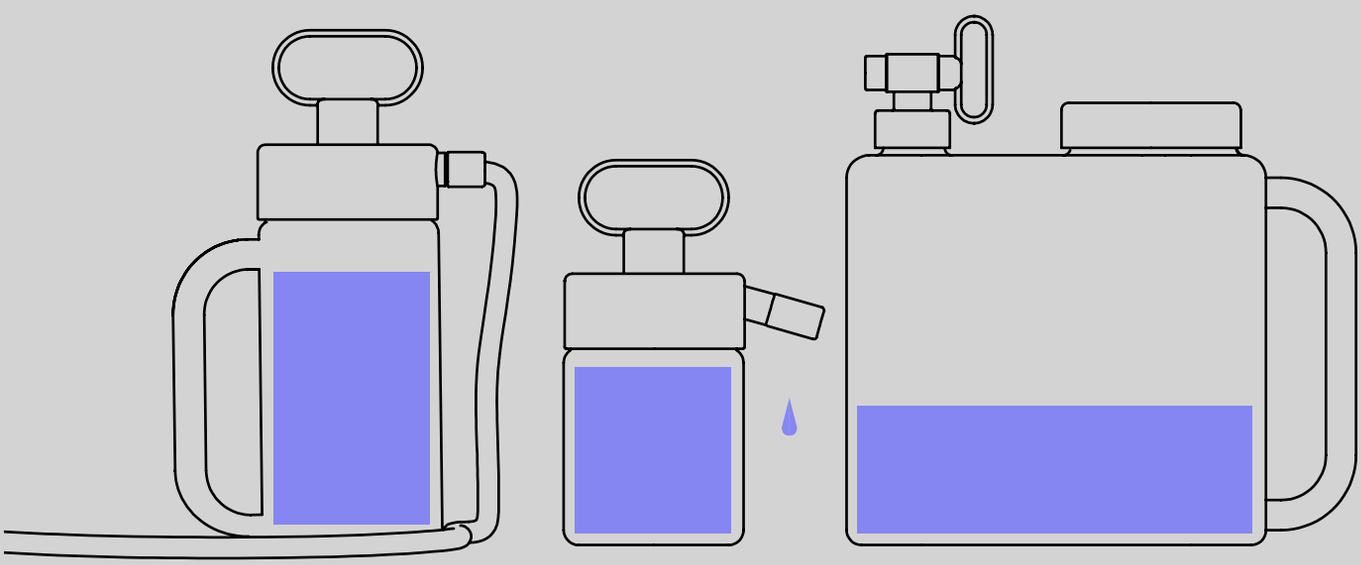
SILO

72 hour Off the grid water use



Stina Henriksson - Degree Project for Master of fine Arts in Design - 2018 - School of Industrial Design
Lund University - Supervisor Anna Persson - Examiner Per Liljeqvist

SILO

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Examiner Per Liljeqvist
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2018
ISRN: LUT-DVIDE/ EX--18/50404-SE

LUNDS
UNIVERSITET

ABSTRACT

This project focuses on how a household in Malmö can manage a crisis situation with no electricity, water, heat and communication for 72 hours. This is due to the recommendation that we can take care of ourselves for 3 days in case of a crisis. This spring residents of Cape Town have been living with water restrictions of 50 litres per person per day. This can be compared to the 160 litres per person and day we use as an average in Sweden. The point when water is completely out is called ”Day Zero”. This was expected to happen in April this year but has been delayed to 2019. The delay is mainly because of water restrictions to less than one sixth of the average water consumption.

If events like this should occur here in Sweden the municipalities expect that people take a big personal responsibility, something that most people may not be aware of. In a recent survey 88% of the respondents estimated that they were poorly prepared for a crisis. “Prepping” was however one of the new words in the Swedish Language Councils (Språkrådet) dictionary 2016 and has been an increasingly discussed topic in books and media during the last few years.

This project is about solving Off the grid challenges in a city household to make the situation as comfortable as possible. The project aims to investigate how it can be made easier to be prepared for such an event, as well as raising awareness of how vulnerable our dependency on the functioning grid is. This is done through development of a set of containers for collecting and using water. These containers optimize the water usage and saves up to about 80% in cleaning and hygiene situations compared to regular use. It can be used during a power shortage or when you simply can’t get water from the tap and need to save your resources.

Detta projekt fokuserar på hur ett hushåll i Malmö kan hantera en krissituation utan elektricitet, vatten och värme i 72 timmar. Rekommendationen från myndigheterna är att vi kan ta hand om oss själva i 3 dagar vid en kris. Denna vår har invånarna i Kapstaden i Sydafrika levt med vattenbegränsningar på 50 liter per person och dag. Detta kan jämföras med de 160 liter per person och dag vilket är den mängd vi använder i genomsnitt i Sverige. Tidpunkten för det totala vattenstoppet, när vattnet är slut, kallas ”Day Zero”. Detta förväntades hända i apri i år men har skjutits fram till 2019. Förseningen är främst på grund av att myndigheterna infört vattenransonering på mindre än en sjättedel av den genomsnittliga vattenförbrukningen.

Om det skulle hända här i Sverige förväntar sig kommunerna att människor tar ett stort personligt ansvar, något som de flesta kanske inte är medvetna om. I en ny undersökning uppskattade 88% av respondenterna att de var dåligt förberedda för en kris. ”Prepping” var emellertid en av de nya orden i Svenska rådetsrådslistan 2016, och har varit ett alltmer diskuterat ämne i böcker och media under de senaste åren.

Detta projekt handlar om utmaningen att göra situationen så bekväm som möjligt för ett stadshushåll . Vidare syftar projektet till att undersöka hur det kan bli lättare att vara förberedd för en samhällskris, samt att öka medvetenheten om hur sårbart vårt beroende av det fungerande nätet, *the grid*, är. Detta har gjorts genom av en serie behållare för insamlande, förvaring och användning av vatten. Dessa behållare optimerar vattenanvändningen och sparar upp till cirka 80% vid rengörings och hygien jämfört med vanlig användning direkt från en kran. Den kan användas under strömavbrott eller när vattnet helt enkelt inte kommer från kranen och du behöver spara på de dyrbara dropparna.

TABLE OF CONTENT

What do you do if the power goes out for a longer period and the water stops running from the tap? How do you cook your food and keep warm?

This masters project is a collaboration with IKEA starting from the topic *Off the grid.* It connects to the IKEA idea about democratic design, to give the many people access to high value products that makes everyday life better. After looking into the different areas of the topic *Off the grid* household crisis preparedness was what interested me the most.

Changes can occur in society that we have no control over. It can be related to climate change and extreme weather situations that will be more frequent. According to a report from WMO disasters are occurring five times as often today as in the 1970`s. In spring 2018 the residents of Cape Town have had water restrictions of less than one sixth of the average consumption. *"Day Zero"* was due this April, but the restrictions delayed it. We do understand that tomorrow might not look like today. Even if there is preparation for these things in society it is a paradox that we as individuals become less able to handle crises. This is called the vulnerability paradox. We have a convenient store close by to buy food for tonight's dinner. When we come home we put the food in the fridge, get information from the world from our cell phone, drinking water from the tap. A big power shortage will totally shut down most workplaces and functions.

Now MSB, Myndigheten för sammhällsskydd och beredskap, sends out the brochure Om krisen eller kriget kommer to all Swedish households for the first time in 57 years, recommending being able to handle 72 hours off the grid. This to free ability for the authorities to help those who cannot take care of themselves because of for example handicaps or poor health. However, the evaluation of one of their campaign 72 timmar – kan du klara dig tre dygn? was that even though the information was noticed to a high degree by the public, they did not seem to get more prone to prepare for unforeseen crises than before.

Survivalism or Prepping is originally an American movement of people who are preparing for possible crises. This is often associated with storing weapons and large amounts of food and water. Some even build bunkers to save them from the apocalypse. It can therefore be thought of as dystopic or paranoid to prep for a crisis. We feel quite safe, and that is of course a good thing. But the truth is that the authorities work is based on the Principle of responsibility. This means that if you do not require help with food, communication and water in your everyday life you cannot demand this help in a crisis. Although the authorities of course will try to help as many as possible, it is most important though to first care for those unable to do so themselves.

I will in my research focus on examining how a household in Malmö (one or several people) can manage a crisis situation with no electricity from four critical home situations; lack of or limited water, heat, food and/or food preparation and communication. The reason for this is that these things are our most vital needs in a crisis situation according to MSB.

I want to make it easier to have preparation for a crisis with a longer shortage of power, heat and water.

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https://www.msb.se/RibData/Filer/pdf/28206.pdf
Geijer 2017

How To Make a Gas Mask from a Two-Liter Bottle

INITIAL BRIEF IKEA - DEMOCRATIC DESIGN CHALLENGE: OFF THE GRID

”IKEA would like to explore the topic OFF THE GRID.

OFF THE GRID connects to the IKEA idea about democratising great things - to give the many people access to high value products that makes everyday life better. There are 1,4 billion people out there that don’t have access to electricity. And for housing, water and plumbing the numbers are even bigger. And
there is also a growing number of people that want to be independent - they want to get off the grid and become self sufficient, when it comes to both energy and communications.

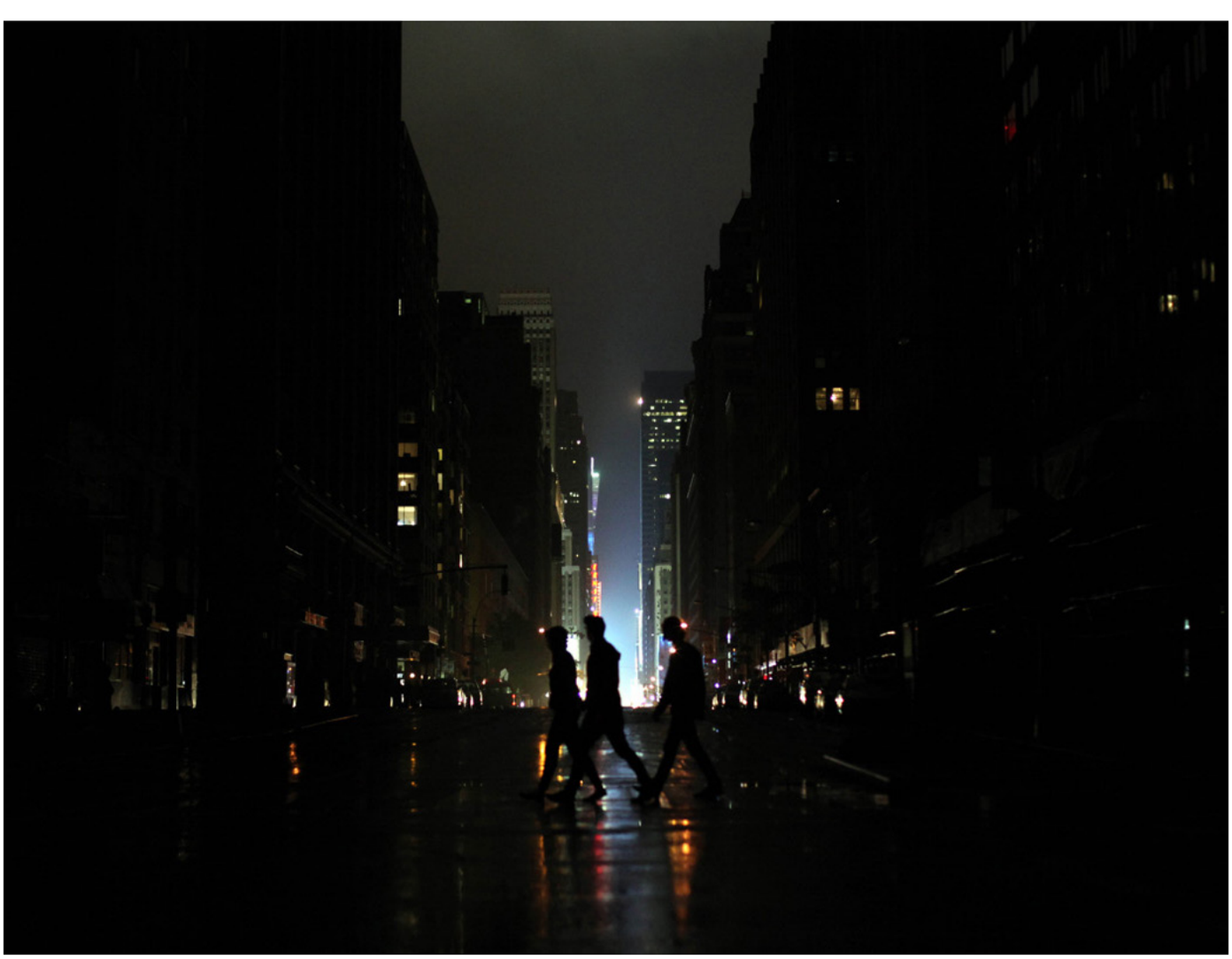
OFF THE GRID as a theme is also deeply connected to our ambitions to be people and planet positive. When it comes to energy, off the grid solutions are often sustainable (and free): solar, wind, kinetic. It’s just that the tools you need to harvest the energy are often too expensive.

Finally, OFF THE GRID as a theme is a about curiosity. We see OFF THE GRID as an approach popping up in many places in
different ways - it will probably be an important thing going forward, in a society that will be more automated, more monitored and more uniform.
The idea is to develop a collection of OFF THE GRID solutions to be launched during 2020. It could be about OFF THE GRID solutions for energy, for internet connection and other means of communication, for housing, for education, for cooking, water, plumbing. Anything that is independent from existing systems, but where you can connect within your community to share hardware, ideas and good practices to create both individual and common value.

Our three main focuses are: energy, water and communication.”

MY BRIEF

Design one or several solutions to help a Malmö apartment household prepare for and manage a 72-hour power shortage with no water, heat and electricity. The final result should be a solution for this urban home environment which can provide a possibility to take care of one self for at least 72 hours without help from the authorities.



METHODS

A literature review will be executed in the fields of Off the grid and Crisis preparedness. The search will be for previous research in the field like theoretical material from papers and reference lists within the area, and recommendations from experts. This will be done to find out what has been done in the field and to get inspiration for what might be possible good solutions for the future.

Furthermore, I will do semi structured interviews. I will talk to Herman Geijer, writer, about his ABF course in Surviving a Zombie apocalypse, a topic he also wrote two books about. I will also talk to Lina Ringberg, Krisberedskapssamordnare (crisis preparedness coordinator) at Malmö Stad about crisis situations in the city of Malmö. I will have prepared questions of the open kind, but with the possibility of narrower questions of a more specific nature as the interview progresses. I will talk to Renato who lived with lack of water and electricity in Bosnia during the war. I will also find out how a household who was without power during the storm Gudrun in the south of Sweden managed the situation.

I will for 72 hours conduct an experiment in my home together with my 4 family members where we will turn off water, heat and electricity to find out what that can be like and what problems can occur.

Evaluation is done by fitting the ideas to the brief and keywords formulated as a core during the project.

The project will focus on being prepared for 72 hours with no electricity and water in an urban city household. I will not focus on the reason for these kinds of crisis, only go through possible or most likely scenarios, since all events will be unique. Initially the research will have a broad focus on crisis preparedness and from this the research will narrow its focus and aim for a specific problem within this field.

The decision is also made to make a physical object rather than a campaign or other digital material. This is due to personal interest and to deepen my knowledge and skills in this area.

