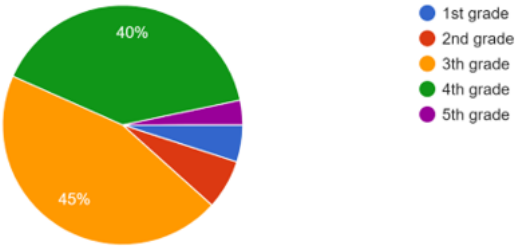


Figure 9 What grade are you in?

The respondents differentiated in age from 16 years old to 22 years old. Most students were 18 years old (22 students). The division of female/male was almost equal. There were 53,3% female respondents and 46,7% male respondents. The 3th and 4th graders were overrepresented in the respondents. Almost 85% were in these grades.

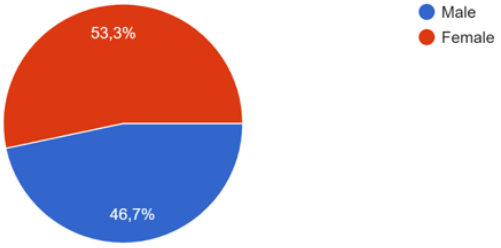


Figure 10 What is your sex?

As discussed in our December report, there are multiple topics which can be of relevance for the school. In the previous report we discussed the current situation in Uganda and gave a general overview. Based on these findings, we sent out a survey to the Kidiki School. The results of this survey are discussed in the following part.

<u>COVID-19</u>

A first important topic we probed for in our survey was the effects of COVID-19 on students' well-being over the past two years. Although the pandemic is not yet fully over, life has begun to return to normal in Uganda. To this end, students have been able to return to school since January (2022) and are able to attend classes at Kikidi secondary school again.

We asked several questions about the COVID-19 pandemic and the effect on their day-to-day lives. When we asked if the students felt more worried than before the pandemic the results were divided. This showed us that the pandemic has not affected them all in a similar way. Within the workshops this difference can be discussed and also why some students did become more worried. The graph shows a good starting point for the discussion about differences among the students.

In our next questions, we delved deeper into the feelings and actions the students took during the COVID-19 pandemic. Students indicated that they were worried about COVID-19. Besides this, almost half of the students indicated that they felt loneliness, change in sleep pattern, loss of knowledge and skills, not getting enough physical exercise and anxiety. Only two students indicated that they had none of these experienced during the pandemic. This shows that the students are almost all affected by the pandemic and it may be beneficial to discuss this with the peers in a controlled environment.

Lastly as Figure 9 indicates did students feel socially isolated in 32,2%. 25,4% mentioned that they did not feel socially isolated and 20,3% said they felt a bit socially isolated (group 3). This indicates that students are impacted by the pandemic and feel either more alone or on the other hand not more socially isolated. This shows that some students can rely on family and friends while others might have more difficulty with this.

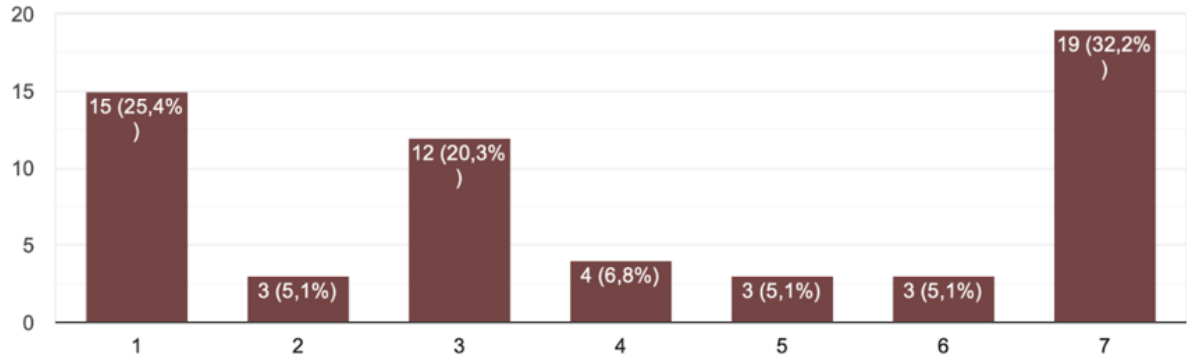


Figure 11 How socially isolated do you feel right now on a scale from 1 (lowest) to 7 (highest)

However in a comparison with the situation before COVID-19 students indicated that they were less socially isolated. This is shown in Figure 10. A possible explanation for this could be the fact that they spent a lot of time back at home with their family members or in their community. These two results show two different outcomes, which can indicate that students in general feel more socially isolated.

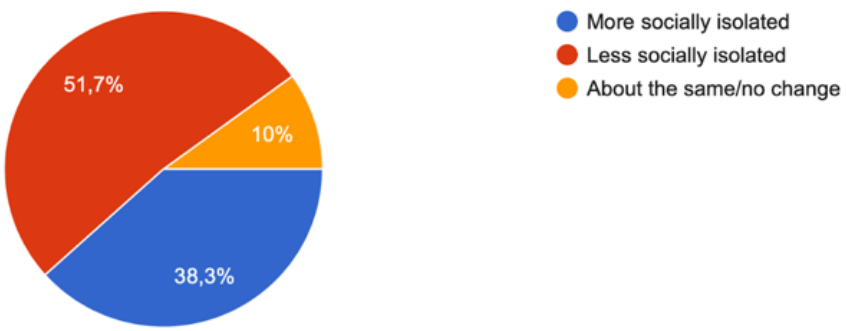


Figure 12 Compared to your life before COVID-19 do you feel more...

All of these results show that the pandemic had some sort of impact on the lives of the students. The pandemic might have worsened the specific struggles that students already felt and therefore should be discussed. The workshops shall focus also on what effect the pandemic had on the mental health of the students and women's rights.

Mental health

The second topic we surveyed was mental health. Covid-19 has had a very big impact on this and perhaps offers an opening to start talking about it and gradually break the taboo. The results of the survey itself can be used as a starting point during workshops because it gives a clear picture of the situation of the students.

We also asked several questions on this subject. It was interesting to see the answers to the question of how much the COVID-19 pandemic has hampered their access to mental health care. This tells us that many of them already experience mental health care. This will be an interesting topic to discuss to see how this happens, what they mean by mental and how this differs from other approaches to mental health.

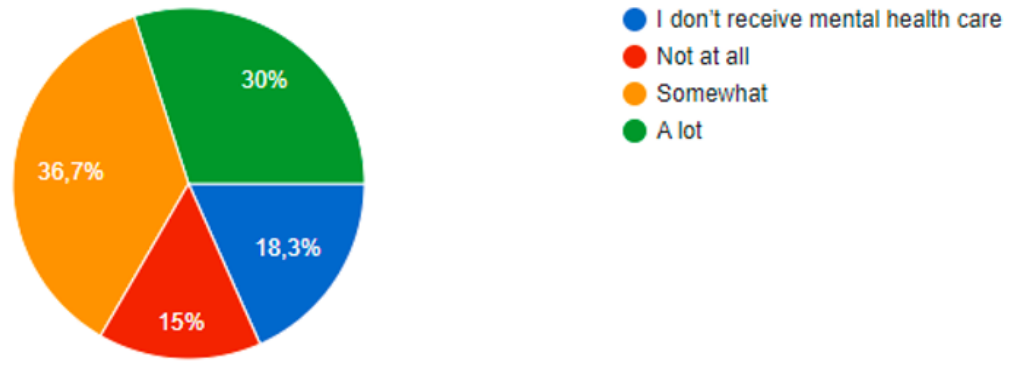


Figure 13 How much has the COVID-19 pandemic interrupted the care you receive for your mental health?

We have also gained insight into some of the things that the students do to take care of their mental health. Here we find a clear outlier, namely *exercise in or around your home*, which was or is applied by 23 students. Also 'talk to friends or family on the phone or video chat' was a popular way with 15 answers. Finally, *participating in creative activities or hobbies* and *learning a new skill or engaging in distant learning* are two more frequently occurring items with both 8 answers. These answers already reassure us to some extent that positive things are often the focus and little refuge is sought in things like smoking. Of course, social desirability must be taken into account when interpreting this result.

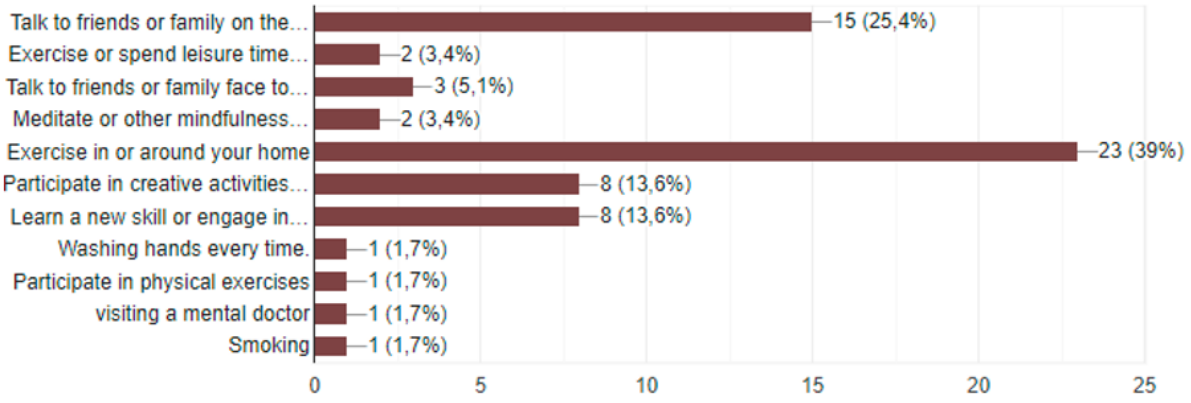


Figure 14 What are the things you have done to take care of your mental health during the COVID-19 pandemic?