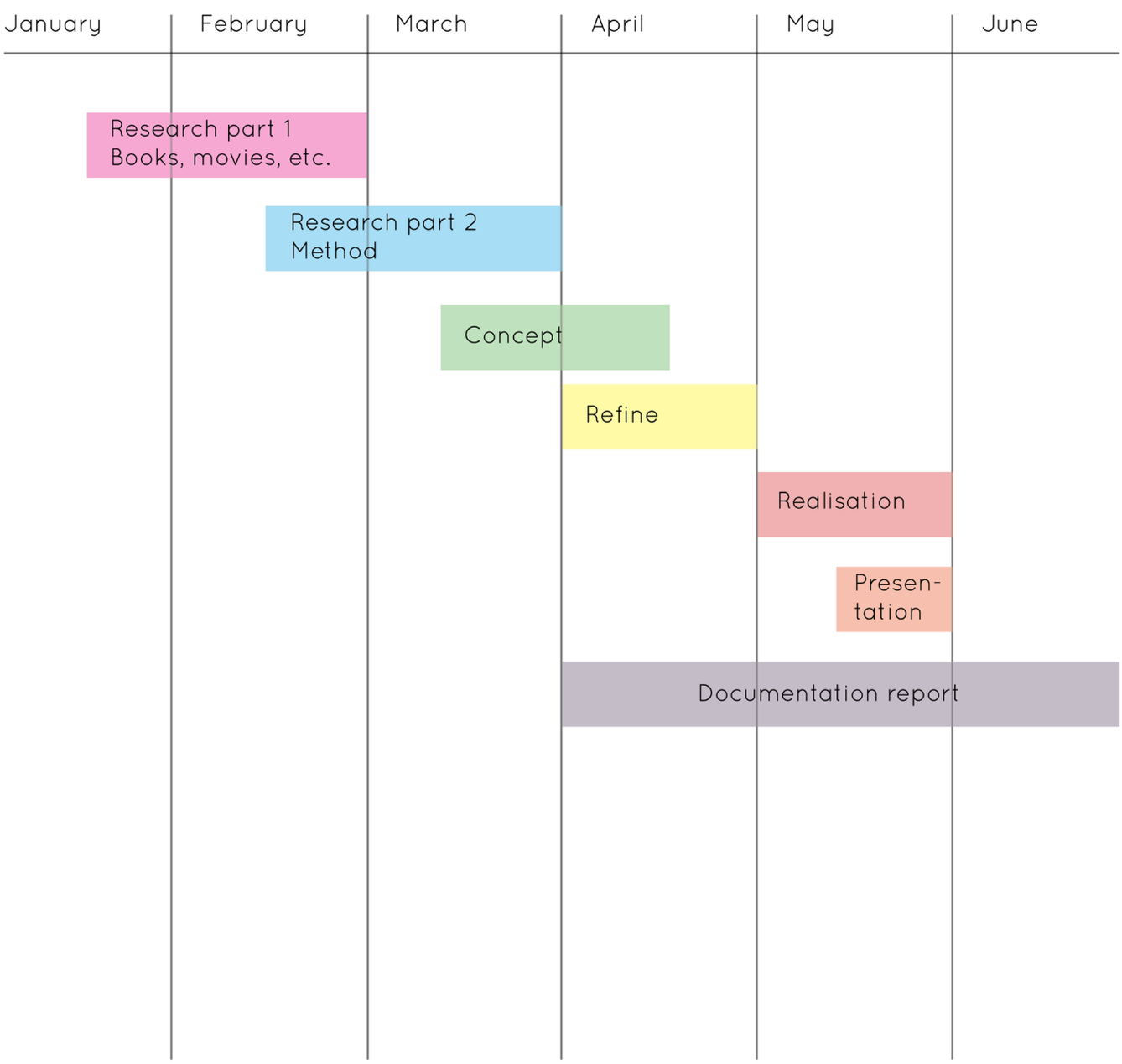
Personal

I would like to make the project reflect on me as a designer and that it will show a broad range of the skills I have developed during my five years of study. It is also to deepen these knowledges, for example my experience in the workshop and model making. The project also aim to improve skills in research methods and the design process as a whole.

Project specific

The purpose of this research study is to investigate how a household in Malmö can manage a crisis situation with no electricity from four critical home situations; lack of or limited water, heat, food and/or food preparation and communication. The goal is make it easier and more natural to have preparation for these kinds of crises, much like it has become for us to wear a safety belt or have a fire alarm in the ceiling.

TIMEPLAN


January
February
March
April
May
June
Research part 1
Books, movies, etc.
Research part 2
Method
Concept
Refine
Realisation
Presen-
tation
Documentation report

RESEARCH
PART 1: THEORETICAL

WATER

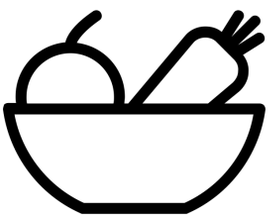
FOOD

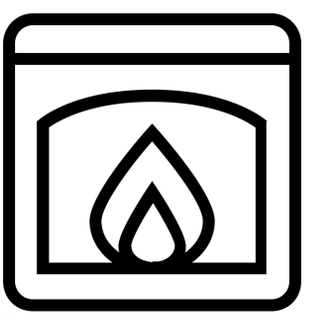
HEAT

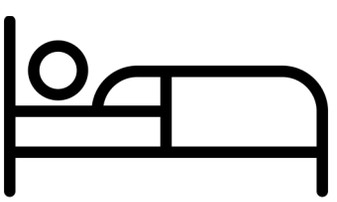
SLEEP

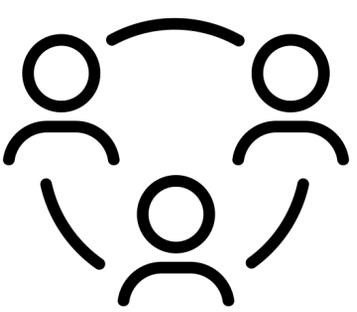
SAFETY

http://www.72timmar.se/vara-fem-grundbehov









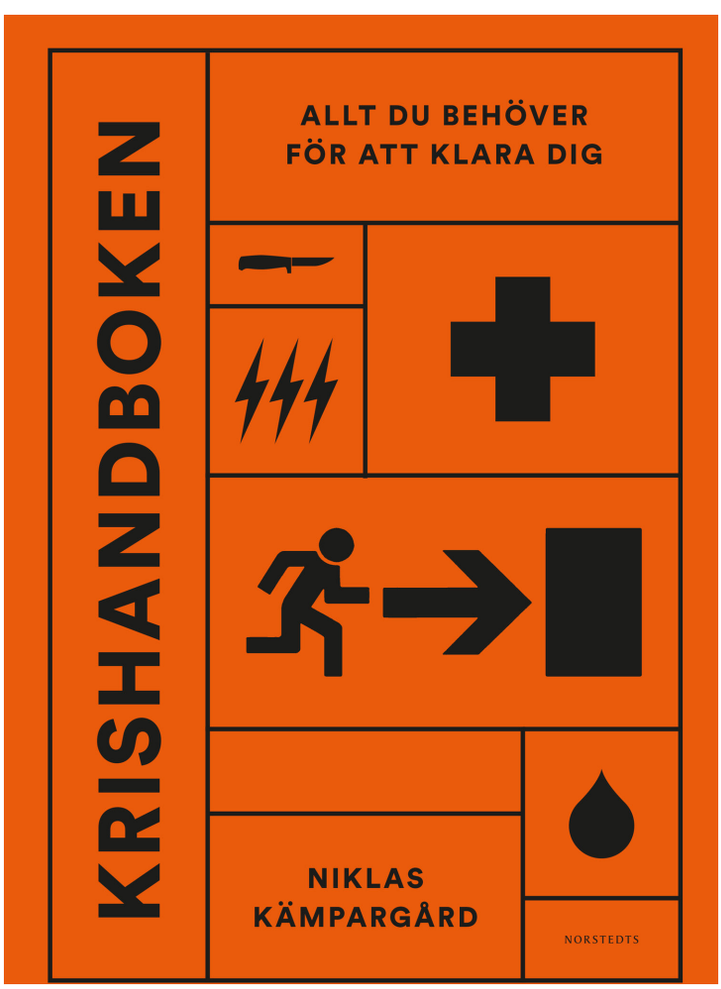
SURVIVAL
THE PREPPER CULTURE

The term Survivalist goes back to 1976. Survivalism is primarily an American movement of individuals or groups (called Survivalists or Preppers) who are preparing for possible local or international or disturbances in socially or politically. Compared to Preppers Survivalists are often more focused on self-defence than just gathering the necessities for coping with a crisis in general. This often include weapons and stockpiling large amounts of food and water.

Some build survival retreats or even bunkers to save them from the apocalypse.

Prepping was one of the new words in the Swedish Language Councils (Språkrådet) dictionary 2016 and has been a more and more discussed topic in media during the last few years.

Wikipedia



Many books inspired by the prepper culture or lifestyle has poppes up during the last two years.


PREPPING
NORSTEDTS
ATT HOPPAS PÅ DET BÄSTA, MEN FÖRBEREDA SIG PÅ DET VÄRSTA
ANNA-MARIA STAWREBERG


DIN
SKOGSHANDBOK
EN ÖVERLEVNADSHANDBOK FÖR SURVIVALISTER OCH ANDRA SKOGSTOKIGA

Lately there has been much talk about heightened preparedness in media, the importance of civilian preparedness. Crisis preparedness means ability by education, practice and other actions, as well as the organization and structures that are created before, during and after a crisis to prevent, resist and deal with the situations.

How vulnerable is society?

How are individuals affected during a crisis? Former Director of Defense College Karlis Neretnieks, now General Major and attached to the Royal Swedish Academy of Sciences, said in an interview that food production and food supply are central to all preparedness work. If we do not have food, everything else is pointless. He believes that after a week of closed import, stores in Sweden would be without food. We are increasingly dependent on food imports and our own stocks are discontinued.Therese Frisell, expert at the Swedish Food and Drug Administration (Livsmedelsverket) agrees that the situation is serious On the first day of an eventual blockade, milk and fresh bread would end, day two we would be left without fresh produce in most shops; third day schools would have to serve leftovers. Day four and five, we would not be able to serve food at schools and hospitals and the fuel shortage would force us to leave the car at home.

Even a longer power outage affects us. In that event most things stop working in a modern society. Water, sewers, heat, light, stoves, ventilation and elevators stop working. Shortly after a power outage, water supply often works even without reserve power, so water for family needs can be stored immediately after the break.

What responsibility does the municipal residents have?

The municipalities expect that people take a big personal responsibility, The municipality's emergency preparedness focuses primarily on maintaining critical activities and take care of individuals subjects to social legislation. The majority of municipal residents can only expect support in terms of meeting points around the municipality where drinking water and heat huts can be provided. Emergency Planners responsibility is primarily to inform the public about risks and what preparedness one should have at home.

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http://www.civil.se/blog/2017/02/07/krisberedskap-ligger-i-tiden/
Norén A. 2015. Första hjälpen i civilt försvar – en kunskapssammanställning, FOI Memo 5551, Totalförsvarets forskningsinstitut, Stockholm.

A crisis is a serious event that differs from the normal and affects many people and disturb important social functions and requires urgent efforts. These events could be pandemics, IT accidents, natural disasters and terrorist attacks.

Nature events

Nature events refer to events that are primarily caused by natural forces, but human activity can affect the likelihood of their occurrence, like for example, greenhouse gas emissions which lead to climate change

Accidents

Major accidents include events caused by humans, but without antagonist intention, alternatively caused by technical faults, lack of maintenance or incorrect construction. The category can be divided into subdivisions; transport accidents, extensive fires, emissions of hazardous substances.

Interference in infrastructure

Technical infrastructure and supply systems are of crucial importance to ensure the functionality and continuity of socially important functions and society at large. The category includes disorders caused by man, however, without antagonistic intention or alternatively caused by technical faults, lack of maintenance or improper construction.

Antagonistic events

Examples of antagonistic events are cyber attacks, terrorism and extreme violence.

Epidemics and pandemics

Influenza pandemics have hit the world with irregular intervals since at least the 16th century. Researchers have identified at least twelve flu pandemics since then. Since it does not follow any pattern it is impossible to determine on the basis of historical experience when the next pandemic could break out. However, most researchers agree that it will come. A pandemic is defined as an outbreak of an infectious disease that rapidly and easily spreads among people across very large geographic areas. While an epidemic can rage in a single country, a pandemic, at least in its ultimate consequence, affects people all over the world.

A resilient Malmö

Malmö Citys RSA (Risk and Vulnerability Analysis) gives us a picture of the kinds of risks that the municipality in particular identifies. System failures such as interruptions in the supply of electricity, water etc are the risks that are mentioned the most. When it comes to weather-related events a class 3 storm is considered to be the most likely risk, the consequences being judged to be medium. Risk of an elevated sea level 300 cm above average water levels is judged to have the biggest consequences but has a low probability.

http://www.sakerhetspolitik.se/larare/Krisberedskap/Fakta-for-larare-Krisberedskap/
https://www.msb.se/RibData/Filer/pdf/25599.pdf
http://illvet.se/medicin/sjukdomar/hur-definieras-en-pandemi
http://malmo.se/download/18.1c002f7b12a6486c372800015822/Malmo_RSA_slutrapport_web.pdf
https://www.krisinformation.se/detta-kan-handa/extremt-vader-och-naturolyckor/storm
https://www.msb.se/RibData/Filer/pdf/28183.pdf

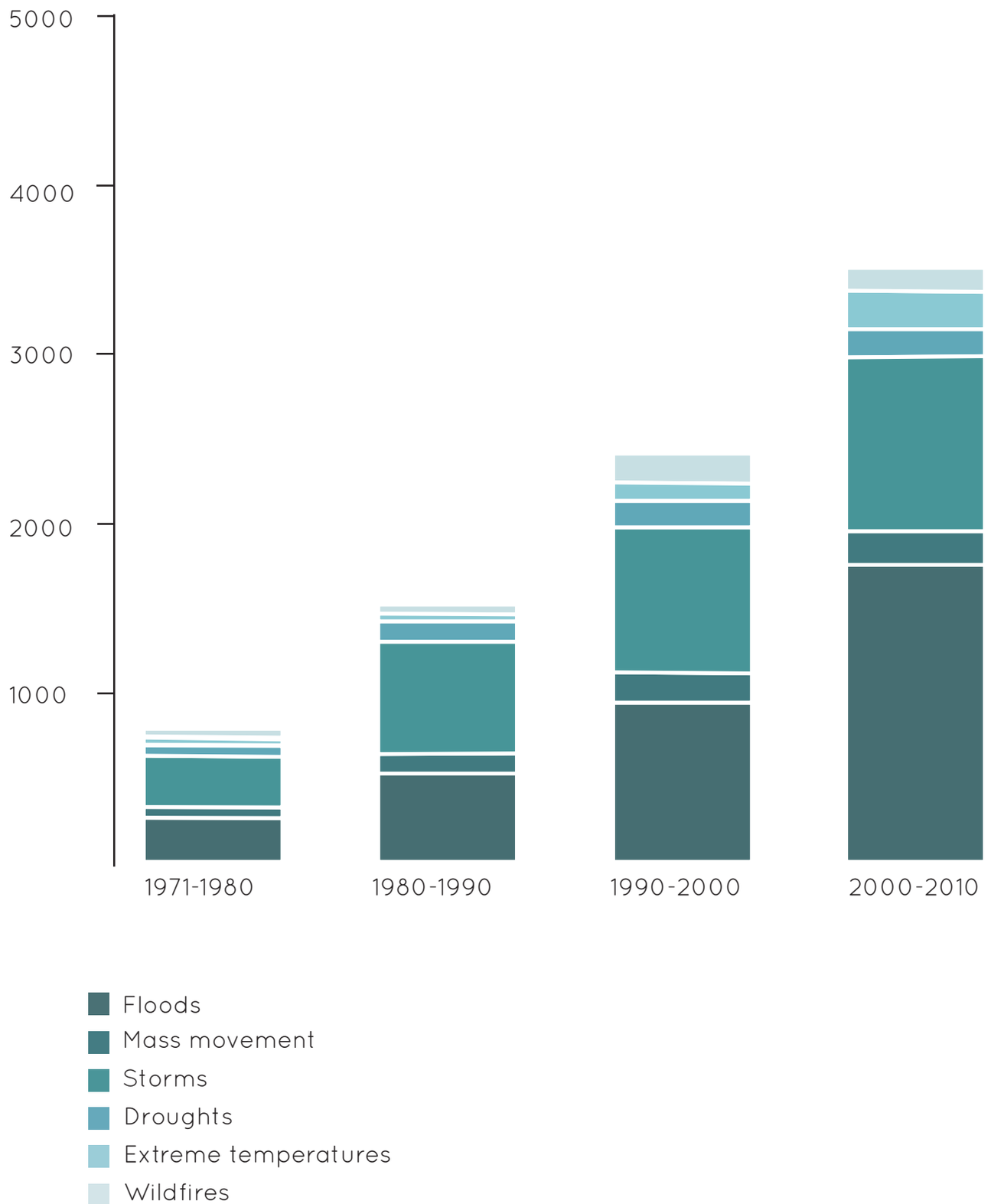
The damage from storms has increased lately in Sweden as well as in Europe, and experts say that storms may be even more intense in the future. Combined with rising sea levels as a result of climate change future storms can cause major and severe floods, especially in southern Sweden. Storms are more common in the south than in the north of Sweden. The results of this can be a rise of power shortages with results like equipment and heating in homes does not work and water stops coming from the tap. It also effects communication, transports and business in society. Storm damage also has effect on soil chemistry. The impact of heavy machinery on the ground at the clearing of the damaged forest after the storm Gudrun led to leaching of mercury from the ground. This can accumulate in aquatic eco systems.
Southern Sweden is particularly vulnerable to flooding due to climate change and a rising sea level. High waves in combination with storms is expected to lead to problems. In addition to this higher soil moisture can be expected to lead to increased likelihood of trees falling in forests. since the groundwater level rising will lead to more surface near root systems and this will in turn make the trees more sensitive to storms.

Heavy rains will increase in intensity across the country. Many municipalities already have problems with floods of sewage and drainage systems that lead to cellar floods and waste water leaks. Drinking water supplies may be cut due to contamination and flooding of power stations can lead to prolonged power outage.
It took a long time before all of this could be restored. In the most remote parts it took over a month before everyone had access to electricity and telephone again.

https://www.msb.se/RibData/Filer/pdf/26546.pdf
https://www.msb.se/sv/Forebyggande/Naturolyckor/Anpassning-till-forandrat-klimat/Effekter-av-ett-forandrat-klimat/Oversvamningar/

Flooding in Malmö 2014.

Number of reported disasters by decade by hazard type (1971-2010)



http://climatestate.com/2014/07/14/climate-water-and-weather-extreme-data-1970-2012/

THE STORM GUDRUN 2005

The storm Gudrun sometimes is called The January Story in Europe 2005. It hit the south of Sweden from 8 to 9 January 2005. The German Meteorological Institute Deutscher Wetterdienst (DWD) named the storm Erwin. Gudrun is southern Sweden's largest natural disaster in modern times, and 7 people lost their lives. Many motorways in Småland were blocked by fallen trees and the trains stood still.

When the winds stopped 75 million cubic meters of forest had disappeared, 730,000 subscribers simultaneously were without electricity. In total, 3,000 Swedish miles of electrical wiring had been destroyed and the telecommunications connections were down. The rescue service and the Swedish Road Administration immediately started clearance work but stopped since many trees still risked falling over them. Mobile power plants for power supply were transported from military storages, power grid companies and from abroad. The lack of electricity caused many schools and health care facilities to close down.

https://sv.m.wikipedia.org/wiki/Orkanen_Gudrun
https://www.krisinformation.se/handelser-och-storningar/2005/stormen-gudrun

The water tasted like smoke

On July 31, 2014, what would become the largest forest fire in Sweden broke out. An area of 13,100 hectares of forest burned up. More than 100 forest owners lost their forest and 1.4 million cubic meters of forest was destroyed. I26 buildings, of which 11 were people's homes, were destroyed, one died, one was seriously injured, and some got burns. Because the large amount of smoke in the air, it even resulted in the water tasting like smoke.

There are many families that had to leave their homes, and even lost them. The Muhr family had gone away for the day because the smoke was so disturbing, and their daughter had asthma. When they got home, the family met the neighbour who shouted and waved his arms at them. " The police were here 15 minutes ago and said we got 15 minutes to leave. You have to go now!".

Several people volunteered and acted as coordinators of supplies and food to those involved. Even companies helped out, among them were Ikea Västerås. Through their Facebook page they said that "we have been in contact with the municipality's crisis centre, the police and 113 13 and announced that we can help with beds, blankets, blankets, pillows and food."

To act in a crisis: Elisabeth became a "doer".

Elisabeth Pettersson in Västra Färnebo was one of the volunteers during the fire. She says in an interview that she likes that role a little too much. "It is like I turn something off and something else kicks in." she says. When the fire trucks and rescue vehicles ran out of diesel fuel, she called the municipality and simply said" We need fuel!" She then got the mandate to purchase what was needed herself and send the bill to those in charge. She then contacted the diesel company and ordered what was needed. " I believe there are a lot of bills with my name on it." She describes it as being her best self in a crisis. capable and full of adrenaline. When the crisis was over she felt a feeling of emptiness. " What do I do now? It made me think; am I doing the right things in life?" she says. Everyday things like doing laundry became harder to deal with after the fire.

A psychologist explains this phenomenon with the expression" From hero to zero". It is quite common for volunteers to get a feeling of being important and getting a boost from it. In a way it is a simple situation, when there is not much to discuss, only to act. In a stressful situation the frontal lobe in the brain, that is in charge of reasoning and discussing, is disconnected, and reflexes kick in, like riding a bike. After a situation like that it is common to evaluate your life and everyday situations.

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https://www.skogsstyrelsen.se/mer-om-skog/skogsbranden-i-vastmanland-2014/
https://m.youtube.com/watch?v=8TBSu8hnk5s
https://www.youtube.com/watch?v=8TBSu8hnk5s

Risk communication

One might say that risk communication goes back to the late 19th century. Then it was mainly issues of public health that were in focus, and the reasons were mostly economics; you need healthy people who can be labour and soldier material. In the mid-1980s the term ”risk communication” was first mentioned in a scientific context. Now the risks were quite invisible and required expert analysis to be discovered. Things like long-term effects of radiation, poisons and foods etc. At the same time, our awareness of risks had doubled, and the media contributed greatly to this by creating a new type of reporting, ”the risk alarm”.

Preparedness in Sweden

In the first half of the Cold War, the message was that the ”total war” would hit the Swedish society. The total war affected all social functions and all citizens. Information to the public about the total defence was therefore important, that every citizen knew its place and how to act in the event of war. Already during the preparation period during world war two the Crisis Council published an information brochure called ”If the war comes.” The 1961 edition was largely about how to protect the civilian population from the effects of the war. ”If the war comes” was meant to be a manual for the public.

New publication on crisis preparedness

During the Cold War the publication of a similar script was updated. Now the belief was that the attacker would respect international law, and therefore there is nothing written about evacuation in the 1984 version. A short version of ”If the war comes” was then published in the telephone book during most of the Cold War, until 1991. Because the phone book was free to all subscribers this meant that almost all households had access to the information. The catalogue formed an important part of telephone use and was also therefore saved, in short, the information in If the war comes is about duty. It is the citizen’s duty to know how to act in an emergency. A new publication on crisis preparedness is going out to all Swedish households in May 2018 for the first time in 57 years. The civil defence has recently emerged on the agenda after a few decades. This has in part been a consequence of that threats to Sweden play a greater role than before. In the decades after the fall of the wall the thought has been that there are no threats in the immediate area. This has led to a down priority of the Swedish defence and a re-prioritization of civil defence, focusing on crises during peace-keeping conditions, usually called crisis preparedness.

This meant that regulations were changed, and the availability of supplies and protective equipment was discontinued. As previously mentioned this also led to that Sweden no longer has any food stock and would only last for a few days if the import of food were to be cut off. This compared to Finland that would last 12 months on their supply.

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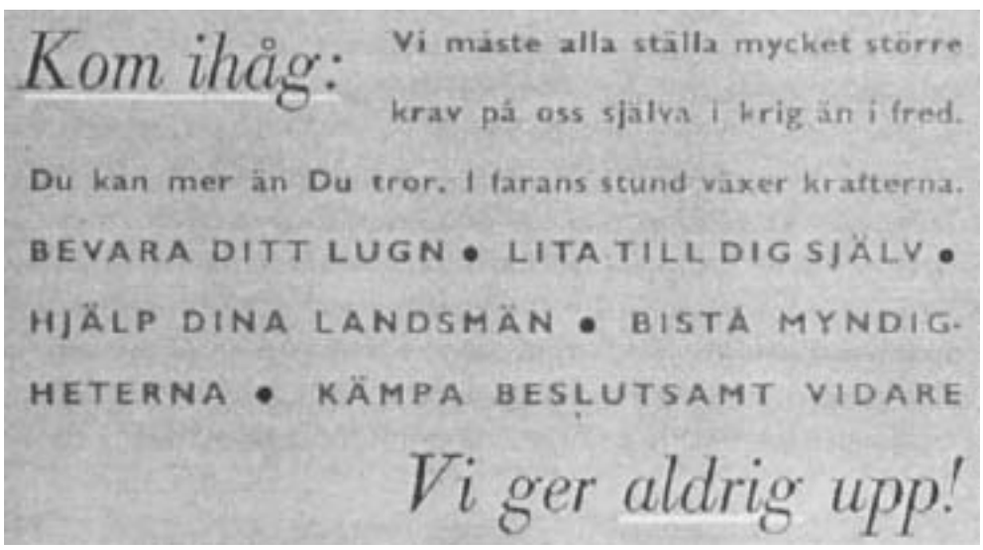
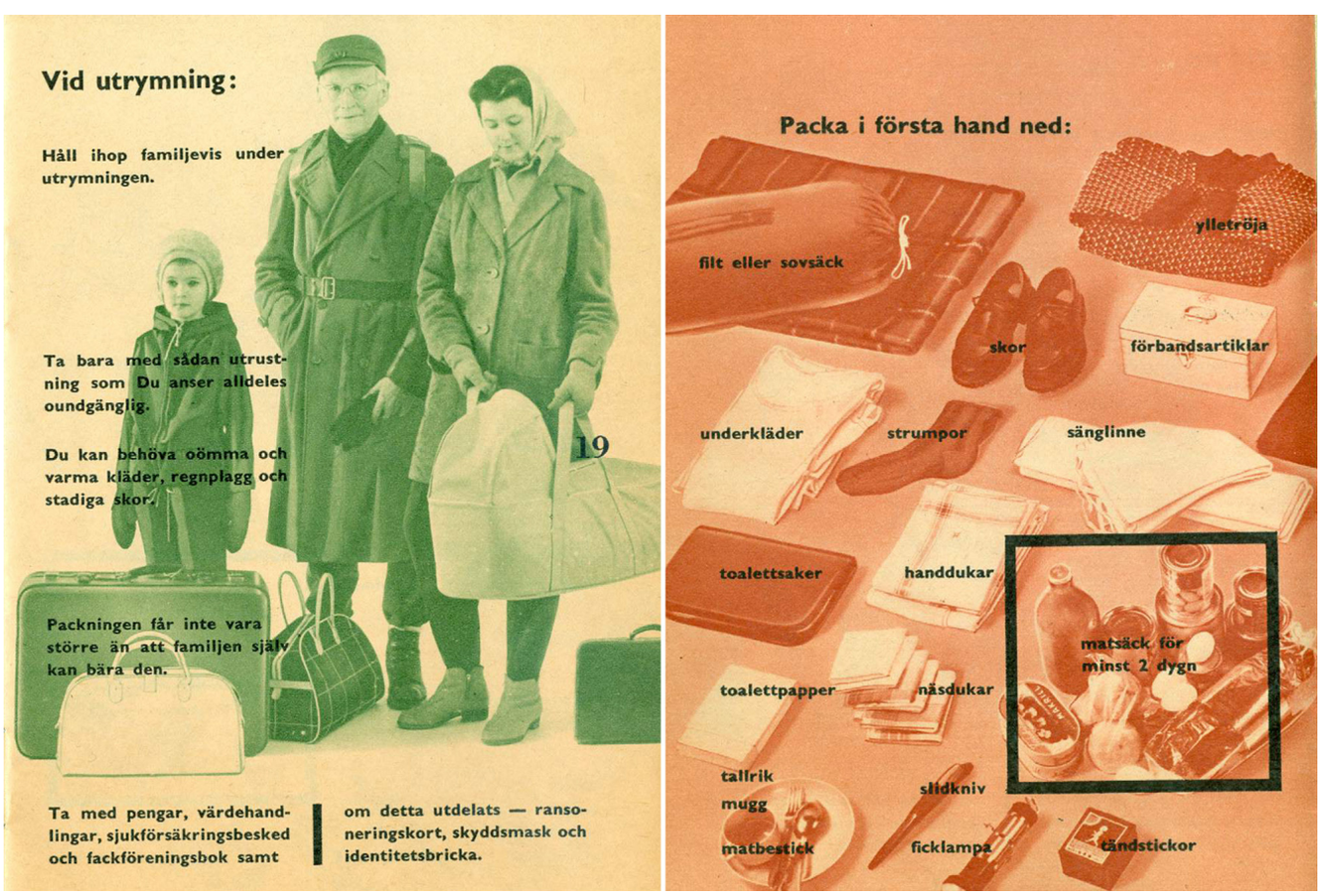
https://www.msb.se/Upload/Forebyggande/Krisberedskap/Krisberedskapsveckan/G%C3%B6teborgs%20stads%2072-timmarskampanj_2016.pdf
http://www.bergrum.se/sverige/civilt/om-kriget-kommer.php
file:///http___webbrapp.ptn.foi.se_pdf_9f116e49-dfc9-4306-bad9-239c30c0c2c8%20(1).pdf
Beredskap i kris, Susanne Gäre och Gunnar Lyckhage



Last words in the 1961 edition of the publication of *If the war comes.*



Page from *If the war comes* from 1961

OM KRIGET KOMMER

Sverige vill fred

I vårt land hoppas vi att motsättningarna i världen blir lösta på fredlig väg. Vi verkar för detta i FN och genom andra internationella insatser.

Om kriget skulle bryta ut i vår omvärld ska vi vara neutrala och stå utanför. Om vi trots detta blir angripna ska vi försvara oss. Var och en måste då göra sin insats i totalförsvaret. Mycket har förberetts i fredstid. Myndigheterna ska hjälpa och skydda människorna. Men var och en måste också kunna skydda sig själv och vara beredd att hjälpa andra.

Alla har en uppgift

Vi har ett totalförsvar, som omfattar hela samhället, omställt för krig. Alla har en uppgift i totalförsvaret om kriget kommer.

För män mellan 18 och 47 år gäller värnplikt. Både män och kvinnor mellan 16 och 65 års ålder kan tas ut till civilförsvaret genom **civilförsvarsplikt.** Alla som kan sjukvård har **tjänsteplikt** för arbete i krigssjukvården — upp till 70 års ålder om så behövs.

De som inte är med i det militära försvaret, civilförsvaret eller krigssjukvården ska vara beredda att göra annan samhällsviktig tjänst. Regeringen kan besluta om **tjänsteplikt** för alla mellan 16 och 70 år. Då är du skyldig att ta det arbete som anvisas. Du får inte heller byta arbete utan särskild orsak. Tjänstepliktslagarna gäller också invandrare, som stannar i Sverige.

Om du är krigsplacerad

kan du kallas in genom post eller bud, radio och TV eller genom **beredskapslarm,** som är en order om allmän mobilisering av militära försvaret och krigsorganisering av samhället. Blir du kallad ska du så fort som möjligt ta dig till den plats som står på din order.

Krigsplaceringsorder eller inkallelseorder gäller som färdbiljett. Om du hindras — t ex av strider — ska du anmäla dig vid närmaste militära förband, hos hemvärnschef, civilförsvarschef eller polisen.

Fältpostnummer

På militär krigsplaceringsorder står ditt fältpostnummer. Det är din enda postadress när du är inkallad. Meddela ditt fältpostnummer till dina anhöriga! Annars kan de inte nå dig.

Om du ska arbeta

i industri, jordbruk, handel, kommunikationer, sjukvård eller i någon annan del av totalförsvaret:

Följ de anvisningar som du fått redan i fred av myndigheter och arbetsgivare! Om du inte fått annat besked ska du fortsätta ditt arbete. Det kommer mer direktiv när beredskapen skärps.

För alla gäller:
I krigets och farans stund måste vi mer än annars hjälpas åt, var och en på sin plats och efter sin förmåga.

Var vaksam och kritisk!

En angripare kommer att försöka lura oss att ge upp, trots att vi kan kämpa vidare. Fienden kommer att säga att motstånd inte lönar sig.

Följ radio och TV, men var på din vakt mot falska sändningar och förfalskade exemplar av svenska tidningar, tidskrifter och flygblad. Var vaksam och kritisk mot rykten. Sprid inte rykten!

Om någon del ockuperas

Ingen del av vårt land ska ges upp utan hårt motstånd. Skulle fienden ändå lyckas ta någon del av vårt land och upprätta en egen styrelse där, så är området fortfarande svenskt. Befolkningen inom området lyder fortfarande under Sveriges lagliga regering. Svensk lag fortsätter att gälla.

Enligt folkrättens regler ska en ockupationsmakt svara för att befolkningen får mat och sjukvård. Ockupationsmakten får upprätthålla allmän ordning och skydda sig själv.

Motstånd i olika former

Motståndet ska fortsätta inom det ockuperade området. En inkräktare ska aldrig känna sig säker! Kampen ska fortsätta tills hela landet är befriat.

Svenska militära förband, som hamnat bakom fiendens linjer, ska fortsätta motståndet. Civila kan frivilligt gå med i motståndsrörelse för att försvåra fiendens verksamhet. En motståndsrörelse kan verka genom väpnad kamp och sabotage. Alla kan göra passivt motstånd.

Män och kvinnor, som organiserar en motståndsrörelse, verkar med livet som insats. Enligt folkrätten får dock medlemmar i beväpnade enheter inte straffas om

- enheterna står under ansvarigt befäl
- medlemmarna bär sina vapen öppet omedelbart före och under anfall
- motståndsrörelsen följer krigets lagar.

Om medlemmar i sådana enheter tas till fånga har de rätt att bli behandlade som vanliga krigsfångar.

Grundlagen gäller

Sverige styrs både i fred och krig enligt grundlagarna. Varje "regering" som kommit till i annan ordning än genom fria och allmänna val är olaglig.

I fredstid har riksdagen beslutat om särskilda bestämmelser för verksamheten under krigsfara och krig. De går alla ut på att samhället ska fungera i lagliga former även under krig.

TOTALFÖRSVARETS UPPLYSNINGSNÄMND

TUN

From the 1982 telephone book

New publication to all households in may 2018 for the first time in 57 years.

The term 72 hours is used internationally by preppers and used for the sale of survival kits. The thought of 72 hours is based on a contractual thinking, where the citizen is obliged to take take care of yourself for 72 hours as far as it goes, while the authority in return promises to keep part of the contract: run out tankers with water, take care of those who can not handle, and then, after 72 hours, be able to take care of the rest of the population if needed.

https://www.msb.se/Upload/Forebyggande/Krisberedskap/Krisberedskapsveckan/G%C3%B6teborgs%20stads%2072-timmarskampanj_2016.pdf


72
TIMMAR

Myndigheten för samhällsskydd och beredskap, MSB, (The Civil Protection and Preparedness Authority) is a government agency with the task of developing society's ability to prevent and deal with accidents and crises. MSB has had information campaigns during the last few years with the aim to get more people to be more prepared. The work is done with municipalities, authorities and organizations. When a serious accident or crisis occurs, they provide support to those who are responsible. Crisis resilience is built up by many different actors in society, both in public and private. A crisis often affects several sectors of society and therefore businesses, which means that preparations must be made across sectoral boundaries. This requires coordination between different actors. The task is also to make sure that society learns from what has happened.