Some questions were about the more negative things experienced by the students in relation to their mental health. It was noted that *having little interest or pleasure in doing things* was experienced regularly by students, and even 16 students experienced this on a daily basis. *Feeling down, depressed, or hopeless*, on the other hand, was experienced less frequently on a daily basis but by slightly more students (33) occasionally. The answers to *feeling nervous or anxious* also follow a

similar trend. Only feeling aggressive or a sense of violence was experienced significantly less by the students.

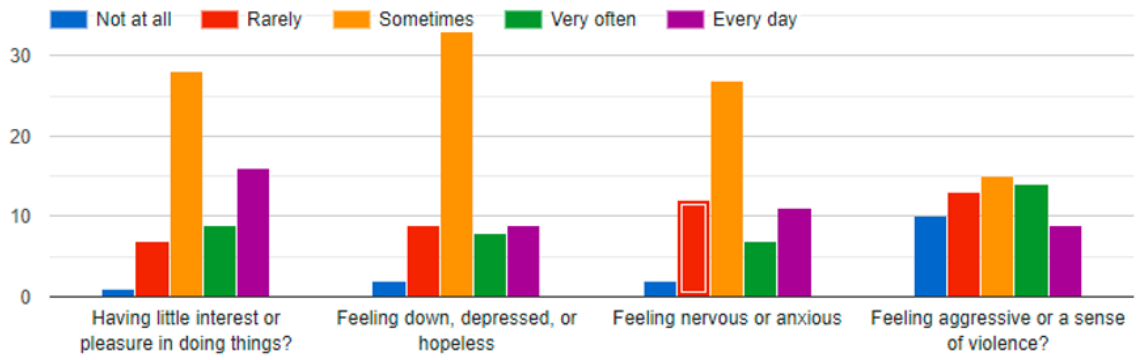


Figure 15 Over the last two months, how often have you been bothered by the following problems: (not at all - nearly every day)

We will keep these findings in mind when organising the workshops. Some of the results themselves can be cited as starting points for discussion, as mentioned earlier.

Learning loss

Following the topic of COVID-19 and how it affects the school activities and mental health, we also asked questions regarding learning loss. We start this survey with an open question to map the familiarity with the topic. We asked, "What do you associate with learning loss?". Out of 59 responses, we found a pattern that more than 50% of respondents associated learning loss with loss of knowledge as the school closed during the pandemic. Around 26 respondents associate learning loss with the loss of time to consult with the teacher, discuss with classmates, and even fail to advance to the next grade. Some other interesting answers regarding the loss of friends and classmates, some respondents stated that some of their friends dropped out of school because they felt that they were too old to be in school or got married instead. Some answers associated learning loss with regrets and alcoholism which is interesting to dig deeper into the field while collecting narratives of stories.

We then asked a more personal question "Do you feel like you experienced learning loss? If yes, please explain." The answers to this part of the survey indicate that all respondents have experienced learning loss. The majority feel they have learning loss because they cannot consult with their teacher, making them forget about the lesson and knowledge they obtained before. They also stated how staying and trying to study at home is challenging and makes them lazy. Some explain how the pandemic hampers their goal and time plan to reach a certain education level. At the same time, others

correlate learning loss with the loss of a friend: Grief, as one of their friends, passed away due to COVID-19.

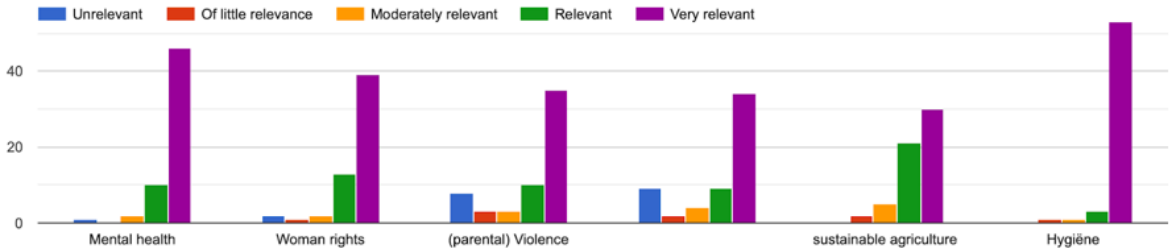


Figure 16 Rate these topics on a scale from 1 (not relevant) to 5 (very relevant) of how relevant you find them

Women's rights

With the concern that women's rights are still often neglected in Uganda, we put it as another topic proposed for a workshop in Kidiki School. Our survey started with an open question, "What do you associate with women's rights?" and we got varying answers. Some of them mention several things associated with women's rights, and we can see the repeating pattern in the answers. One-third of the respondents mention that they associate women's rights with the symbolic celebration of women's day. One-third of respondents mentioned helping their female family members with domestic work and other heavy work. Another most repeated answer on the survey is buying hygiene products (e.g. pads, tampons, etc.) when their female relatives are on their period.

We dive deeper into specific questions to map the condition in their neighbourhood. We asked, "Do you believe women are treated equally to men in your community?". Out of 21 responses, ten said "Yes". In these ten responses, some explain that, according to them, women are treated equally because they have the same rights to education and political participation. However, the other 11 answered "No". One of the answers is provided with an explanation linked to the tradition on the site. The respondent answers, "women in our society do kneel while greeting a fellow elder, which still portrays women are at a low level". This practice can be dug deeper during our fieldwork to see the cultural effect and reasoning behind it or whether the practice or its meaning has shifted.

Following that, we gave a more specific question about the problem that often arises regarding women's rights. We asked, "Have you experienced or witnessed sexist behaviour or sexual harassment at your school, workplace, or home?". We got 17 respondents, and six mentioned that they have

witnessed or experienced it. However, all the answers do not further elaborate. Ten of them answered "No", and one other answer did not specify.

Chosen topics

Based on these results, the findings of the previous report and the preference of the teachers at the Kidiki School, the following topics are chosen to create workshops on mental health, women's rights and the effect of COVID-19 on these two topics. In the following part of this chapter the HEADS-UP framework is discussed. With this framework a proposed set-up for the workshops is presented. Due to the fact that the local context will have a large consequence on the workshops the set-up is just a proposal, which can be adjusted as well as the topics.

3.2.3. HEADS-UP Framework

Our starting point for the workshops is the HEADS-UP framework that encourages an ethical global issues pedagogy, specifically made for secondary teachers (Pashby & Sund, 2019)[7]. Examples of global issues are climate change, violence, poverty but also women's rights and mental health. HEADS-UP is an acronym for Hegemony, Ethnocentrism, Ahistoricism, Depoliticisation, Salvationism, Un-complicated solutions and Paternalism. This framework can be used to explore a challenge or to identify some sub-challenges within a larger theme. The methodology tries to counter a too simplistic and one-sided (Western) view when discussing global issues (such as decolonisation or climate).

The framework was designed to teach critical thinking about multiple and different perspectives and experiences, as this is essential for a responsible relationship with current and future generations. The study from which this framework emerged therefore examined various barriers and facilitators that teachers experience when addressing complex connections between environmental, economic and social issues in their teaching. HEADS-UP focuses not only on students but also on the continuing professional development of teachers. It acts as a guide and is intended to support teachers in their classroom practice, not to tell them how to do something.

First of all, the guide provides different reflections and questions for teachers to examine their own classroom practice. The reason for this is simple and was beautifully articulated by Vanessa Andreotti:

[7] To see the complete framework, go to:
https://www.mundu.dk/wp-content/uploads/Karen-Pashby-Louise-Sund-EthicalGlobalIssues.pdf

> "If educators are not 'critically literate' to engage with assumptions and implications/limitations of their own approaches, we run the risk of (indirectly and unintentionally) reproducing the systems of belief and practices that harm those we want to support." (Andreotti, 2014)

The ***Reflections for Teachers*** section is a tool that teachers can use to reflect on the materials and pedagogies that can support the facilitation of lessons on global issues now and in the future. Next to that, there are four more sections in the guide related to HEADS-UP. ***Orienting learners to the global issue*** provides different orienting activities as ways of introducing a global issue. The section ***Exploring an Issue*** offers several questions sequences that can be used to analyse a campaign, in support of international development, directed at students. ***Breaking down an issue and identifying key challenges*** is the next section and consists of a series of three questions to support students in their research on a global issue. The last section is named ***Responses and action checklist*** and provides a checklist that can be used after students have studied a topic, to reflect on the future implications of their conclusions.

There are several reasons why we have chosen this guide. Firstly, it is a ready-made toolkit that can be used immediately in practice without too much preparation. This means that once you have read through all the information in the guide, you can get started fairly quickly. In addition, this framework is specifically constructed with three very important issues in mind that are also a focus of our project: sustainable development, ethical global issues and secondary teachers. Investing in sustainable development has been a goal for us from the outset because we want our joint efforts to continue to bear fruit far into the future. The fact that this framework focuses on the professionalisation of teachers only contributes to this.

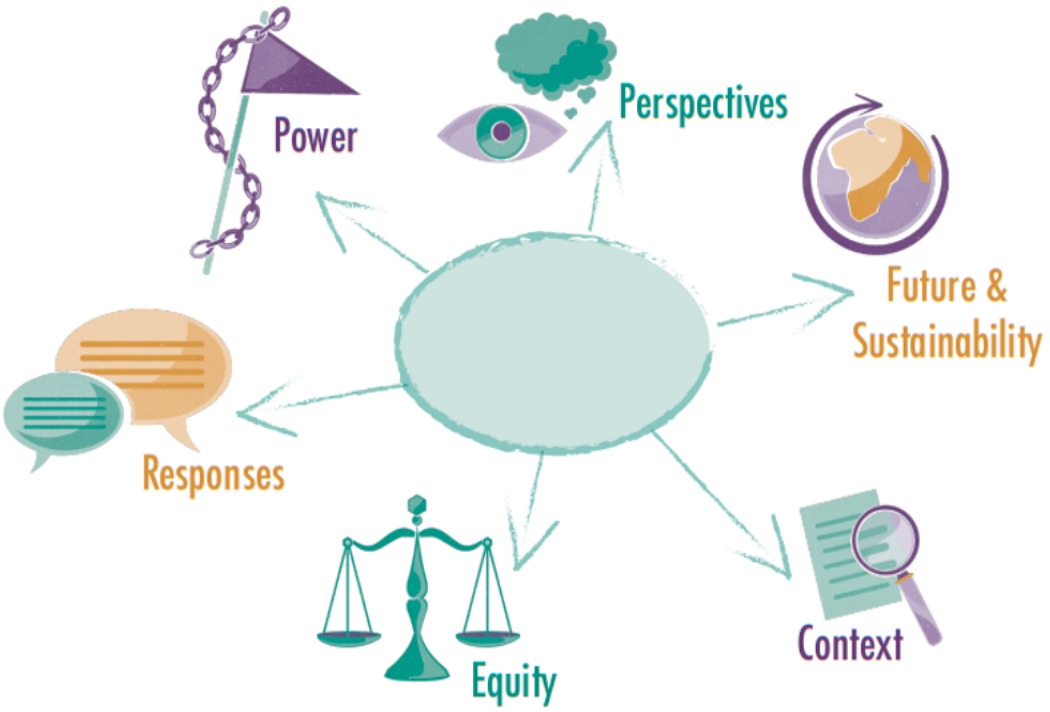


Figure 17 Pashby, K., & Sund, L. (2019). Teaching for sustainable development through ethical global issues pedagogy: A resource for secondary teachers, p.17.

Finally, this guide offers guidelines and ways to address ethical issues in an approachable way. We already know from our work with Michael, Julius and Wilson (headmaster and two teachers of Kidiki SS) that they are open to discussing more sensitive issues such as mental health and women's rights. They themselves are in favour of this and absolutely wanted it on the agenda at the beginning of our cooperation. In addition, we know from the survey results that there are strong opinions on these topics that are sometimes diametrically opposed. That is why we think it is so important and useful to apply this guide, because it offers space to take everyone's perspective into account and to discuss it in a safe way.

3.2.4. Provisional lesson plan: Mental health

To discuss all kinds of topics, we have chosen to create a lesson plan consisting of different lessons. These lessons can be given each week, so it takes around four weeks to cover the whole topic. The school can for example organise a themed month about a topic and engage all the students to think about the topic that is under discussion. In the following part each lesson is discussed separately, however the order and the sort of lesson are all changeable if needed. We chose to do a more general plan, because then the teachers can also change the topics or make changes in the plan if it would not work for a certain topic. Besides this, we also have to first merge ourselves into the school and their working to see what can work and what cannot.

First lesson:

In the first lesson, the students are asked to share their ideas and knowledge on the topic at hand. This is mostly an orientation class, where the knowledge of the students is gathered and the starting point of the lessons for the following weeks is decided.

Middle lessons:

Depending on the knowledge of the students this middle part can be filled with lessons that dive into the subject with experts and new information. However, when the students show that they have a very broad understanding of the subject, this part can be filled with further deepening of the subject and organising projects to spread their knowledge. These projects can be done in the community or at the school. Students will also get the opportunity to prepare for the final debate in which they will use their knowledge to defend their point.

Last lesson:

In the final lesson a class discussion will be held. Where students will prepare to defend an argument. This will conclude the lesson series about a specific topic. In this debate students are encouraged to think out of the box and use the knowledge which they have learned over the past few lessons. We chose for a class debate because the school curriculum focuses a lot on rhetoric during classes. This is therefore a form of work that the pupils are familiar with.

Chapter 4. AFD project impact map

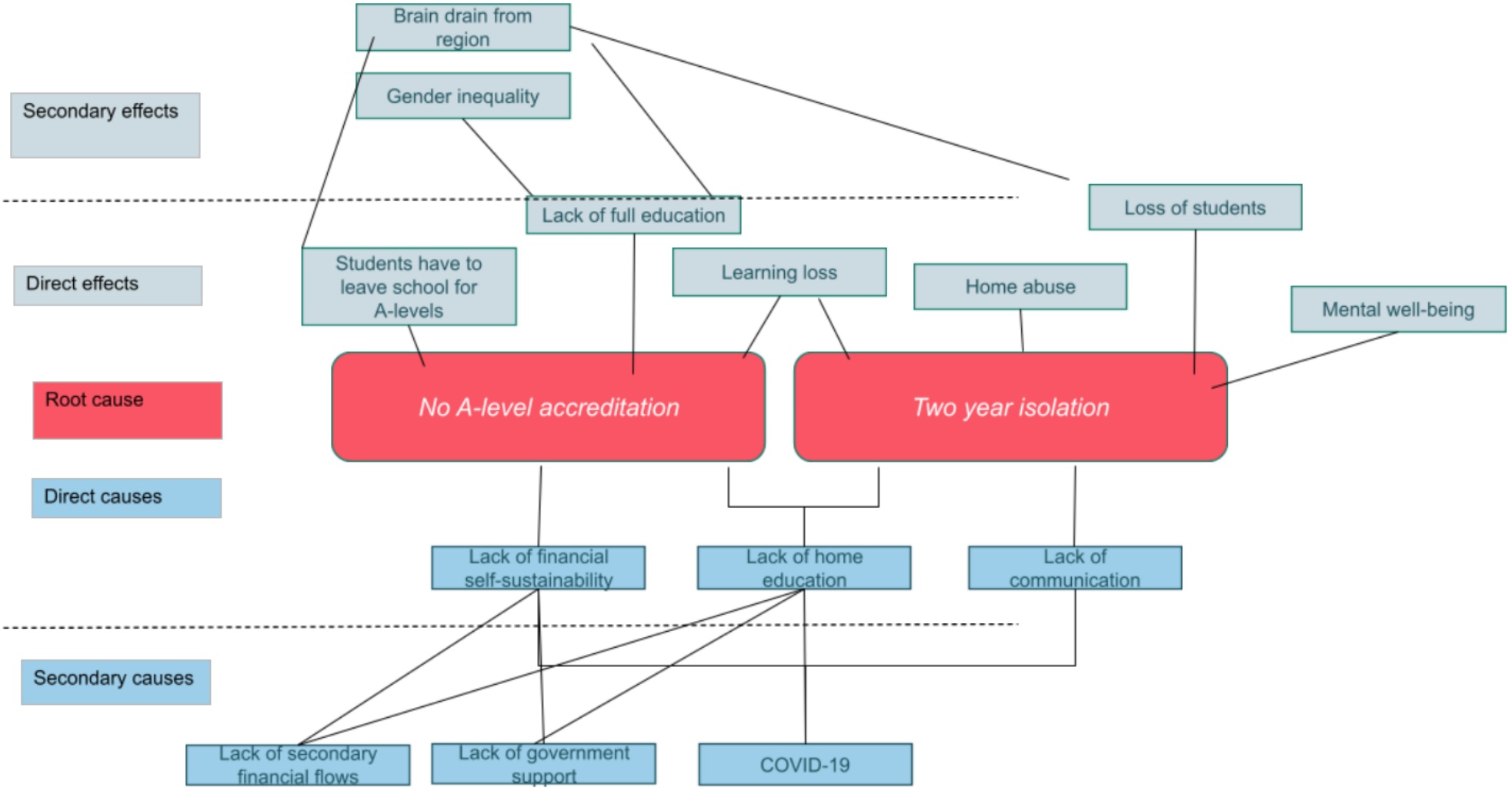
The two main root causes identified for the project are first the lack of A-level accreditation for the Kidiki School. This means that the school can not viably hand out diplomas for the last grade of secondary education, leading to the students leaving the region to other schools to complete their education. This causes a brain drain from the region, which hinders the development. The lack of full education of the people in the region also partly contributes to the perseverance of traditions and habits that create a gap between men and women.