The Principle of Responsibility

The work of the municipalities emergency preparedness is based on *The principle of responsibility*, which means that the person responsible for operations under normal conditions has the same responsibility during crisis and war situations. This means that if you do not require help with for example food under normal circumstances, this is nothing you can demand during a crisis. It is therefore important for the citizens to have some level of preparation.

The 72 hours campaigns can be seen as up to date version of the campaigns If the war comes. Now it's no longer about preparing for war but being able to cope without help from society during the first few days of a crisis. The argument from the state and municipalities is that the resources during the most acute phase of a crisis is needed for people who are more vulnerable This message can be found on the website dinsakerhet.se powered by MSB:

"In a society crisis, resources will not be enough for all affected at the same time, it needs to be prioritized for the most vulnerable. Others need to cope for a while. Have you reflected on how you and your relatives should manage a day without all that we are used to? What specific needs and what conditions do you have to take into account? "

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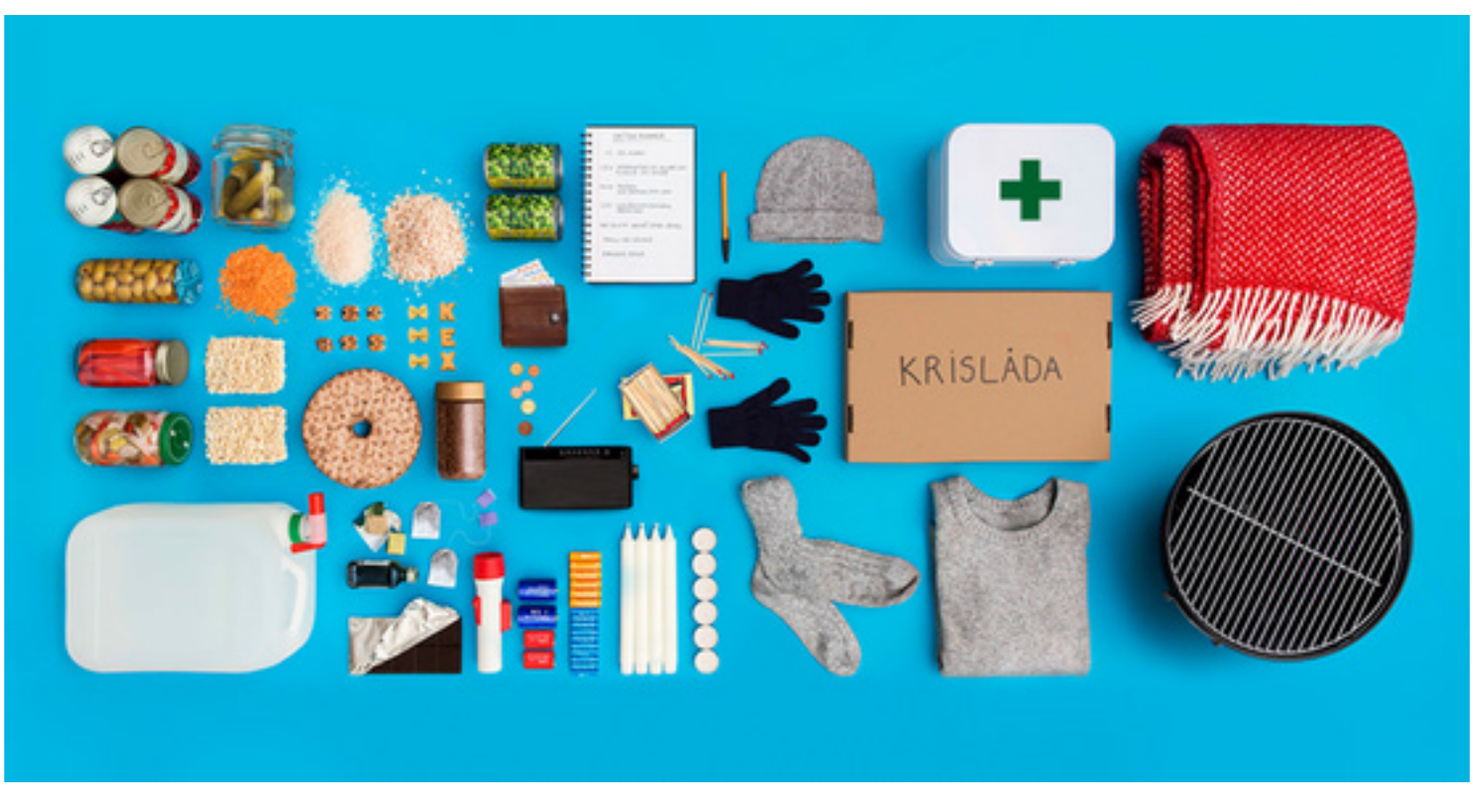
https://www.msb.se/sv/Om-MSB/
https://www.msb.se/sv/Forebyggande/Krisberedskap/Om-krisberedskap/

Purpose of communication

- Inform of own responsibility
- Encourage action



MSB*s recommendations for household preparations

INTERVIEW WITH LINA RINGBERG, MALMÖ CITY CRISIS PREPAREDNESS COORDINATOR.

The municipalities obligation is to analyse the risks and vulnerabilities that may lead them to no longer perform the activities they are required to perform. For the municipality's part that means for example, water supply, sewerage, childcare and elderly care, cleaning and social services.

Therefore municipalities, county administrative boards and central authorities must each year carry out so-called risk and vulnerability analyses. The municipalities must also have a plan for dealing with possible crises.

”We should not make people stupid”

Lina Ringberg is Crisis preparedness coordinator in Malmö. She describes the Crisis preparedness weeks that the municipality arranges (Malmö in May) as a way to teach the citizens about how our democracy works, rather than telling people to get prepared. If you do not even have a home, she says, how can you get a crisis box? She talks about the Principle of Responsibility, that if the grid stops working no one might come to your rescue. The municipality's responsibility is to make sure there is continuity in their work even in a crisis. They make thematic analyses of example scenarios, like an Ebola outbreak. The crisis preparedness work first of all aims to prevent or reduce risk before it happens. Other than that, limit the consequences during the crises, and recover after. Lina also talks about this work as Prevent, Prepare and Handle.

She thinks the 72-hour focus can be problematic. As an example, she tells me about an incident in Eslöv a while ago. First the power went out, and then he water. When the emergency water arrived the que for the water was long. People were impatient and security guards were even called to the scene. This even though the next village had water, and people could in fact quicker go there to get water. ” We cannot make people stupid”, she says.

When I ask Lina about what is expected of a person in a crisis, Lina says that the ability to collect water in own containers is important. VA-Syd, the water supplier is only responsible for the quality of the water they supply, not the amount. Therefore, you are responsible for collecting the water you need yourself during a crisis. The municipality will as previously mentioned provide emergency water tanks eventually, but even there is no guaranteed amount for each person. She also thinks that it will be a big problem to get the emergency water out to all of Malmö at once.

Lina shows me a plastic water container, flat as a plastic bag, containing 4 litres. This comes from the food and drug administration, and originally from Israel, she believes. The handle is a bit narrow, but the size is easy to carry, she thinks, even though one person would need several to last 72 hours, and a family much more. She reflects upon the possibility for the municipality to have a stock of these to provide all of Malmö with water collecting containers. Should we store several plastic water containers for everyone in Malmö community, a large stock that may never get used, or should we spend the money on for example education and health care?


STADSHUSET

Herman Geijer is the author of two books abour preppeing, *Överlev katastrofen* and *Zombie överlevnad -din guide till apokalypsen*. He also works at ABF (the Workers' Educational Association) and has held courses in Zombie survival. The 72-hour concept and Prepping culture was the starting point of these courses. Herman had read a lot about it but felt it was something missing, the behavioural and psychological issues. When I ask Herman about the purpose of the course he says it was for fun. But there were many interesting discussions during the course, and many that applied. There was a lot of interest in the subject. He is still lecturing and believes there are even more interest today. It could be though, he says, that it is partly because of the attention around his books.

Prepping problematic

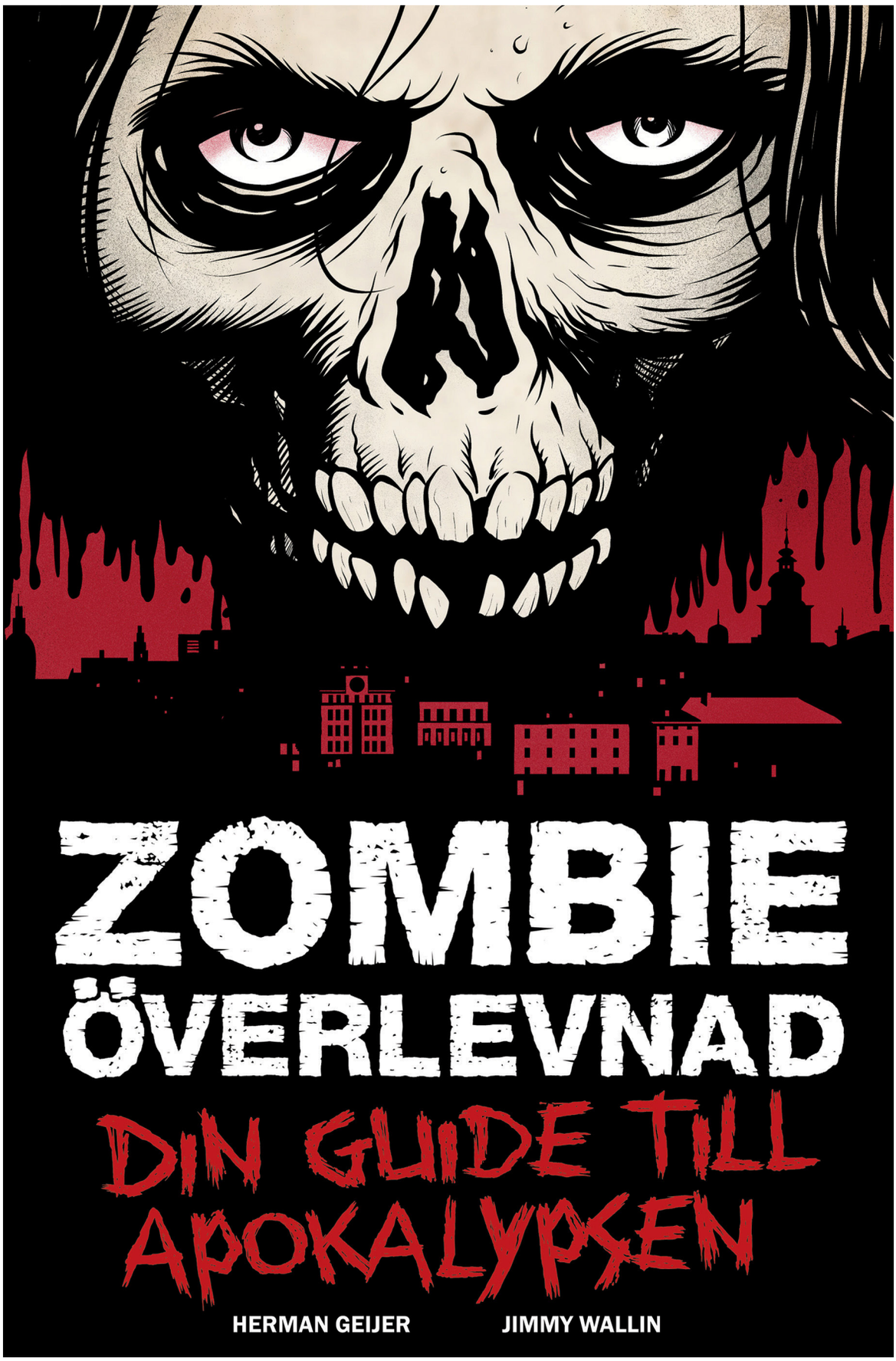
Herman says that it would be hard to get people to prepare for a crisis since we do not know how to do it. He compares it to the safety belt, we all use it because we just trust that it works. But he believes that everyone can manage a 72-hour power shortage. " I mean, we won't die", he says. He does not really prep very much himself. Since he has kids he has a storage of food anyway. The things you get must fit in the home anyway, he says. All you need is a little bit of knowledge, and some water containers.

Geijer means that the Prepping culture can be contra productive, since their efforts might seem dystopic and exaggerated. If you think you need to store hundreds of food cans and buy a lot of expensive gear you simply give up and will not do anything at all. The thresholds for crisis preparation must be low and unobtrusive.

Neighbors important

The hardest, but also a very important thing is the relationship with neighbours. In a crisis he believes that will be crucial. But it can be difficult to get to know your neighbours unless you have kids or dogs, he says. Then you automatically stop and talk to each other, maybe even share things. Other difficult material things would be the water and having storage for it. Also, to get information, where you need a battery and a hand crank radio when the power is out.

Herman believes it is hard with the between position; extreme prepper or unprepared. To achieve this, he thinks it could be good with objects that have a natural place in the home, like the designed fire blankets and fire extinguishers that got popular the last few years. It needs some design to fit in the home.


ZOMBIE
ÖVERLEVNAD
DIN GUIDE TILL APOKALYPSEN
HERMAN GEIJER
JIMMY WALLIN

There have been some attempts to make “crisis-boxes”, a collection of things to manage a crisis at home. These can be bought on websites if you search for just this, and they cost several thousand Swedish crowns. This means that you need to have knowledge and interest in the prepping culture already, and also money to spend on it. The other option is to collect yourself from different places the things needed. This also requires engagement in a way that most people do not have, according to the research.

The content of a crisis box varies on different sites and blogs on prepping and crises preparedness, and no recommendation is exactly the same. These are the most frequent occurring things important to have at home in case of a crisis:

Water and food

- Cans for collecting and/or storing water
- Food that can be stored in room temperature (canned food, pasta, nuts, chocholate etc.)
- Camping stove

Warmth and light

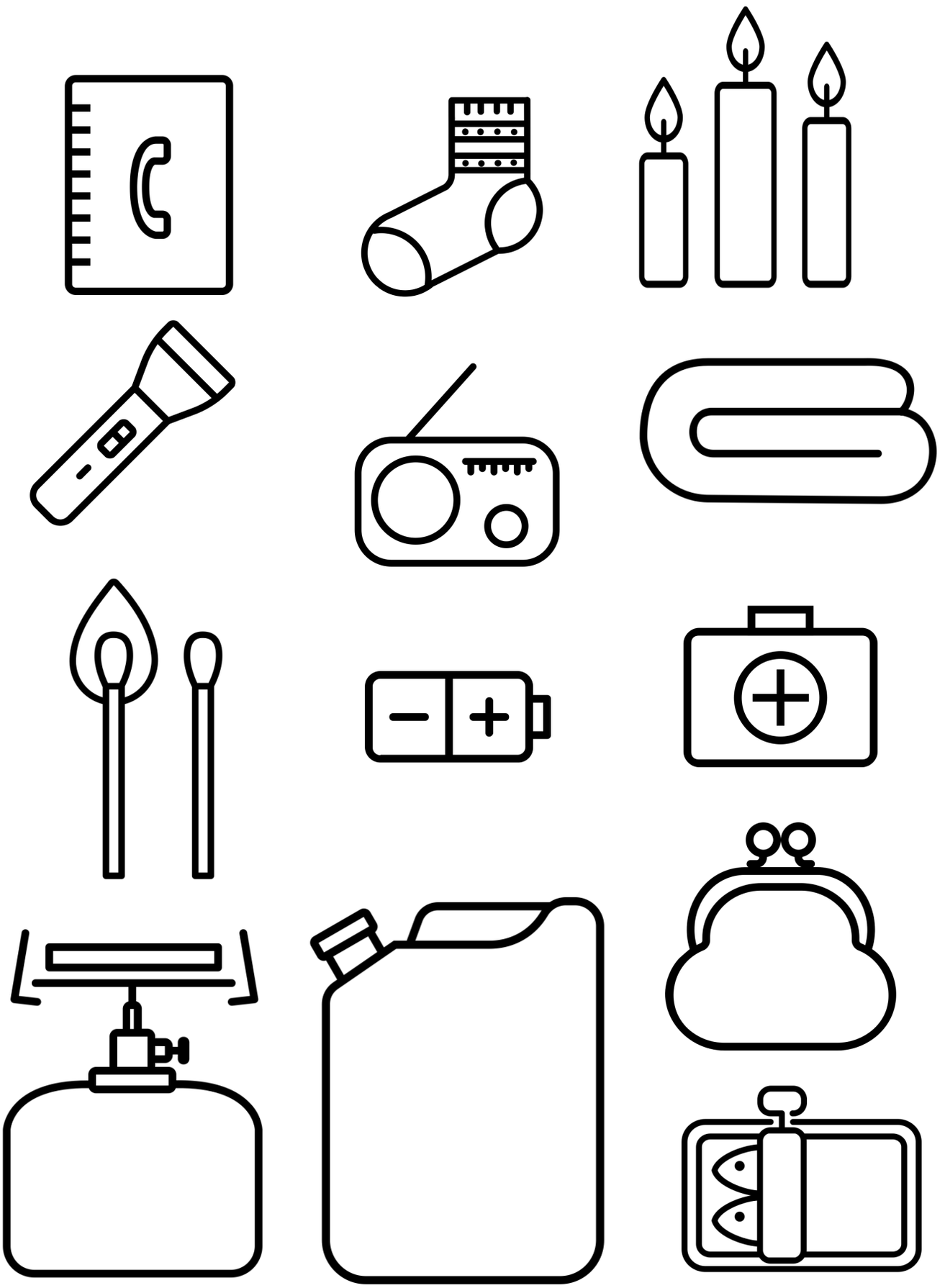
- Flashligt with extra batteries
- Candles
- Tea lights
- Matches
- Warm clothes and blankets

Information/ Communication

- Battery run radio
- Phone list with important numbers
- Extra batteries, powerbank etc.
- Cash

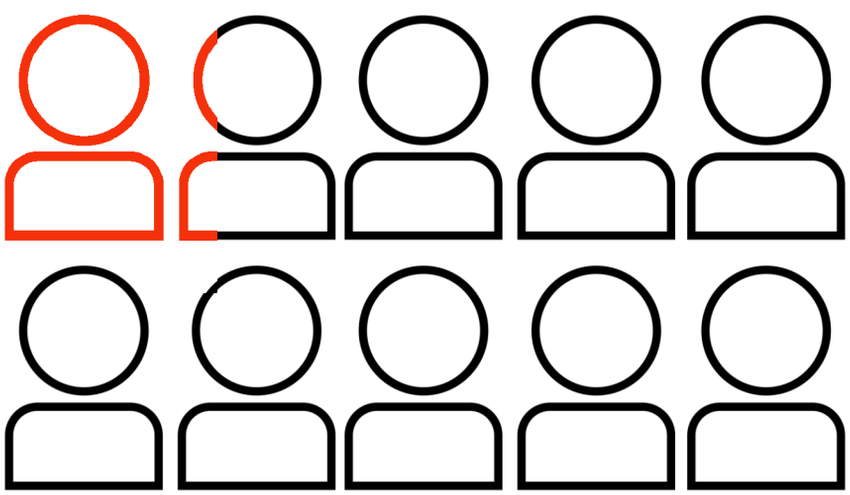
Medicine

- First aid kit
- Medicines imoprtant to you



According to the research from a thesis at Lund University Division of Risk Management and Societal Safety which aimed to develop a method for measuring public preparedness, it is doubtful that more knowledge about potential risks would generate a higher level of readiness. The motivation to take action to protect and avoid risks is strongly linked to the extent you personify the risk, and this is in turn influenced by past experiences. However, the research also showed that lack of experience does not mean that people are unaware of the consequences of a prolonged power outage. 84 % of the respondents in this research were aware that the heating would disappear during a power failure. 74% knew that the water network probably would not work. This means though that 26% of the respondents believed that the water supply would not be affected. On the other hand, people do not seem overestimate their ability to cope for 72 hours. 88% of the respondents estimated that they were poorly prepared.