Even though the teachers are fully qualified to teach up to A-levels, the government does not allow it as long as the school is not fully financially self-sustainable. As it is a private school which can not rely on subsidies from the government, they must come up with secondary financial flows to achieve self-sustainability themselves. If this is not reached, it might lead to the price of education increasing and the exclusion of those who can no longer afford it.

The second major root cause is student's two year isolation from education. The schools were closed already in January 2020 to stop the spread of COVID-19, and remained closed until January 2022. This led to a two year learning loss, which was made worse by the government allowing all students to skip one year of education. This quarantine led to increased cases of home abuse, as well as students dropping out of school as they needed to sustain their families and picked up jobs. This isolation also had a major impact on the mental wellbeing of the students because their social contact lowered significantly. Where some of the more wealthy schools could turn to online education, Kidiki School could not due to the lack of extra income, further increasing learning loss.

These issues must be tackled if Kidiki School is to advance past these hurdles. On the one hand, the combination of the produced ECOSAN fertiliser with the new irrigation system will lead to substantially increased crop yields. These can then be sold to obtain added revenue for the school to become financially self-sustainable. To deal with the problems created by the two-year lockdown, awareness must be created about the potential issues students have incurred during the time. This will allow the topics to become more socially accepted, meaning students who struggle with these things can discuss them to relieve their social exclusion.

All the connections discussed in this part are visualised in the following problem tree:


Secondary effects
Direct effects
Root cause
Direct causes
Secondary causes
Brain drain from region
Gender inequality
Lack of full education
Loss of students
Students have to leave school for A-levels
Learning loss
Home abuse
Mental well-being
No A-level accreditation
Two year isolation
Lack of financial self-sustainability
Lack of home education
Lack of communication
Lack of secondary financial flows
Lack of government support
COVID-19

Chapter 5. Conclusion

For the water management and hygiene aspect of the project, we will implement the ECOSAN latrines and the drip water bucket system this summer. Furthermore, we will conduct tests to analyse the water quality of the well and the water used for domestic purposes and irrigation. To start up the water distribution system, we will collaborate with the teachers and make a map with GIS©. Especially for the latrines, we will implement workshops to explain the working of the latrines in collaboration with a teacher who already has some expertise with the ECOSAN latrines. For the workshops, we have done a survey among 60 students of the Kidiki school in February. Based on the results of the survey, we chose to implement workshops on mental health, women's rights and the effect of COVID-19 on the two previous topics. The workshops themselves will be set up based on the HEADS-UP framework. To tackle the two different topics, a provisional lesson plan has been elaborated as a general plan for the workshops.

Chapter 6. Budget statement

6.1 Ecosan toilets

For the construction of the ECOSAN toilets, a list was put together in collaboration with WASH engineer Mutegeki Collines who has much experience with the construction of ECOSAN toilets (table 4). Though the prices are given in UGS, the actual prices in the Namwendwa region may differ slightly from what is provided here. The money for the construction of these toilets will come from the Okwaganaana organisation.

Table 4: *Price calculation for materials of ECOSAN toilets.*

	ECO SAN TOILET BILL OF QUANTITIES FOR ONE UNIT					
S/NO	**PARTICULARS**	**UNITS**	**QUANTITY**	**RATE**	**AMOUNT (UGS)**	**AMOUNT (€)**
1	CEMENT	BAGS	6	32.000	192.000	52
2	HARD CORE	TRIPS	0,5	60.000	30.000	8
3	SAND	TRIPS	0,5	60.000	30.000	8
4	AGGREGATES	TRIPS	0,5	130.000	65.000	18
5	TRANSPORT (SAND, AGREGG AND H/CORE)	TRIPS	3	70.000	210.000	57
6	PRE-CAST SLABS (INCLUSIVE TRANSPORT)	PCS	4	65.125	260.500	70
7	TIMBER	12*1	3	12.000	36.000	10
8	DPM	M	6	2.500	15.000	4
9	ISS BLOCKS	NO	640	1.300	832.000	225
10	TRANSPORT BLOCKS (LOADING AND OFF LOADING)	TRIPS	1	110.000	110.000	30
11	WELDED WIRE MESH	PC	1	27.000	27.000	7
12	PVC PIPE 4"	M	5	4.500	22.500	6
13	PVC TEE	PC	2	4.000	8.000	2
14	PVC BEND	M	1	3.000	3.000	1
15	PVC PLUG	PC	1	4.000	4.000	1
16	PVC GLUE	TIN	1	6.000	6.000	2

17	RAIN STOPPER(METALLIC CAP)	PC	1	5.000	5.000	1
18	IRON SHEETS	PCS	3	43.000	129.000	35
19	ROOFING NAILS	KGS	1	7.000	7.000	2
20	TIMBER 4X2	PCS	7	5.000	35.000	9
21	PVC PIPE 2"	M	3	5.000	15.000	4
22	TRANSPORT HARD WARE MATERIALS	TRIPS	1	79.500	79.500	21
23	JERRYCAN WITH LOGO	NO	1	15.000	15.000	4
24	LABOUR	ITEM	1	400.000	400.000	108
25	IRON BAR	NO	1	27.000	27.000	7
26	WATER	JERRYCANS	17	500	8.500	2
27	STIRR UPS 8MM	PC	1	20.000	20.000	5
28	DOOR	NO	1	250.000	250.000	68
29	Rubber washer	Pkt	1	6.500	6.500	2
30	NAILS	KGS(4")	1	5.000	5.000	1
31	**BONDEX**	TIN	1	10000	10.000	3
32	HOOK IRON	M	6	1000	6.000	2
33	ASH BOX	ITEM	1	10000	10.000	3
34	WATERING CAN WITH LOGO	PCS	1	15000	15.000	4
	TOTAL				2.894.500	782

6.2 Test kits for water quality

Table 5 shows the prices for the two water test kits, originally given in dollars and converted to euros.

Table 5: *Price calculation for water test kits.*

Test kit	Quantity	Price ($)	Price (€)
ITS Water quality test kit	1	29.99	28.50
mWater Test Kit (presence/absence	20	200	190.09

E.coli)			
Total		229.99	218.59

Chapter 7. Planning

The entire period of stay will be from the 7th July to the 25th August. The school year ends on the 13th August which leaves us with enough time to finish up work on site.

When	**Tasks**
7th of July	Arrival in Uganda
Week 1	● Meeting the local partners and community ● Laying cement for ecosan base ● Design map to describe community water supply ● Create blueprint of school in GIS
Week 2	● Starting agricultural fieldwork ● Create blueprint of school in GIS ● Set up a team for the water safety plan
Week 3	● Building lower ecosan compartments and pour second layer of cement ● Organising social workshops 1
Week 4	● Organising social workshops 2 ● Implement water safety plan
Week 5	● Continue field work ● Feedback moment of workshops and follow-up
Week 6	● Continue field work ● Work together with teachers to prepare plans for the future
13th of August	Closure of the school for summer holiday

Chapter 8. References

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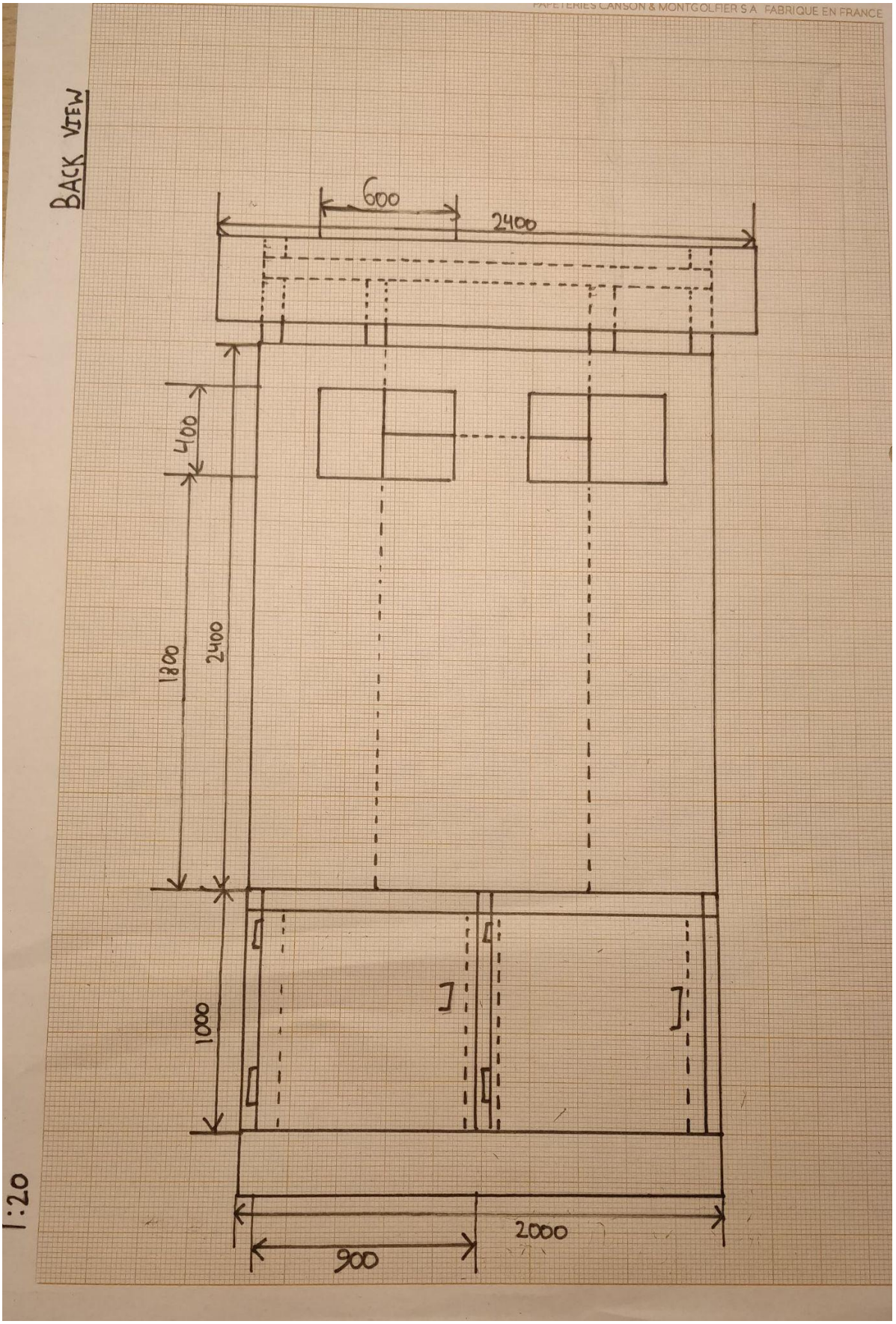
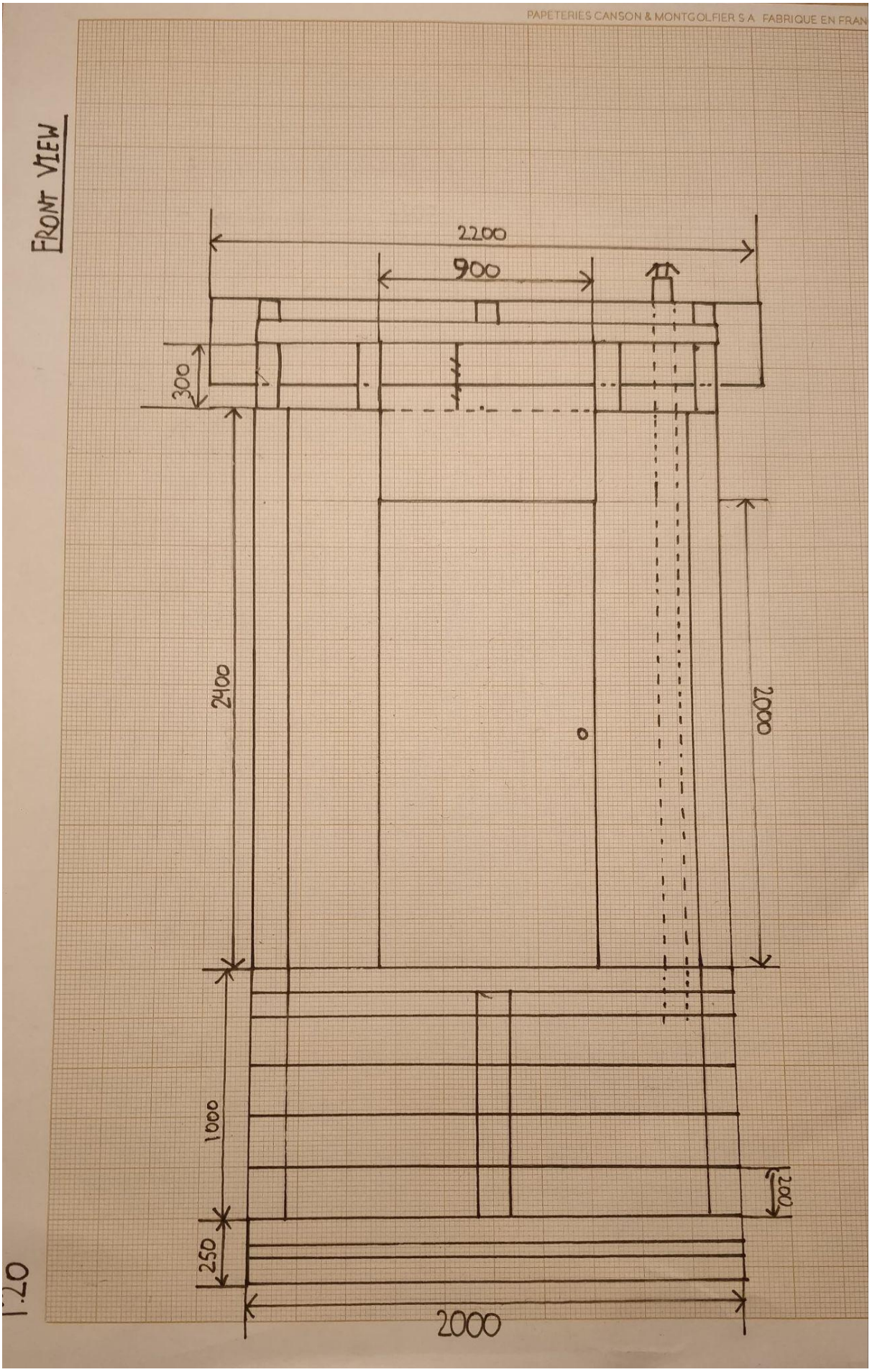
WHO (2022). Guidelines for drinking-water quality: fourth edition incorporating the first and second addenda, Geneva: World health Organization: Vol. 33, Issue 33).