Holmstedt J. J. (2014)



88 % thinks that they are poorly prepared for a societal crisis.

”Can you manage three days?”

The 72-hour information campaign could be seen in ads on buses and trams with the message ”Can you manage three days?”. The message was illustrated with pictures on canned food, water cans, battery run radios, flashlights etc. Focus was on the consequences of crises most likely seen from a local perspective: heavy snow, storm or floods and power shortages due to these weather conditions. The Gothenburg City 72-hour campaign has attracted great interest, and according to information from the city of Gothenburg 47 other municipalities have received the material and made it their own.

The analysis of the campaign show that the message relates little to the situation of citizens of Gothenburg. The pictures are abstract, and the actions are described in general. This might according to the evaluators leave the citizen with the feeling that this is about the government’s imposition, not how to best protect one self. It also seems that some of the preparations could seem irrelevant and excluding to a large part of the population, for example the recommendation to write down important phone numbers. This is of course to not be dependent on mobiles in order to have access to the numbers, but the evaluators ask themselves why you should have access to the numbers if not the cell phone works? A rapidly growing part of the population has no stationary telephone, and there are currently no phone booths in the public spaces. So, from where should you call? It may be problematic to warn about a threat that is only in theory, because it can scare the population.

The aim

The campaigns aimed audience is in other words someone who has access to a stationary phone, which together with the battery-powered radio points to an age group which clearly are not young people. The recommendation for a hand-held charger for the mobile phone in combination with a power bank is more up to date maybe. On the other hand, I believe it does not take much effort to write down things on paper, and maybe there is always someone to borrow a charged phone from.

One conclusion that is made from the campaign is that it is doubtful that the campaign

really contributes to getting people better prepared and actually collecting things needed, if the crisis comes. The evaluators mean that to achieve this effect you must reduce the thresholds of doing this considerably.

Risk communication in this way is meant to get people to prepare for a situation that - may or may not - happen in the future, and this seems to be a challenge. The evaluation states some basic problems for this communication, one is to warn about a crisis where social functions are out, in a situation when there is no problem.

Suggestions for change

The suggetions from the evaluation are:

- *Clear focus on the mutual contract: What does the municipality promise to take care of (for example water supply by tankes)?*
- *Concretion of problems and threats through stories and examples from local crises and threats.*
- *More concrete and narrative images, showing action and actual situations*
- *Collaboration with other actors (companies or organizations) in order to create a standard crisis box that is available to buy cheap in many places.*
- *Review the list of what the survival box should contain based on the actual recipient's life situation.*
- *Division of the target group from place of residence and practical possibilities. (Do you need the same if you live in the big or in the country, in an apartment or in your own house?)*

Are people affected by information campaigns?

According to the evaluation it is easier to influence people's knowledge than their opinions. Behaviour is the most difficult to influence. To change behaviour, social norms often need to change, preferably together with lowering the thresholds for a changed behaviour. The less effort required, the easier it is to succeed. The most effect is if the information is followed by political decisions, laws or social reforms.

Almost half of the respondents in the evaluation (49 %) means that they have preparedness in food supply without having to go to the store. Most respondents however think it would cause problems to be without water for three days. Most people say they will not take any action after seeing campaign (55 %). Only 7 % say they will definitely start to prepare. Bottled water is most common (29 %). That you do not get more prepared for being without water even though you know that it will be a problem may be due to the difficulty in preparing for water shortages. Although the message is that you should have water cans at home to be able to go and get water, many people think that they need to store the water at home. The evaluation also states that if you want to achieve the effect that many people prepare for a crisis by getting the stuff needed, the thresholds for action must be reduced, for example with collaborations to make a crisis box standard in a household.

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https://www.msb.se/Upload/Forebyggande/Krisberedskap/Krisberedskapsveckan/G%C3%B6teborgs%20stads%2072-timmarskampanj_2016.pdf

Just like in the previously mentioned report on Risk Management and Societal Safety, another study comparing the preparedness in Stockholm with the countryside municipality Krokom show that we prepare more for the risks we have previously experienced.

Living in a house or apartment is believed to affect one's risk perception. If you live in a house on the countryside you can generally be more prepared since you have more space to keep things needed, and you may already have off the grid sources for heat and water. If you live in an apartment building you can do less yourself and you are often in the hands of the landlord. However, worry is not the biggest reason for preparedness. Instead it is the living situation that play the greatest role.

The respondents in Stockholm are generally associating crisis with a so-called housing bubble or housing crisis and stopped imports of different types of goods to Sweden. The respondents in Krokoms municipality generally has difficulties defining the concept of crisis. However, some do not think that a crisis outside Sweden can affect them in their home. since they live too far away.

City

When the concept of risk was to be defined, the threat of terrorist attacks was the most mentioned by the respondents in Stockholm. Terror attacks are a risk and the reason for this association is experience along with knowledge and spreading of information. Terrorist attacks are described as something you know may happen whenever and anywhere, while it is considered impossible to protect yourself from. The experience is from the attack in Stockholm in April 2017.

The respondents in Stockholm also associate the term risk with an increased military threat. Based on the urban respondents' point of view water supply is the most critical thing in a crisis situation in the city.

Countryside

Respondents in Krokom believe that power failure is most associated with the concept of risk. This seemed based on knowledge of what could potentially happen, but whether this knowledge is based on experience or something else is uncertain. According to the report the respondents in Krokoms municipality just like in Stockholm think terrorist attacks are a risk. However, they do not think it is likely this will occur in their environment, and therefore it does not affect the preparedness. Based on the rural respondents' point of view communication is the most critical thing in a crisis on the countryside.

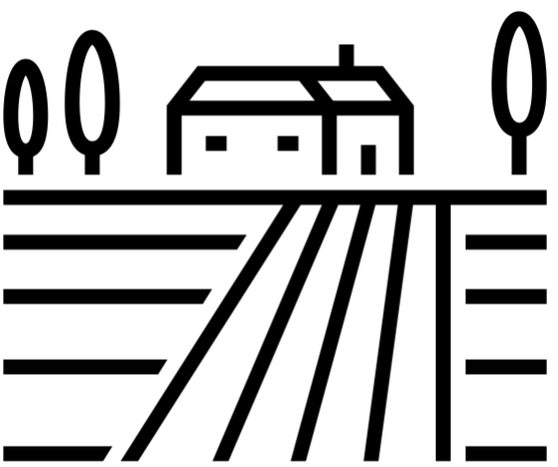
”Unprepared preparedness”

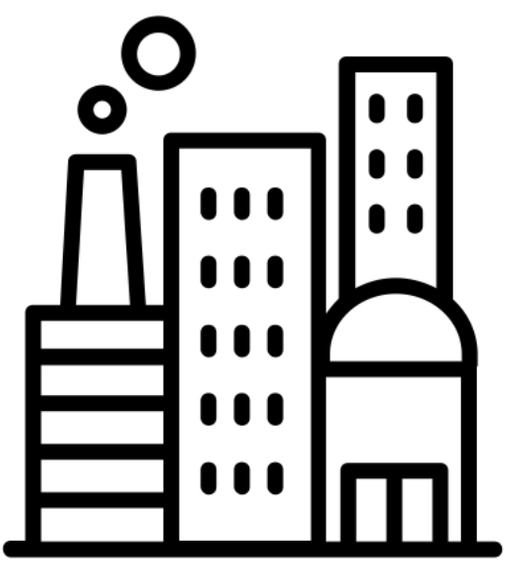
According to the report some of the things in common for the city and countryside is that heat and food are not considered to be very big problems. Everyone has some food at home. In the rural areas it can be a bit easier due to a larger area for storage, possibility for an extra freezer. It is also easier to use a camping stove and most people may also have a gill.

In conclusion, one similarity identified between the urban and the rural areas is the fact that the existing preparedness for a crisis is based on other reasons and are connected to lifestyle, type of housing, interests and material conditions, indicating that the perception of risk

that exists does not affect the preparedness.

However, one conclusion is that household preparedness in general is better on the countryside than in the city, but it is not created on purpose, but rather as previously mentioned connected to the type of housing and lifestyle. Patterns in the survey show that respondents in Stockholm have power banks which they perceive as preparation in a crisis. However, these products were not purchased for the purpose of preparing for a crisis, but rather associated with lifestyle and interests. This, according to the report, indicates some kind of ”unprepared preparedness”.





Norén, I. (2017) Den oförberedda beredskapen: En studie om hushållsberedskap i stad och glesbygd, Stockholm

Information in the event of a crisis.

When it comes to internet or telephone in case of a large power shortage , some areas may have internet coverage and connection, while other areas lack it. Therefore, there will be information via the internet. Information is also spread from mouth to mouth.

Through the Swedish Radio P4 emergency channel, you will receive information about events and disturbances and the signal VMA, (Important Notice to the public). This means you should go inside, close all ventilation and turn on the radio. Therefore the recommendation is to have an FM radio. If your phone works, you can call SOS Alarm on phone number 113 13 and get information. The municipality set up information centers and contact points. They engage volunteers, send out information buses and will go door knocking to make sure to help for example the elderly or ill.

Malmö power

Svenska kraftnät is the authority responsible for ensuring that the electricity transmission system is safe, environmentally-friendly and cost-effective. The government has given the Svenska kraftnät the mission to maintain and develop the Swedish electricity grid. Electricity from wind, water and nuclear power plants is transported to regional and local networks, which are forwarded to the consumers. Svenska kraftnät are working to ensure that the electricity supply is prepared for extreme events like storms or fires that can cause serious strains on society. They work to ensure that actors with tasks within society's emergency preparedness connect to and use the Rakel communication system.
Rakel is a communication system for safe and secure communication between employees in socially important activities. The system has uniquely high operational reliability, coverage throughout Sweden and is used by approximately 550 organizations.

Malmö water

Under the streets of Malmö there is a pipeline network of about 900 kilometres. A small amount of water comes from Lake Bolmen in Småland via Bolmentunneln but the water supply with drinking water comes from the lake Vombsjön (about 80 %) and also Grevietäkten (about 15 %, which is 4-5 cubic metres of water per year). Grevietäkten in Staffanstorp Municipality has supplied Malmö with water since the beginning of 1900`s and is of major importance for water supply in Malmö. Grevietäkten also serves as a regional water reservoir. If the regular water supply stops, Grevietäkten is the only available bigger water resource in the region. In order to protect this a water protection area was formed in 1977. The water is produced at Vombverket and at Bulltofta Waterworks, which is VA SYD's own waterworks.

https://www.krisinformation.se/detta-gor-samhallet/vad-ar-en-kris/information-vid-handelser-och-kriser
https://www.svk.se/om-oss/
https://hallbarstad.se/kommunerna-visar-vagen-i-global-stadsutmaning/malmo-vill-bli-varldsbast-i-hallbar-stadsutveckling/https://www.vasyd.se/Artiklar/Dricksvatten/Var-kommer-dricksvattnet-fran

The Lake Vombsjön from wich malmö gets most of its water.

SUMMARY RESEARCH PART 1

72 hours it is the amount of time the authorities want us to be prepared for in the event of a societal crisis. Some say it is misleading since there are no guaranties after 72 hours either, but after my research I think that 72 hours is a graspable and reasonable amount of time to get prepared for. It could also help since it might contribute to the ability to help neighbours who might not have done any preparations at all. People in general are not prepared for crises, and research show that it is hard to start preparing unless you have experienced a crisis before. Household preparedness in general is better on the countryside than in the city, but it is not created on purpose, but rather as previously mentioned connected to the type of housing and lifestyle.

Storms are more common in the south than in the north of Sweden. Southern Sweden is also vulnerable to flooding. According to Malmö City's RSA (Risk and Vulnerability Analysis) a class 3 storm is considered to be the most likely risk, resulting in shortage of power and water. Even a longer power outage affects us. In that event most things stop working in a modern society. Water, sewers, heat, light.

It seems however there are also something exciting about these crises. Elisabeth from Västmanland became a "doer" during the big forest fire and felt an emptiness when the danger was called off. She says she is at her best in a crisis.

- 72 HOURS A GRASPABLE AMOUNT OF TIME TO PREPARE FOR.

- EVERY PERSON IS RESPONSIBLE FOR THEIR OWN SAFETY AND WELLBEING IN A CRISIS.

- GENERALLY LESS PREPARED IN THE CITY.

- STORMS AND CONSEQUENSES LIKE POWER SHORTAGE MOST LIKELY CRISIS SITUATION

- EXCITEMENT?

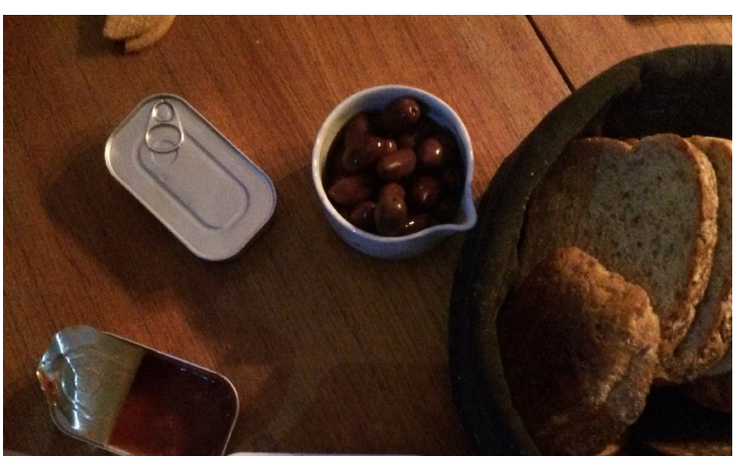
RESEARCH
PART 2: PRACTICAL

In the second part of the resaerch I wanted to investigate more hands on what the problems could be being off the grid, to be able to eventually choose a path and a specific situation to dig deeper into. I started off with an experiment and from that I could see that the lack, or shortage, of water was the most interesting issue for me, and the research was focused on that.

From Logg:
1 day before experiment starts.

I decided to conduct an experiment where me and my family would be without power and water for 72 hours, this according to MSB: s recommendations. The reactions have been cold, to say the least. People I talked to seem quite surprised and sort of impressed by our ”bravery”. The reactions surprised me a bit, since I have the feeling that 72 h is a very short period, and we will not be outside in a forest, we will be in our own home. But I also think I for that same reason may be underestimating the troubles and that I have not really realized how disturbing the power shortage will be. We discussed the level of preparedness, should we be prepared with all that that involves, or should we start as we are and see how it goes? After all, we are aware of when the power goes out, but would we be prepared if it was for real? The conclusion was to start as we were except for a camping stove and a 15-litre water container that we already had. In case of a long power shortage there will be pressure left in the pipes so that you can fill up water for a couple of hours, so that’s what we planned to do.