Annex I – ECOSAN latrine material list

BOQs for one unit.xlsx

Annex II – ECOSAN latrine design sketches




PAPETERIES CANSON & MONTGOLFIER S.A. FABRIQUE EN FRAN
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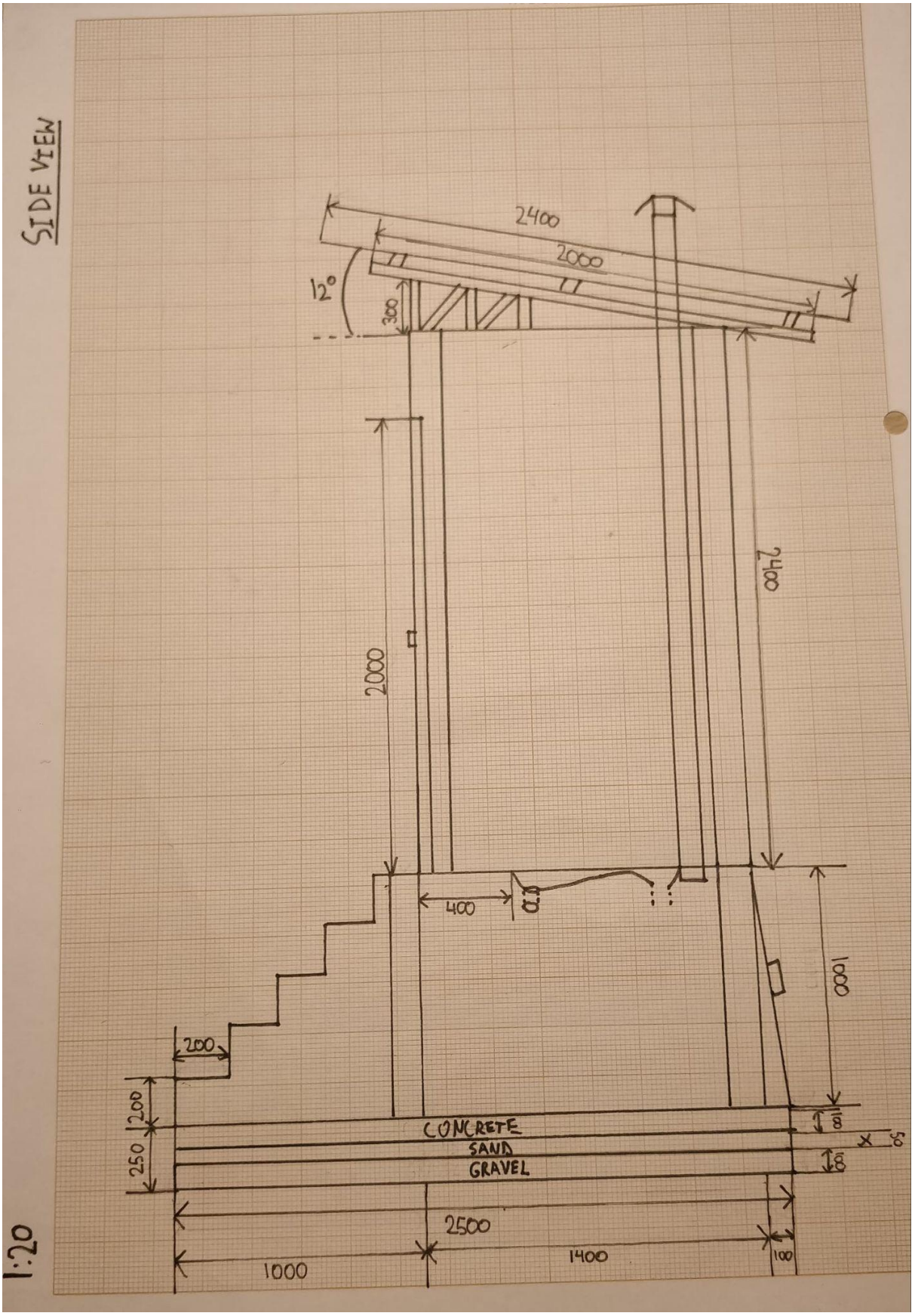
1:20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2000
12°
300
2400
2000
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200
200
250
CONCRETE
SAND
GRAVEL
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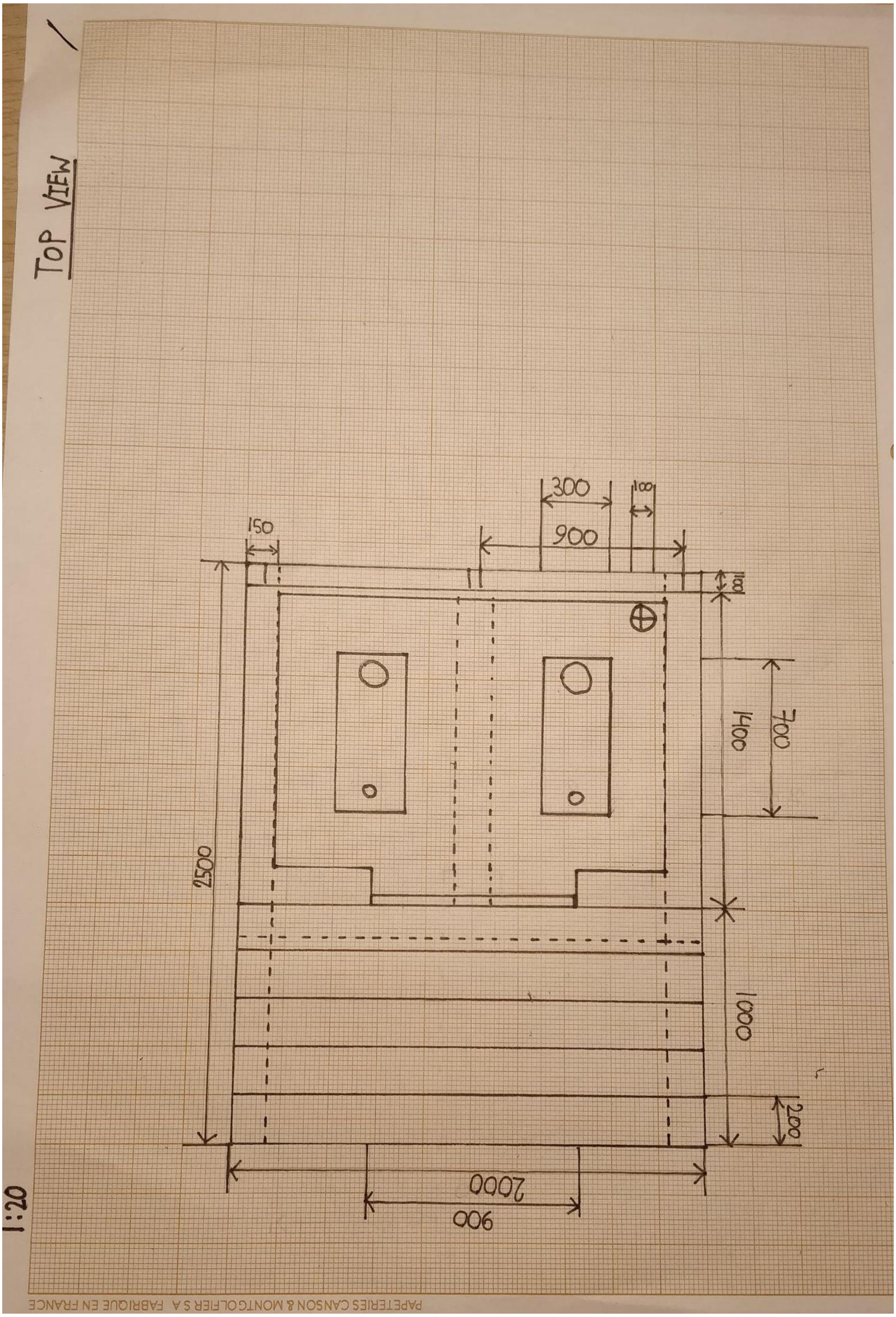
100
2500
1000
1400
100
1:20


TOP VIEW
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100
900
100
2500
1400
700
1000
200
2000
900
PAPETERIES CANSON & MONTGOLFIER S.A. FABRIQUE EN FRANCE

Annex III – Sanitary inspection forms

Sanitary Inspection Form: Borehole with Hand Pump

Part 1. General information

a. Location: .....

b. Village/Town: .....

c. People served: .....

d. Water sample taken? …….

Sample ID …….

e. Date of visit: .....

Part 2. Risk assessment

Circle the most appropriate answer. A 'Yes' answer means that there is a potential risk and a 'No' answer that there is no or very low risk. See explanation on the following page.

Question	**Observation**
1. Is there a latrine within 10 m of the borehole?	Y/N
2. Is there a latrine or other source of fecal contamination uphill of the borehole?	Y/N
3. Is there any source of other contamination within 10 m of the borehole (e.g., animals, agriculture, roads, industry, etc.)?	Y/N
4. Is the drainage absent or faulty allowing water to pool within 2 m of the borehole?	Y/N
5. Is the drainage channel absent, cracked, broken or in need of cleaning?	Y/N

6. Is the wall or fence around the pump inadequate?	Y/N
7. Is the well apron less than 2 m in diameter?	Y/N
8. Does spilt water collect in the apron area?	Y/N
9. Is the well apron or pump cover cracked or damaged?	Y/N
10. Is the hand pump loose at the point of attachment? For rope-washer pumps, is the pump cover missing?	Y/N

Risk of contamination (add the number of 'Yes' answers): ……/10

Part 3. Results and comments

a. Risk of contamination (check the appropriate box):

9-10 = Very high	6-8 = High	3-5 = Medium	0-2 = Low

b. The following risks were observed:

Part 4. Name and signature of inspectors

Explanatory Notes: Borehole with Hand Pump

1. *Is there a latrine within 10 m of the borehole?* Latrines close to groundwater supplies may affect water quality (e.g., by infiltration). You may need to visually check structures to see if they are latrines in addition to asking household members.

2. *Is there a latrine or other source of faecal contamination uphill of the borehole?* Contamination on higher ground poses a risk, especially in the wet season, as faeces (and other contaminants) may flow into the water source. The risk is increased if no surface water diversion is present. Groundwater may also flow towards the borehole from the direction of the latrine.

3. *Is there any source of other contamination within 10 m of the borehole (e.g., animals, agriculture, roads, industry, etc.)?* Animal or human faeces close to the borehole are a serious risk to water quality, especially when water diversion ditches are not present. Open disposal of other waste (e.g., household, agricultural) is also a risk to water quality.

4. *Is the drainage absent or faulty allowing water to pool within 2 m of the borehole?* If pools of water collect around the borehole they may provide a way for contaminants to enter the source.

5. *Is the drainage channel absent, cracked, broken or in need of cleaning?* Poor construction or maintenance of the drainage channel, leading to cracks or breaks, is a high risk to water quality, especially when combined with water spillage and poor sanitary conditions.

6. *Is the wall or fence around the pump inadequate?* If there is no fence or the fence is damaged, then animals can access the borehole and may damage the structure as well as contaminate the area with faeces. You will need to check the fencing at the site as well as check whether animals are routinely in the area (sometimes animals are kept in the fenced area for security).

7. *Is the well apron less than 2 m in diameter?* The apron (also known as the platform or slab) is built to prevent backflow of water into the borehole. To do this adequately the apron needs to be at least 2 m in diameter.

8. *Does spilt water collect in the apron area?* If water does not drain away from the apron area, then water (possibly contaminated) could backflow into the water source.

9. *Is the well apron or pump cover cracked or damaged?* Cracks, especially deep ones, in the apron or pump cover may allow backflow into the water source.

10. *Is the hand pump loose at the point of attachment?* For rope-washer pumps, is the pump cover missing? A loose hand pump or missing pump cover may allow backflow of contaminated water into the water source.