FOOD

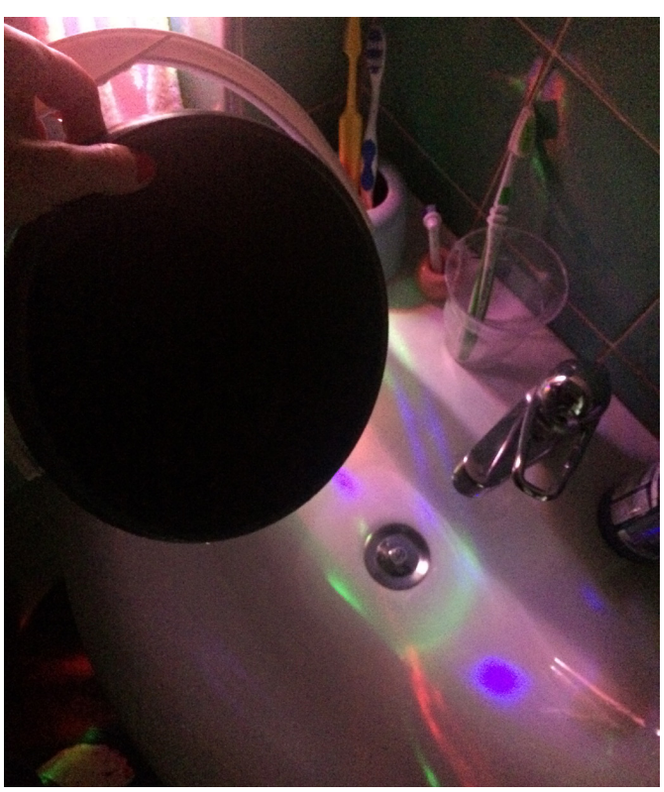


Since it was February we could store all things from the fridge outside. We kept the things in the fridge until used, then we put it on the balcony. That way we opened the fridge as little as possible, keeping the cool longer. We were quite ambitious at lunch, cooking on the camping stove, but already the first night we chose canned food and bread. However, the following days, when getting used to the situation, the camping stove was a good way to be able to get hot food which is nice, at least once a day.

WATER AND HYGIENE

Since there would still be pressure in the water pipes for a couple of hours after a power shortage, we simulated this and filled as many containers as we could find. We also filled the tub with as much as we dared, a bit afraid that the kitten we have would fall in and drown. That water we decided to use for flushing the toilet with buckets. Also, to fill the sink to wash our hands. We plugged the drain, filled it up a bit and splashed our hands around. Only a little while after turning the power off and feeling that it all felt a bit too easy, I felt that the water issue was very annoying. The dishes were made in a similar way, filling a bowl with water. Pretty soon we realized that flushing with a bucket is not very easy. It takes a lot of water. Would we have poured all that down the drain if we did not know the power would be back in a few days? We decided to throw away the toilet paper in a bag and not in the toilet.

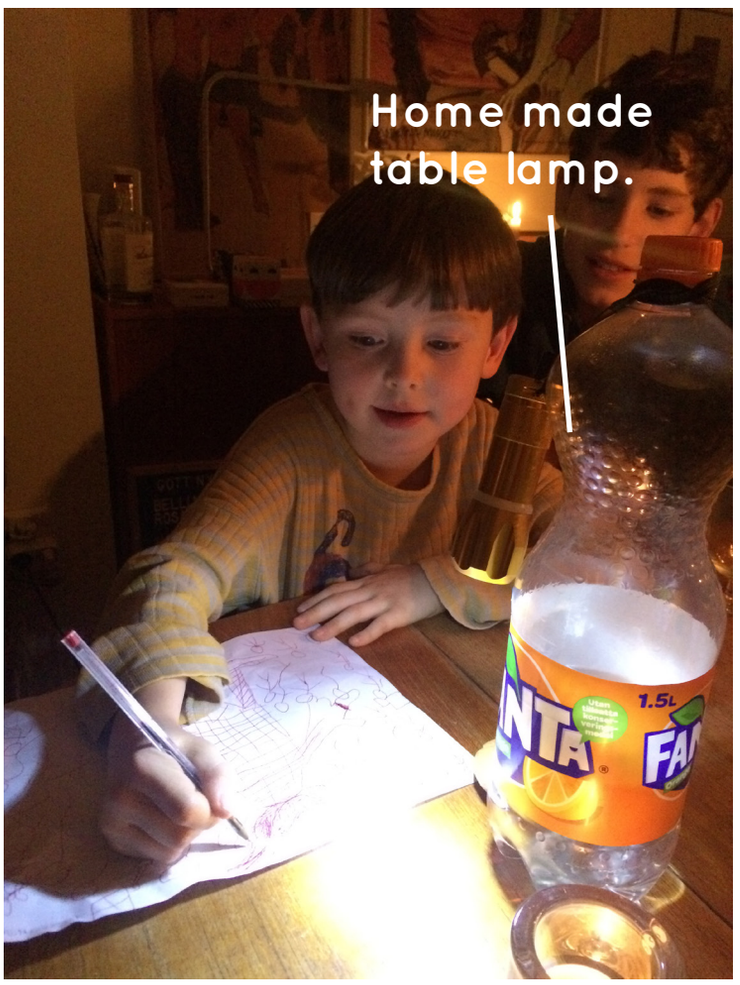
The water is also a source of conflicts. Who took the wrong kind of water for washing dishes when it was supposed to be drinking water? Who did not turn off the hard-to -turn tap on the water container properly?



ACTIVITIES

During the first day we went out to the park. Feeling a bit adventurous we headed for the outdoor gym to play around. The night came so much earlier than usual. The reading during the day moved closer and closer to the windows, to save the daylight as long as possible, and we felt extra tired by the darkness. We decided before the experiment started that we could use our power banks as long as they lasted, but everyone was still trying to save the batteries. Instead, we played cards and told ghost stories. We used the last of the lap top`s battery to look at an old DVD we never came around to watch before. We managed to see almost the whole thing.

Child nr 1 was more active than ever, and did many things he does not usually do, for eample he started to practice writing, and his brother helped by making him a crossword puzzle.


Home made
table lamp.
1.5L


BAJS
SUR


TOSHIBA

CONCLUSIONS FROM THE EXPERIMENT

WATER
-There is not only one kind.

-Make the use easier.

- Reduce consumption
before hand to reduce
impact of a shortage?

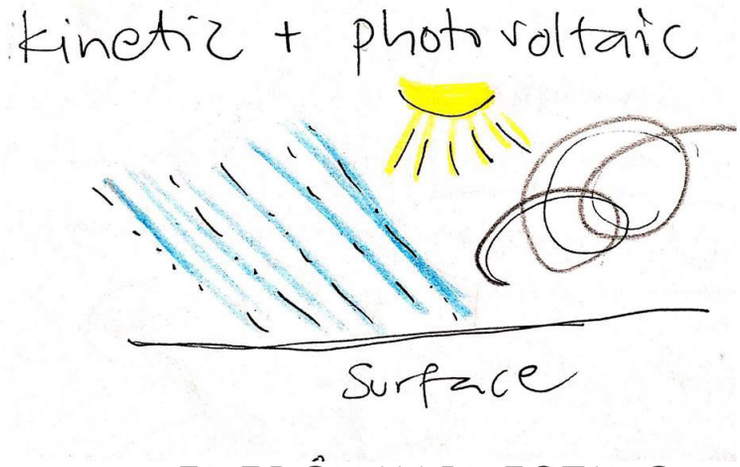
ENERGY
Spend time together without
screens
- Increase ”consumption”.

Make your own power?

LIGHT

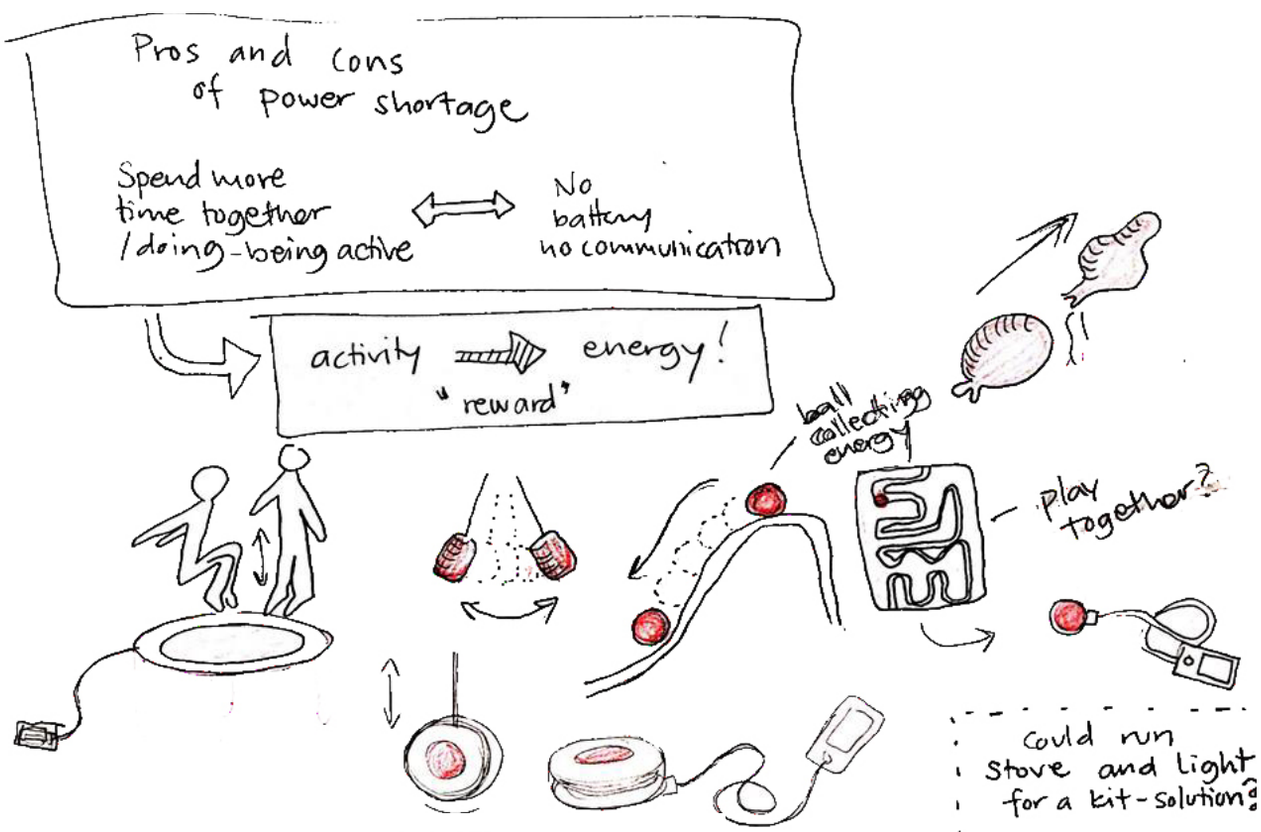
Follow the natural light

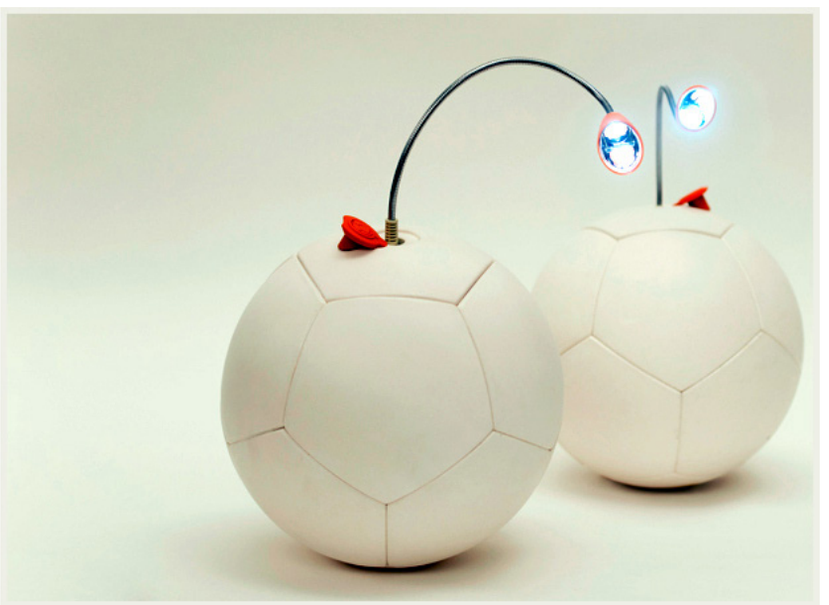
The last night there were only a couple of decilitres of water left.

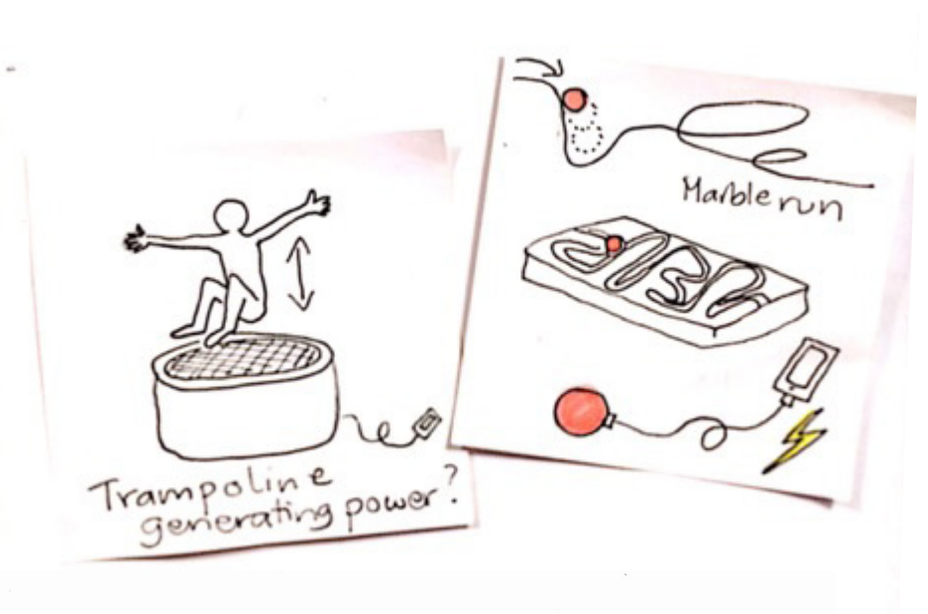


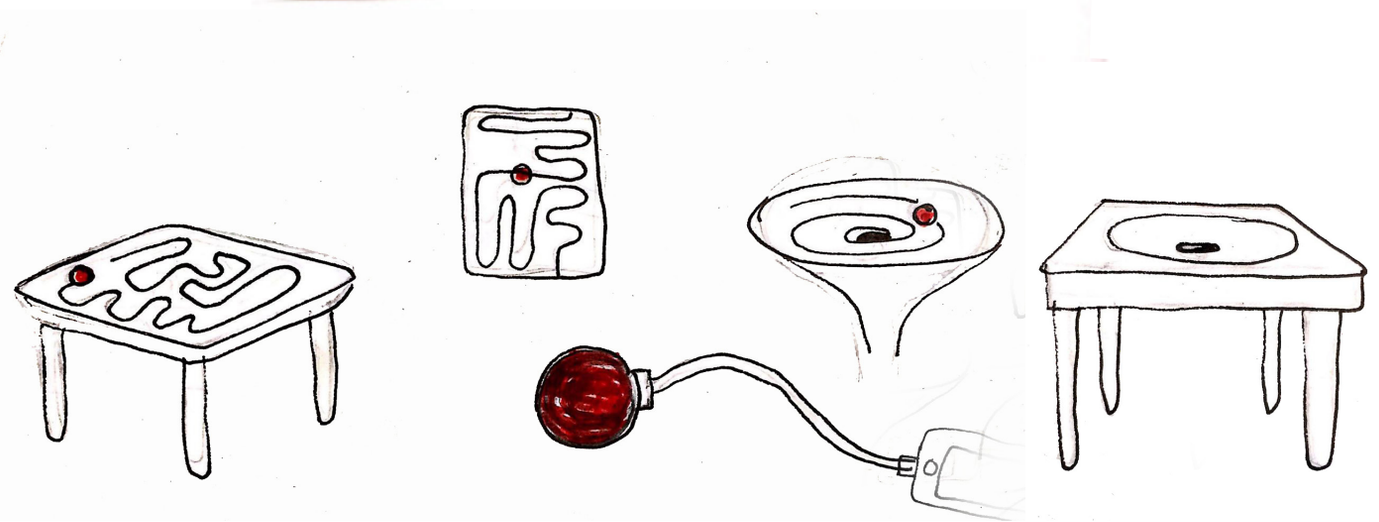
ENERGY HARVESTING IN THE HOME

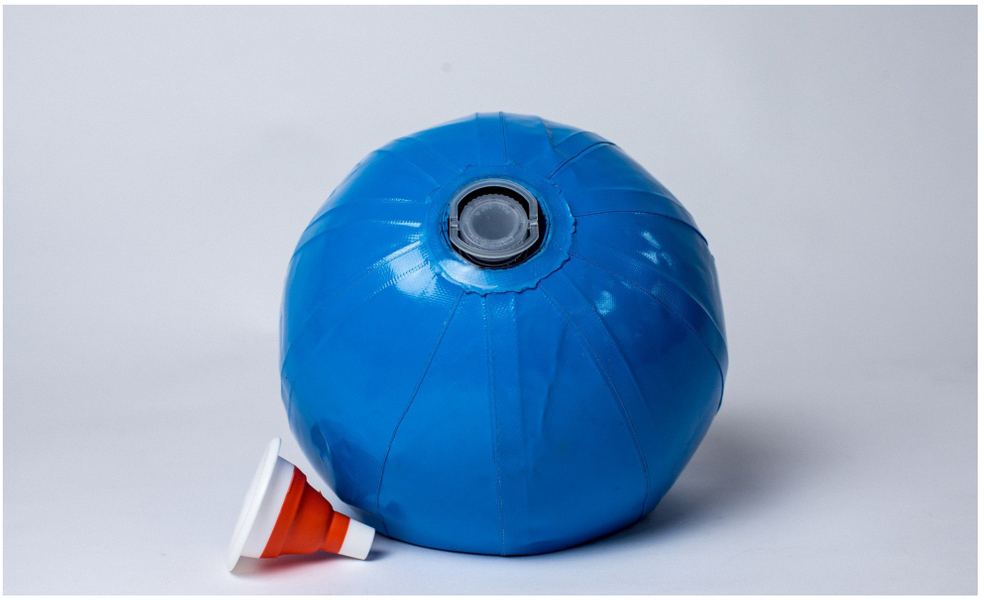
I found energy harvesting interesting, how to harvest energy from kinetic energy, such as movement from wind or rain. This is also the technology behind the hand crank chargers or radios. But maybe it could be done by combining the free time that appeared when not being able to sit in front of a screen, but rather spending time together? Play together and get the energy as a reward.





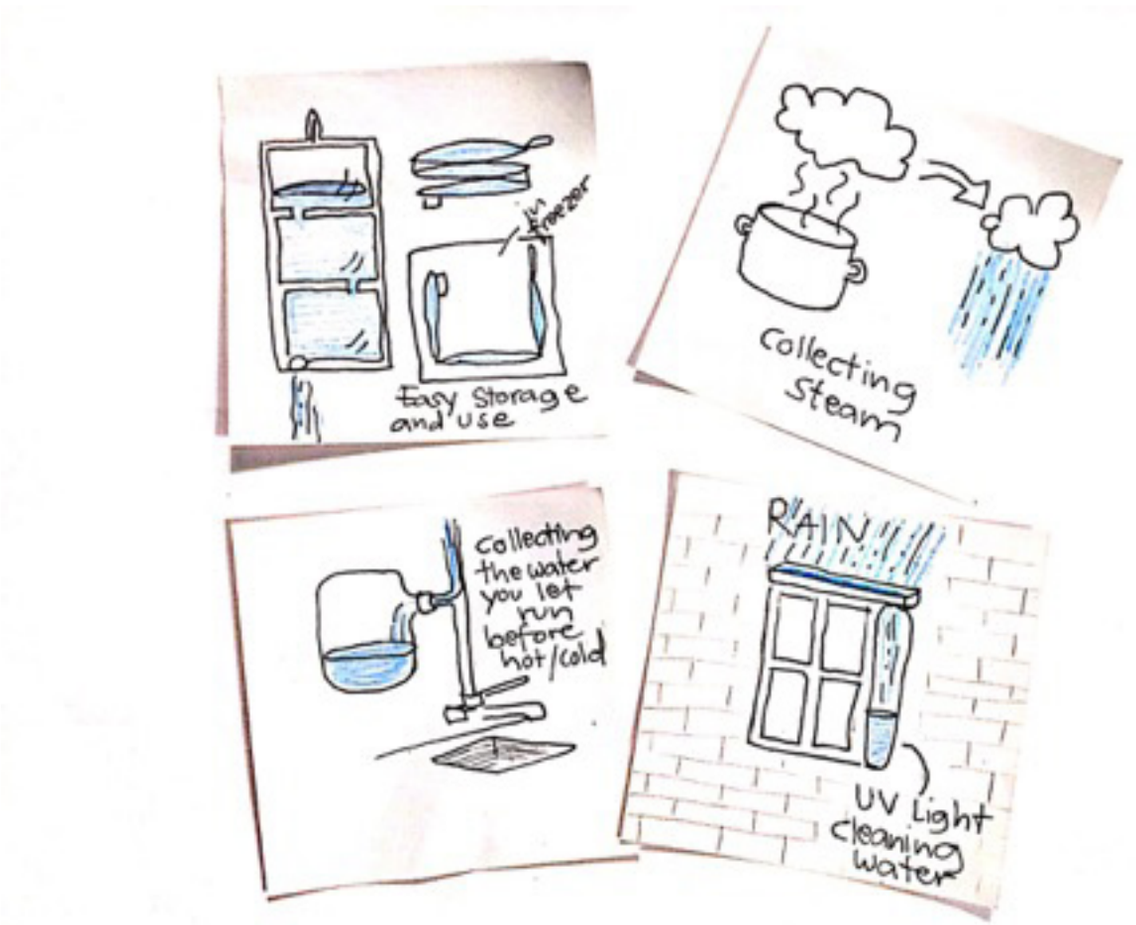

Marble run
Trampoline generating power?





WATER USE AND STORAGE

Water was the biggest concern during the experiment, and the shortage of water became very tangible. We use water in so many ways everyday, and there is really no good way to imitate that convenience off the grid.


Easy Storage and use
Collecting Steam
collecting the water you let run before hot/cold
RAIN
UV Light cleaning water

72 HOUR PREPAREDNESS KIT

What if the crisis kit was as obvious in a home as the fire alarm. A ready made easy access kit as a well designed desired object.


ONSURE
OUTDOOR KIT
TOWEL
BINER | ROPE
COMPASS
FLASHLIGHT
Onsure
FLASHLIGHT
TOWEL
BINER | ROPE
COMPASS


Háromszögletű kendő
96 x 96 x 136 cm
2 db
Kötöző pólya
steril nyomópárnával
8 x 10 cm
3 db
Vágható
sebtapasz
4 x 8 cm
6 db
Rugalmas
nem steril
rögzítő pólya
6 cm x 4 m
2 db
Rugalmas
nem steril
rögzítő pólya
8 cm x 4 m
2 db
112

ENERGY HARVESTING

CRISIS KIT


IN CASE OF
APOCALYPSE
OPEN BOX

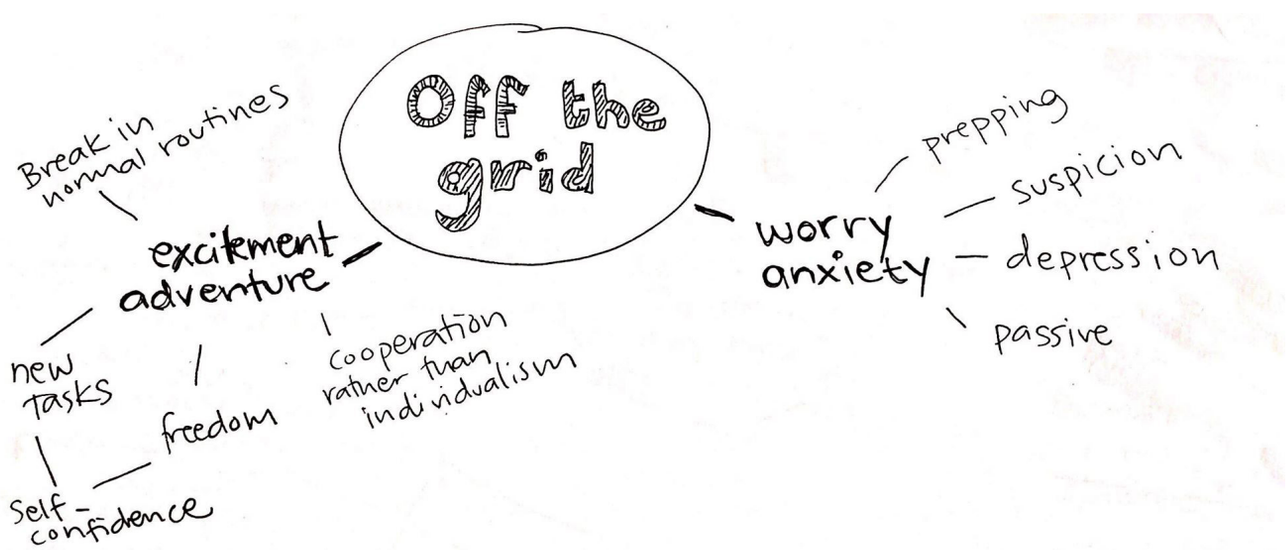

EMERGENCY
RESCUE BLANKET


STRÖMAVBROTTSLÅDA

WATER USE AND STORAGE

One interesting aspect of the Off the grid topic is the psychological part. There are two possible ways to take on the situation, with worry and anxiety or a feeling of excitement and adventure. I believe the feeling of excitement come from having another purpose and view of what is important in life. Like Elisabeth during the Västmanland forest fire. Sometimes it is of course a matter of life and death, but it could also simply be not being able to do your normal tasks but just having to make sure you have your basic needs, taking things into your own hands and being in charge of your life. In that scenario many everyday things might become quite unnecessary, and that I believe can lead to a sense of freedom and self-confidence.

What issue of survival is then most important?



WHAT CAN GIVE A SENSE OF FREEDOM & CONFIDENCE OFF GRID?

Routines ON the grid

Brush teeth under running water

Warmth - certain type of clothes

Turn on the stove

look in fridge

Shop day by day

open faucet and shower

go to work

Tv, social media, charge devices

growing plants

helping each other

Self sufficiency

only the necessary and important

hunting

Having a plan

swim in a lake

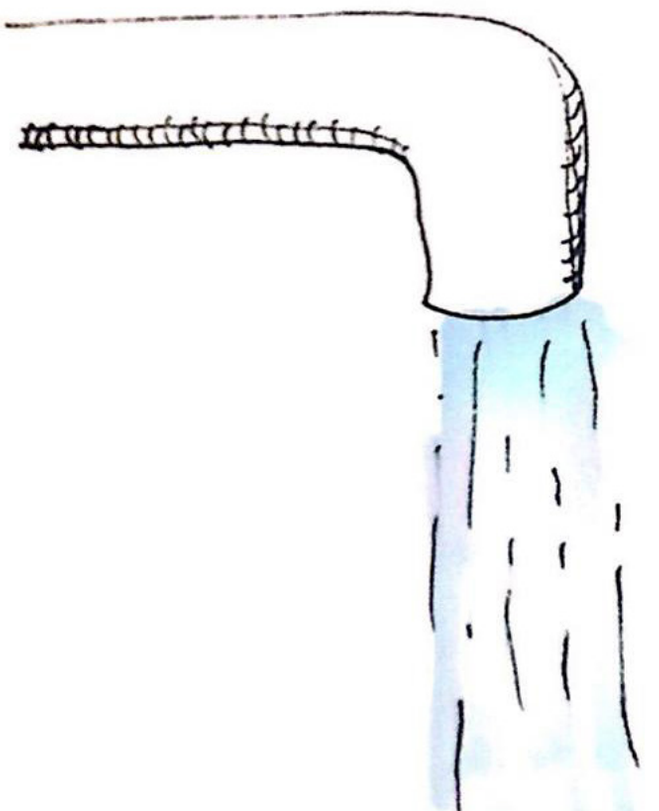
more free time - more balance

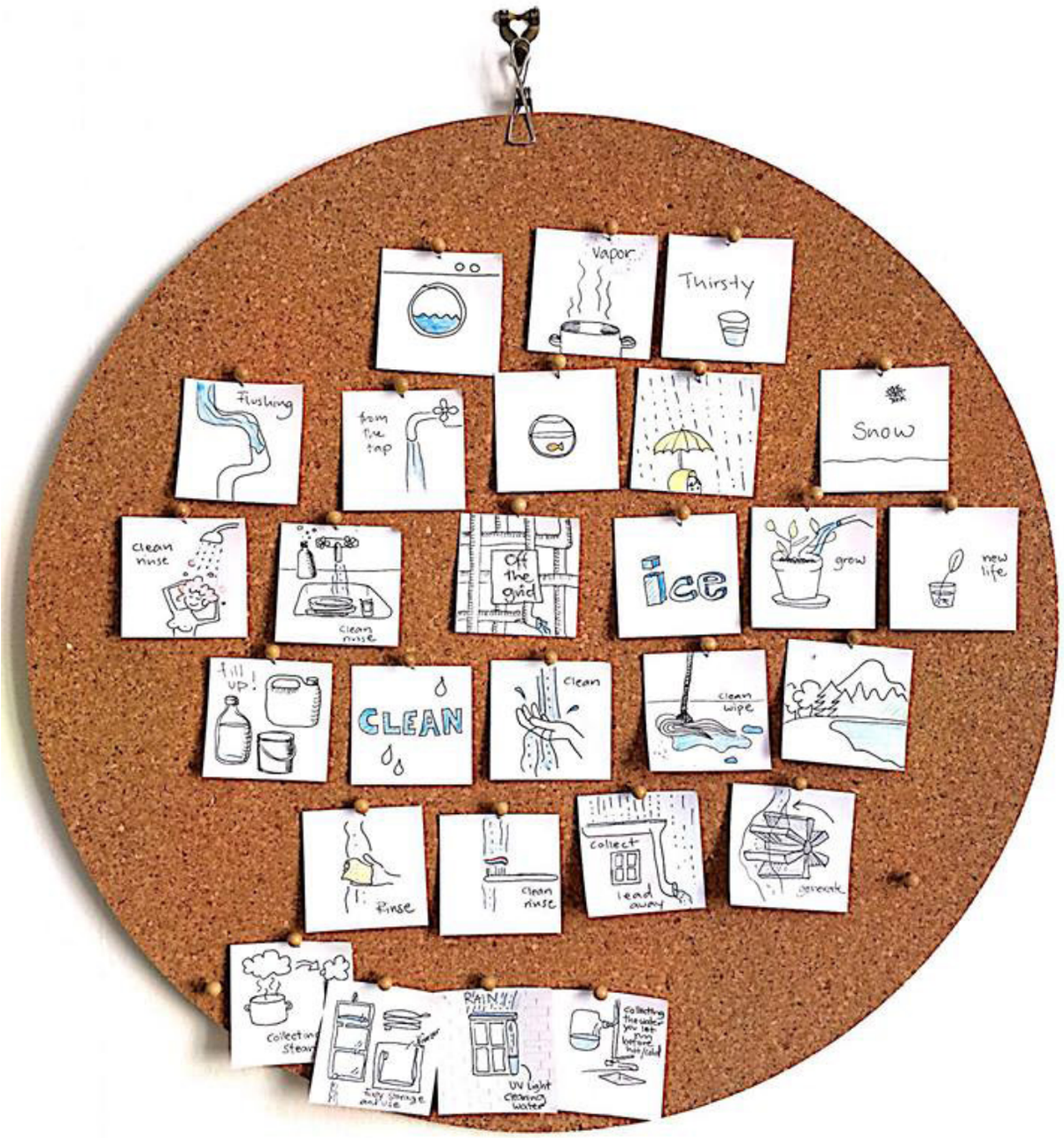
spend time together

After air, water is the most basic need for us. We are born from a water-filled uterus to a water planet, and every day we must consume about 2 litres of water.

A saying is that we manage 3 minutes without air, 3 days without water and 3 weeks without food. Even though we can manage a couple of days without water the effects of the water loss will reduce our ability to work and think and it is also important for our personal and environmental hygiene. In the event of a major power failure water supply may disappear in just a few hours.

The research, the experiences from the experiment along with the analysis of the market for Off the grid products, such as power generators or crisis kits, the most challenging and interesting path seems to be the water shortage issue, all products address the storage issue and not really the usage. How do we use the water when it does not come out from the grid, or when it is not suitable to drink because of contamination?