Sanitary Inspection Form adapted from:

World Health Organization (2012). Rapid Assessment of Drinking-Water Quality: A Handbook for Implementation. WHO, Geneva, Switzerland. Available at: www.who.int/water_sanitation_health/publications/2012/rapid_assessment/en/index.html

World Health Organization (2005). Water Safety Plans: Managing Drinking-Water Quality from Catchment to Consumer. WHO, Geneva Switzerland. Available at: www.who.int/water_sanitation_health/dwq/wsp0506/en/index.html

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Sanitary Inspection Form: Household Water Storage Container

Part 1. General information

a. Household:.....

b. Source of water: .....

c. Village/Town: .....

d. Water sample taken? ……. Sample ID …….

e. Date of visit: .....

Part 2. Risk assessment

Circle the most appropriate answer. A 'Yes' answer means that there is a potential risk and a 'No' answer that there is no or very low risk. See explanation on the following page.

Question	**Observation**
1. Is the container used for storing any other liquid or material?	Y/N
2. Is the container kept at ground level?	Y/N
3. Is the container lid or cover missing or not in place?	Y/N
4. Is the container cracked, leaking, or dirty?	Y/N
5. Is the area around the container dirty?	Y/N
6. Do animals have access to the area around the container?	Y/N
7. Is the tap or utensil (e.g., cup, ladle) used to draw water from the container dirty?	Y/N

8. Is the water from the container also used for washing or bathing?	Y/N
9. Has there been a disruption in the water supply in the last 10 days?	Y/N
10. Does the stored water come from more than one source?	Y/N

Risk of contamination (add the number of 'Yes' answers): ……/10

Part 3. Results and comments

a. Risk of contamination (check the appropriate box):

9-10 = Very high	6-8 = High	3-5 = Medium	0-2 = Low

b. The following risks were observed:

Part 4. Name and signature of inspectors

Explanatory Notes: Household Water Storage Container

1. *Is the container used for storing any other liquid or material?* Other liquids or materials in contact with the container may be contaminated and be a risk to water quality. You will need to visually check the container for evidence of storing other liquids or materials, and also ask household members.

2. *Is the container kept at ground level?* Keeping the container on the ground is a risk to water quality, especially when sanitation and hygiene practices are poor in the home. You can visually check the location of the container.

3. *Is the container lid or cover missing or not in place*? Water stored in uncovered containers can be easily contaminated. You can visually check for the lid or cover, and also ask household members.

4. *Is the container cracked, leaking or dirty?* A damaged container may be a route for contaminants to get into the water. You will need to see if water is from leaking from the container or if it is only spilt water. A dirty container is also a risk to water quality.

5. *Is the area around the container dirty?* Feces, garbage, and other waste are a risk to the water quality.

6. *Do animals have access to the area around the container?* Animals can contaminate the area or the container with feces. You will need to check whether animals are routinely in the area by asking household members and by visually checking for signs of animals and feces.

7. *Is the tap or utensil (e.g., cup, ladle) used to draw water from the container dirty?* If the tap is dirty or, if there is no tap, then the utensil used to collect water may be dirty and contamination can be introduced to the container this way.

8. *Is the water from the container also used for washing or bathing?* Water may be contaminated (e.g., by dirty hands) during collection for washing or bathing.

9. *Has there been a disruption in the water supply in the last 10 days*? During disruptions the distribution pipes become empty and pressure differences may lead to water (and silt) from the soil entering the pipes. The soil may be contaminated and is a risk to water quality. In addition, stored water may be collected from other sources, which may be "unimproved". You will need to ask household members about disruptions (record the frequency and duration if this is possible).

10. *Does the stored water come from more than one source?* Different water sources may have different qualities and may not all be "improved" or "safe". This may be a seasonal occurrence, affected by factors such as availability of sources or the length of queues at water points. You will need to ask household members about their use of single or different sources of water (in different seasons or during disruptions).

Sanitary Inspection Form adapted from:

World Health Organization (2012). Rapid Assessment of Drinking-Water Quality: A Handbook for Implementation. WHO, Geneva, Switzerland. Available at: www.who.int/water_sanitation_health/publications/2012/rapid_assessment/en/index.html

World Health Organization (2005). Water Safety Plans: Managing Drinking-Water Quality from Catchment to Consumer. WHO, Geneva Switzerland. Available at: www.who.int/water_sanitation_health/dwq/wsp0506/en/index.html

World Health Organization (1997). Guidelines for Drinking Water Quality, Second Edition, Volume 3, Surveillance and Control of Community Supplies. WHO, Geneva, Switzerland. Available at: www.who.int/water_sanitation_health/dwq/gdwq2v1/en/index2.html

Sanitary Inspection Form: Rainwater Harvesting Tank

Part 1. General information:

a. Tank location: .....

b. Village/Town: .....

c. People served: .....

d. Water sample taken? ……. Sample ID …….

e. Date of visit: .....

Part 2. Risk assessment

Circle the most appropriate answer. A 'Yes' answer means that there is a potential risk and a 'No' answer that there is no or very low risk. See explanation on the following page.

Question	**Observation**
1. Are there visible signs of contamination on the roof (e.g., feces, dirt, leaves)?	Y/N
2. Is the gutter system that collects rainwater dirty or blocked?	Y/N
3. Are there any problems with the filter box or first flush system at the tank inlet?	Y/N
4. Is there any other point of entry to the tank that is not properly covered?	Y/N
5. Is the top or wall of the tank cracked or damaged?	Y/N
6. Is the tap leaking or broken?	Y/N
7. Is the concrete floor under the tap missing, broken or dirty?	Y/N

8. Is the water collection area inadequately drained?	Y/N
9. Is there any source of contamination around the tank or water collection area?	Y/N
10. Is a bucket in use and left in a place where it may become contaminated?	Y/N

Risk of contamination (add the number of 'Yes' answers): ……/10

Part 3. Results and comments

a. Risk of contamination (check appropriate box):

9-10 = Very high	6-8 = High	3-5 = Medium	0-2 = Low

b. The following risks were observed:

Part 4. Name and signature of inspectors

Explanatory Notes: Rainwater Harvesting Tank

1. *Are there visible signs of contamination on the roof (e.g. feces, dirt, leaves)?* Water quality is at risk if the roof is dirty or contaminated.

2. *Is the gutter system that collects rainwater dirty or blocked?* Dirty gutters can contaminate the rainwater or introduce dirt into the tank in the same way the roof can.

3. *Are there any problems with the filter box or first flush system at the tank inlet?* Rainwater harvesting tanks should have a way to divert the first water collected during a rainstorm. The first flow (especially at the end of the dry season) may contain vegetation, dirt, and animal feces washed from the roof, which are a risk to water quality.

4. *Is there any other point of entry to the tank that is not properly covered?* Open rainwater collection tanks collect dust and dirt from the air, which is a possible risk to water quality. They can also be mosquito breeding sites, and the mosquitoes may spread dengue fever and malaria, which is a health risk (though not a water quality risk).

5. *Is the top or wall of the tank cracked or damaged?* Deep cracks can allow contaminants to reach the rainwater stored in the tank.

6. *Is the tap leaking or broken?* A broken tap can become a pathway for contaminants. You will need to check that any water around the tap is from a leak rather than from being spilled.

7. *Is the concrete floor under the tap missing, broken or dirty?* Missing or broken drainage under the tap can lead to pools of water collecting which pose a risk.

8. *Is the water collection area inadequately drained?* If water does not drain away from the collection area, then water (possibly contaminated) could backflow into the water source or the soil can erode away and cause damage to the tank.

9. *Is there any source of contamination around the tank or water collection area?* Feces, garbage and other waste are a risk to the water quality.

10. *Is a bucket in use and left in a place where it may become contaminated?* Buckets, cups or other devices used to collect water need to be properly stored and kept clean so that safe drinking water does become contaminated.

Sanitary Inspection Form adapted from:

World Health Organization (2012). Rapid Assessment of Drinking-Water Quality: A Handbook for Implementation. WHO, Geneva, Switzerland. Available at: www.who.int/water_sanitation_health/publications/2012/rapid_assessment/en/index.html

World Health Organization (2005). Water Safety Plans: Managing Drinking-Water Quality from Catchment to Consumer. WHO, Geneva Switzerland. Available at: www.who.int/water_sanitation_health/dwq/wsp0506/en/index.html

World Health Organization (1997). Guidelines for Drinking Water Quality, Second Edition, Volume 3, Surveillance and Control of Community Supplies. WHO, Geneva, Switzerland. Available at: www.who.int/water_sanitation_health/dwq/gdwq2v1/en/index2.html

Sanitary inspection form: Dry toilet with a double pit

Part 1. General information

a. Tank location: .....

b. Village/Town: .....

c. People served: .....

d. Water sample taken? ……. Sample ID …….

e. Date of visit: .....

Part 2. Risk assessment

Circle the most appropriate answer. A 'Yes' answer means that there is a potential risk and a 'No' answer that there is no or very low risk. See explanation on the following page.

Question	Observation
1. Is the toilet superstructure absent, incomplete, damaged and/or does not provide privacy and security to the intended users?	Y/N
2. Is the toilet dirty with visible excreta on surfaces?	Y/N
3. Is anal cleansing material (e.g. toilet paper, leaves, water) absent or inappropriate for the technology?	Y/N
4. Are handwashing facilities absent inside or next to the toilet?	Y/N
5. Can flies and other insects easily enter and leave the pit/container/tank?	Y/N
6. Are there excreta overflowing from the squat hole, pan or pedestal; and/or are there ponds of effluent visible on the ground outside the toilet?	Y/N

7. Is the pit poorly maintained such that the cover slab is cracked or damaged, and/or the side walls are not stable?	Y/N
8. Is the toilet and pit located within 15 m* of a well or hand pump that is used for drinking?	Y/N
9. Is the pit/septic tank located on higher ground from the drinking water source?	Y/N
10. Is the container/pit/septic tank not accessible for emptying?	Y/N
11. Is the pit/container/septic tank almost full?	Y/N

Risk of contamination (add the number of 'Yes' answers): ……/11

Part 3. Results and comments

a. Risk of contamination (check the appropriate box):

10-11 = Very high	7-9 = High	3-6 = Medium	0-2 = Low

b. The following risks were observed:

Part 4. Name and signature of inspectors

Explanatory Notes: Dry toilet with a double pit

1. *Is the toilet superstructure absent, incomplete, damaged and/or does not provide privacy and security to the intended users?* Ingress of rainwater may cause the pit to fill up and overflow, while animals, rodents, insects etc. entering the toilet and/or pit can damage the facility and carry excreta to the community. A door lockable from the inside and a working light will help provide privacy and security to the user.

2. *Is the toilet dirty with visible excreta on surfaces?* If the toilet is not kept clean, the users may be exposed to excreta when using the toilet and/or this may discourage toilet use.

3. *Is anal cleansing material (e.g. toilet paper, leaves, water) absent or inappropriate for the technology?* If culturally appropriate facilities are not provided, users could be exposed to excreta. If anal cleansing material is not appropriate for the technology used, this may cause blockages or damages to the system.

4. *Are handwashing facilities absent inside or next to the toilet?* Handwashing facilities consist of the presence of water and soap. They may be fixed or mobile and include a sink with tap water, buckets with taps, tippy-taps, and jugs or basins designated for handwashing. Soap includes bar soap, liquid soap, powder detergent, and soapy water.

5. *Can flies and other insects easily enter and leave the pit/container/tank?* Flies can carry disease from the excreta in the pit/container/tank to the local community.

6. *Are there excreta overflowing from the squat hole, pan or pedestal; and/or are there ponds of effluent visible on the ground outside the toilet?* If there are, users may be exposed to excreta.

7. *Is the pit poorly maintained such that the cover slab is cracked or damaged, and/or the side walls are not stable?* If the walls are not stable and/or the slab cracked, there may be a risk that the pit will collapse putting users at risk (e.g. falling into pit).

8. *Is the toilet and pit located within 15 m* of a well or hand pump that is used for drinking?* Toilets close to groundwater supplies may affect water quality (e.g. by infiltration) and pose health risks to those relying on this water source for drinking.

9. *Is the pit/septic tank located on higher ground from the drinking water source?* Pollution on higher ground poses a risk, especially in the wet season, as faecal material may flow towards the water source below.

10. *Is the container/pit/septic tank not accessible for emptying?* Workers need to be able to access the pit with tools and emptying equipment to safely remove faecal sludge. There should be at least one removable access hatch/cover/lid over a hole large enough for hoses to be inserted for emptying the pit/septic tank.

11. *Is the pit/container/septic tank almost full?*

Sanitary Inspection Form adapted from:

World Health Organization (2012). Rapid Assessment of Drinking-Water Quality: A Handbook for Implementation. WHO, Geneva, Switzerland. Available at: www.who.int/water_sanitation_health/publications/2012/rapid_assessment/en/index.html.

World Health Organization (2005). Water Safety Plans: Dry toilet with double pit. WHO, Geneva Switzerland. Available at: https://www.who.int/docs/default-source/wash-documents/sanitation/sanitation-inspection-forms/sif-03---dry-toilet-with-a-double-pit.pdf

Annex IV – Instruction mWater Test Kit

mWater Test Kit

Instructions for the *E. coli* test

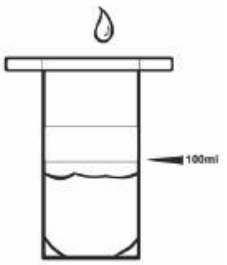
Record & map test results in the mWater Surveyor App (available in the Android of iOS app stores or visit surveyor.mWater.co

Important precautions:

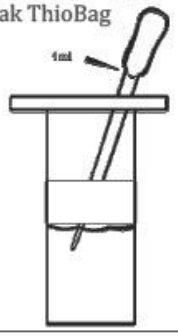
- The result of a test only reflects the quality of water of the sample that was tested on the day it was sampled. Water quality changes frequently and water quality monitoring should include regular testing and management of sanitary risks.
- Store the kit in the dark in a climate controlled room and always check the expiration date on the kit before use.
- This kit tests for *E.coli*, a type of bacteria caused by fecal contamination that is associated with an increased risk of diarrheal disease. There are hundreds of other possible water contaminants that could pose a health risk. Consult with local water authorities or laboratories to determine what additional risks might be present in your water supply.
- Use *aseptic technique*. This means: (i) Assume that your hands and any other surfaces may be contaminated with the target bacteria being detected. Use hand sanitizer before opening one of the sterile parts of the kit (pipettes, compact dry plates, WhirlPak bags, and Growth Medium); (ii) Never touch parts that will come into direct contact with the water sample; and (iii) Minimize the time that the water sample or other sterile parts are exposed to the air.
- Disposeofusedtestssafely.Afterreadingresults,place1AquatabintotheWhirlPakbagtodisinfect.After30minutes,pourthecontents into a toilet or drain. Ideally, test materials should be disposed of as medical waste at local hospitals or labs. Where this is not possible, dispose by incineration or in trash receptacles away from water sources that are not accessible to children, trash pickers, or animals.

Test procedure:

1 Remove tear off strip from top of WhirlPak ThioBag without touching inside and fill to 100 ml.

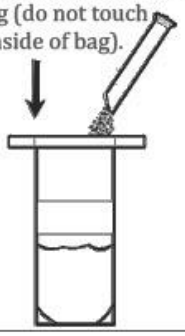


2 Open a fresh pipette and remove 1ml of sample from WhirlPak ThioBag

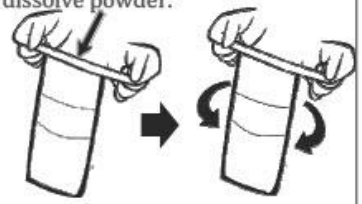


3 Lay a fresh Compact Dry Plate on a flat surface, carefully remove the lid without touching the inside, and squeeze the 1 ml sample onto the center of the plate.

4 Tear open a Growth Medium packet and pour powder into the WhirlPak bag (do not touch powder or inside of bag).



5 Seal the WhirlPak bag by holding the white tabs at the edges and flipping the bag over 3 times. Fold over the tabs or twist them together. Shake gently to dissolve powder.

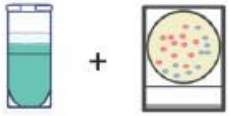
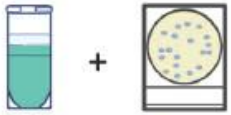
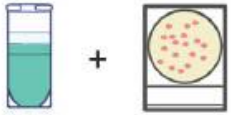
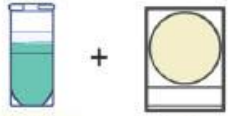
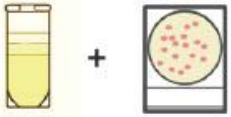
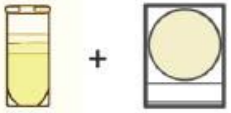
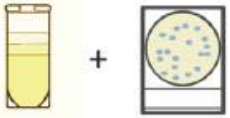
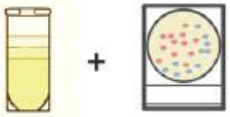


6 Store the Compact Dry Plates and WhirlPak bags for 24-48 hours in a warm and dark location where the temperature is between 25 and 44 Celsius at all times.

24h-48h

25°c - 44°c

Turn over for test results interpretation →→

WhirlPak	Compact Dry Plate Blue	Compact Dry Plate Red	Image	Result
Blue/Green	✓	✓		
Blue/Green	✓	X		
Blue/Green	X	✓		
Blue/Green	X	X		
Yellow	X	✓		
Yellow	X	X		
Yellow	✓	X		Re-test
Yellow	✓	✓		Re-test

mWater Test Kit

Result Interpretation

High risk

Medium risk

(WHO Standard for recreation/bathing

Low risk

(WHO Standard for safe drinking water.)

Compact Dry Plate

Blue Colonies = *E.coli*

Red Colonies = Total Coliform