Vapor
Thirsty
Flushing
from the tap
Snow
clean rinse
Off the grid
ice
grow
new life
fill up!
CLEAN
clean
clean wipe
Rinse
clean rinse
collect
lead away
generate
collecting steam
RAIN!
UV light cleaning water

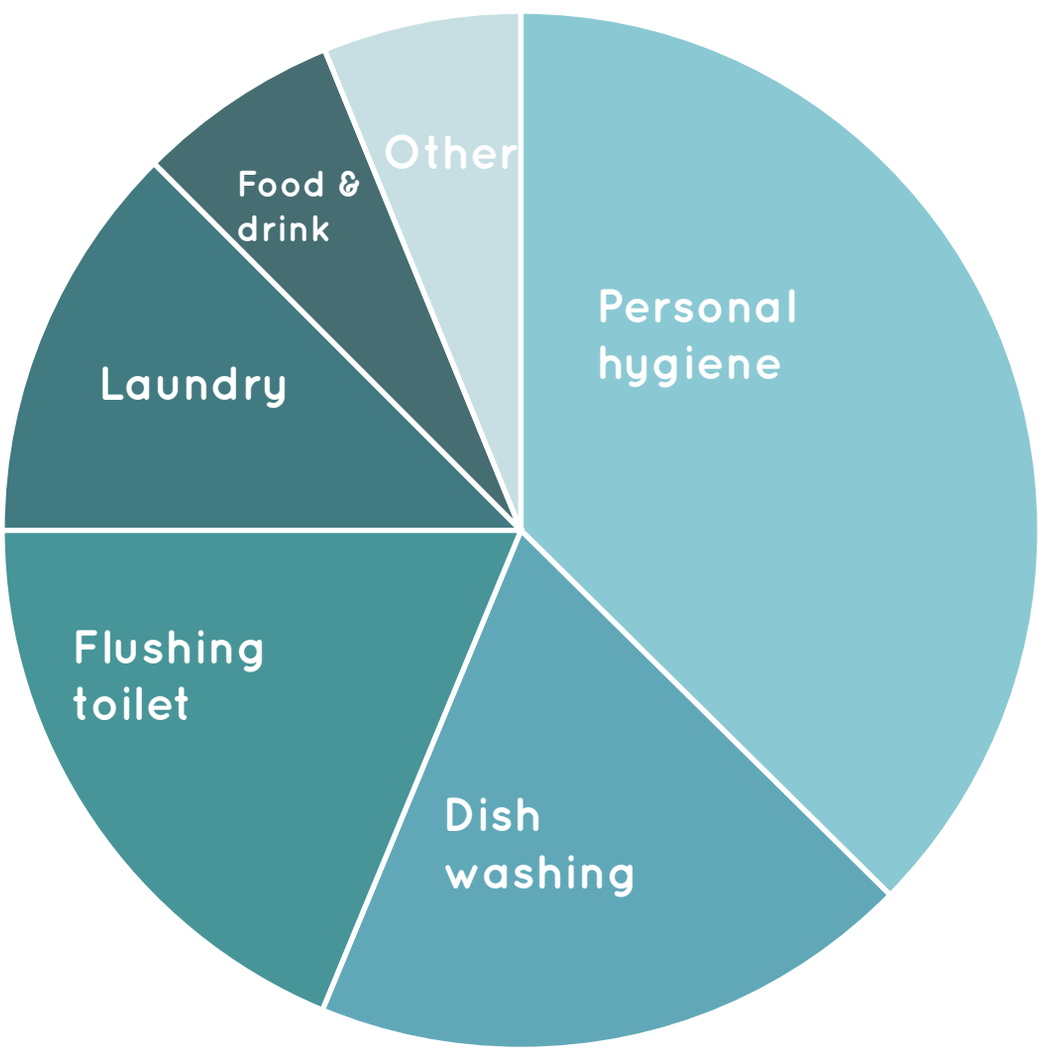
160 litres per person and day

Every person in a household in Sweden uses about 160 litres of water per day as an average. Of the freshwater taken in Sweden in total the industry uses approximately 60%, households 23 %, agriculture 5 % and others 11 %.

The availability of electricity is very important to be able to clean and distribute drinking water. Electricity is needed for everything from groundwater pumps and surface water intake to regulate pressure. A large and in many ways vulnerable link in the drinking water chain is the management system. A pipeline can cover several thousand kilometres. Long wiring makes inspection and sampling possibilities very difficult because the pipes are buried. Floods and leakage increases the risk of growth of microorganisms in the distribution facilities. The growth of bacteria in the grid can double by increasing the temperature with only 10 ° C. The risks are likely to increase in the future with an increasing number of extreme weather events.

In connection with increased amounts of rain both groundwater and surface water resources are affected. The quality of the so called the raw water is also affected by climate change. Groundwater usually has a lower and more even temperature than surface water, in a warmer climate the temperature of groundwater can be expected to increase. Higher sea water levels can threaten coastal groundwater by saltwater penetrating the water supply, especially in connection with increased groundwater usage.

For surface water the ”brownification”, the increasing occurrence of organic matter and / or iron and manganese compounds in the water, one of the biggest problems. Why brownification is increasing is not yet completely determined but increasing temperatures along with land use change is considered by many researchers to be important factors. This is increasing in Europe but is not a big problem in Skåne. However, ”brownification” has been observed in Lake Bolmen, which is one of Skåne’s most important water resources.



Water use per person and day is 160 litres according to Svenskt Vatten.

Several Swedish municipalities have had a shortage of water the last couple of years and in the summer of 2017, more than 40 municipalities had an irrigation ban. Extensive measures have been needed to maintain the drinking water supply on for example Öland and Gotland.

One might not think about the large amounts of energy the water use takes. If you shower for five minutes, it is the same amount of energy as:
A hair dryer for 2 hours
A stove run for 2 hours
Low energy lightbulb of 9 W for 333 hours
Charging your mobile phone for 200 hours.

The world

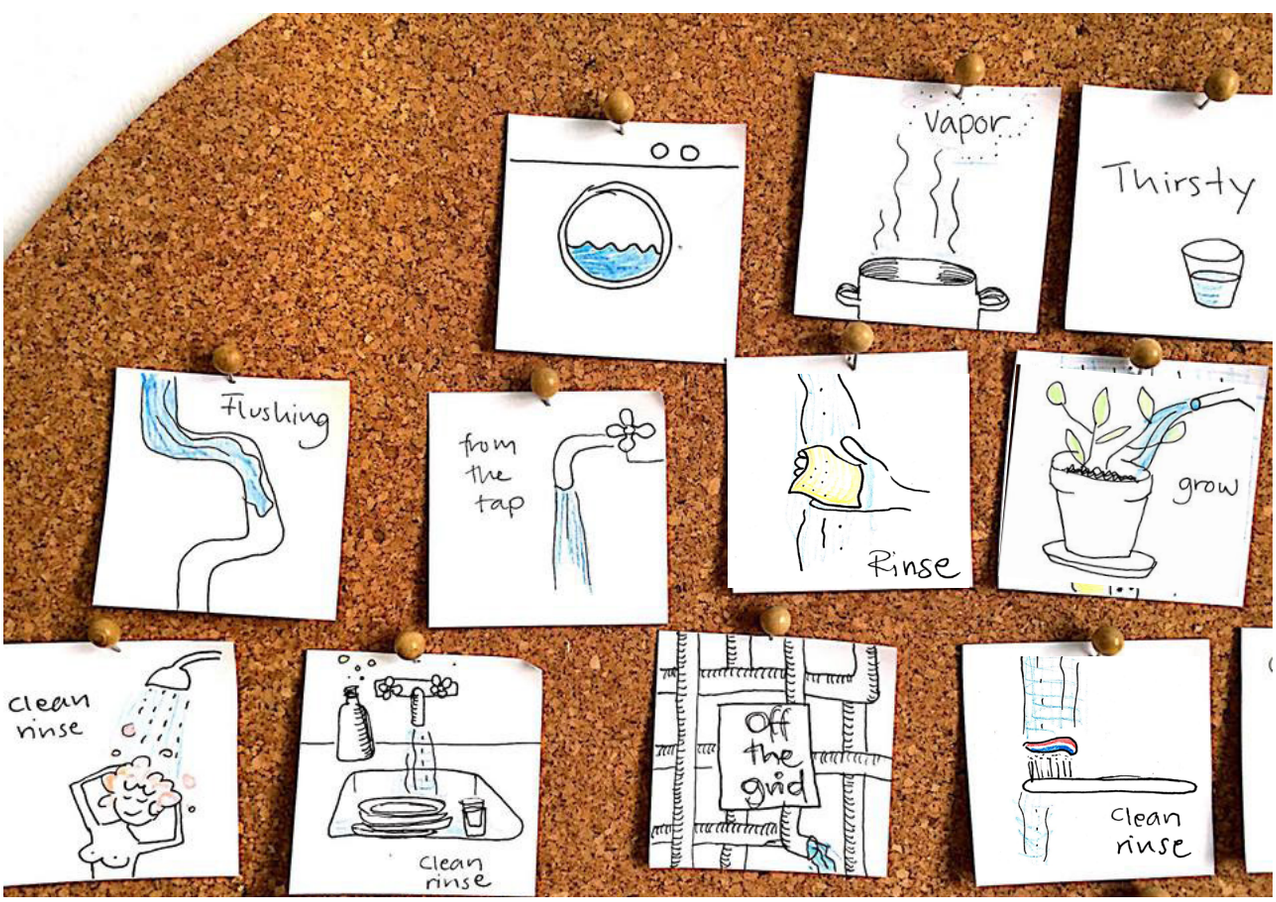
In Sweden we are lucky to be able to turn on the faucet and a nice clean water fills our glasses. In other parts of the world one must walk several kilometres each day to get water. 1 in 3 people on the planet don't have a decent toilet. 1 in 9 don't have clean water close to home. A drop of a toxic substance can contaminate thousands of litres
of water and emissions can remain for generations in our groundwater. Every minute a new born die from infection caused by lack of safe water and hygiene. Diarrhoea caused by dirty water kills a child under 5 years of age every 2 minutes.

Kämpargård, N. 2018
https://www.norrvatten.se/Dricksvatten/Fakta-om-vart-dricksvatten/Sa-anvands-vattnet/
http://www.lansstyrelsen.se/skane/SiteCollectionDocuments/Sv/miljo-och-klimat/vatten-och-vattenanvandning/dricksvatten/skanes-dricksvatten-forsorjning-i-ett-forandrat-klimat.pdf
energimyndigheten
https://www.livsmedelsverket.se/produktion-handel--kontroll/krisberedskap-och-hantering/krisberedskap-och-sakerhet---dricksvatten
https://www.wateraid.org/facts-and-statistics

MY WATER USE DURING ONE DAY

Brushing teeth	2 times
Washing hands	13 times
Flushing toilet	5 times
Drinking a glass of water	3 times
Fill a pot	1 time
Rinsing fruit or vegetables	1 time
Shower	1 time
Rinse dishes etc.	4 times
Rinse cloth etc.	11 times

TOTAL 41 TIMES



If the drinking water supplies cannot be used Reservoir or emergency water is required. Reservoir supply is taken from an alternative water supply and distribution goes through the regular pipeline network or in a temporary pipeline.

Emergency water supply is used in the event of a breakdown and is solved with water tanks that are set up in the affected area. Since the amount of water in the tank is limited it is primarily intended for food, drink and personal hygiene. The citizens are required to go to those places with their own water containers.
The National Food Administration (Livsmedelsverket) has several central warehouses with emergency water equipment.

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http://www.svensktvatten.se/vattentjanster/dricksvatten/sakerhet-och-krisberedskap/dalig-dricksvattenkvalitet/

One kind of emergency water tank.

Storing

Provided that the water is clean it can be stored for a long time. The water may taste differently from time in the plastic tank, but it is rarely dangerous to drink. You should keep the can dark and cool. Dark, because light causes algae growth, mostly in transparent plastic vessels. It is not dangerous, but quite disgusting. Cool, because increased temperature favors bacterial growth. Aquatic bacteria are rarely dangerous, but they cause bad taste. According to Torbjörn Lindberg, microbiologist and state inspector at the Swedish Food and Drug Administration disease-causing bacteria are usually not adapted to living in water so they die after a while in stagnant water. This would mean that if you got dangerous bacteria in the vessel the water gets better after being stored a while. A cool food basement is perfect for keeping the water cool. Not everyone has access to this, and you still need to have water easily accessible in the kitchen. If possible you should have one vessel in the kitchen and the reservoir in a cooler place, if it should be stored a long time.

With the drinking water in the can you can also do well with sea water and rainwater for hygiene and watering, if it is a rainy period and also if you are able to collect it.

In case of contamination in the water supply all water must be boiled to remove parasites, bacteria or viruses. Cooking time is recommended to be ”Big bubbles, no troubles.” UV-light is also an effective way to clean water. Simply leave it out in the sun for a day. There are also water purification tablets and filtering devices to buy in many stores. However neither cleaning tablets nor boiling removes industry or agriculture pollutants.

Size

What is the best size container for collecting, transporting and storing water? according to Kämpargård it is a 10 litre can. It can be moved by most people including children, and it is easier to take one in each hand than one single 20 litre can. The Prepper forums of course also have the answer:

”I have different variants and do not think you should have more than 10 liters. The 20 liters become very heavy and can in principle only be handled by larger adults. For my mother I have set up so she only has 5 liters, because they are easier to handle. Even children can carry a 5 liter can. ”

”Containers of about 10-liters. Then you can send older children to get water. If you have a 20-liter can, it’s basically just the father of the family who can get water. A young teenager can, with wining, carry a ten-liter in each hand. I have tested. ”

https://www.hemtrevligt.se/husohem/artiklar/konsument/20060701/vatten-pa-landet/
Niklas Kämpargård Krishandboken
http://swedishsurvivalist.egetforum.se/biltemas-20l-vattendunkar-t10815.html
http://www.72timmar.se/vara-fem-grundbehov/vatten

GREY WATER

Grey water, which is the water that comes out of the drains of showers, baths, sinks and washing machines, can be used for watering houseplants, landscaping or flushing the toilet.

The water coming from the kitchen sink or dishwasher can contain a lot of organic matter and is therefore not considered grey water but sewage, or Black water. A bathroom sink or tub often has minimal amounts of organic matter and soap residue.

Grey water https://www.treehugger.com/green-home/how-reuse-grey-water-home-and-yard.html

Toilet with grey water flushing

The 27th of May 1992 hell broke loose in the city of Jajce in Bosnia where Renato grew up. He was 13 years old and says that the people in Bosnia never thought it would come to the point that the war reached them. The medieval city is secluded, surrounded by mountains, and there is only one free passage out. There were 45 000 citizens in the municipality, and during the relatively short time that they were under siege, 2000 people died there. They were lucky in comparison, he says, many others were worse off. After 6 months people in Jajce were allowed to escape. During these 6 months there were shortage of both water and electricity. He remembers reaching a city 70 kilometres from Jajce after the escape. They had street lights. "It was beautiful to see". However, the electricity was not a very big problem to be honest," Renato says. "It was the water."

Dangerous getting water

The city has no lack of water, it has two lakes and a spectacular waterfall. There were always places with water, the problem was that the citizens in Jajce could not get to it. The water was controlled by the occupiers. Sometimes they opened passage for a day or so, but the water could be totally cut off for up to a month at a time. Even if there were water the pressure was not enough to reach the buildings. They collected the rain water, and sometimes tank cars came. The problem was that it was dangerous to get to the tanks since they got shot at. Renato tells a story about when they were getting water with a hose from a fire post in the street, and the occupiers managed to shoot a hole straight through the hose.

They filled the bathtub with un-clean water to use to flush the toilet. They had cans of water for drinking. Once again, he points out that other places were worse off. In the capitol people had to run for their lives for every litre of water, he says.

Changed priorities

The water scarcity changed the priorities. He remembers the certain smell from flushing the toilet with buckets, the un-fresh feel. The precious water was not wasted on cleaning in first hand. Nor on personal hygiene. He had to mend all of his teeth after the war.

"The Malmö water tastes so good. I have been a lot of places in Europe, and it is the best. I am really grateful for the water."

Renato's parents now live in his grandparent's apartment where they stayed during the war, were they had to take cover in the basement during the air raids. Their own home got totally burnt down. When visiting them, Renato does not drink the water from the tap. He says it has a bad taste and it is never cold. The systems for water are not properly taken care of and garbage is thrown on the ground. " People do not respect nature, it is sad to see how the waters are polluted". He believes that we are a bit spoiled in Sweden. Of course, it is good that we have few real problems, but he believes the situation can change easier than we think and that what happened in Bosnia and what is happening in Syria can happen anywhere. Everyone can be capable of taking to arms, he says.

" I think future wars will be over natural assets."

Renato does not have preparation for a long-term water shortage today. He has "done his part", as he puts it, He believes it is hard for people to prepare if they do not have experiences of a similar situation. *"You can never be really prepared"*, he says. But he has the awareness. Even today Renato dislikes wasting water.

Jajce in Bosnia and its 23 metre high waterfall

Day zero

A drought two years ago hit South Africa and Cape Town was particularly affected and this has contributed to the water shortage they now encounter. Residents of Cape Town have been living with water restrictions of 50 litres per person per day. This can be compared to the 160 litres per person and day we use as an average in Sweden.

The point when water is completely out being called ”Day Zero”. Originally the date was set to April this year but has been delayed to next year. The delay is mainly because the city gave restrictions to less than one sixth of the average water consumption. When day zero comes, the government will switch off all taps and rationing the resources at collecting points.

“No person in Cape Town should be flushing potable water down a toilet anymore.… No one should be showering more than twice a week now,” said Helen Zille, the premier of the province where Cape Town is located. Scientists think that this should be a wake-up call for other countries.

Droughts have become more frequent, recently California as well as Australia faced a drought that lasted for years. São Paulo had its own Day Zero in 2015, forcing many businesses and industries to shut down, and Barcelona has had to import water from France. With rising populations these situations will increase according to a 2016 study in the journal Science Advances. Fourteen of the world’s 20 mega-cities are now experiencing water scarcity or drought conditions.

In An article in USA Today Cape Town resident Kelson da Cruz demonstrate the water rationing, pointing out the bucket beside his shower.

“We always open the tap, the water is there, easy,” Da Cruz said. “I was lucky to travel to some dry countries where water has always been a big issue. So, when we moved to South Africa that has always been on the back of our mind”

The city has also made two-minute Shower Songs by top South African artists to keep water usage down.

Water theft

According to the article in USA today The United Nations’ 2010 recognition of water as a human right has complicated the issue of water theft. Companies and individuals in countries like Mexico, India and brazil illegally tap into pipelines and reservoirs.

” The right to water does not mean the right to free water. In the same manner that people must pay for food, they should expect to pay for safe water.” one person in the article says.
” There should be two tiers of pricing. Conservation pricing, which charges the minimum amount for water that is sufficient for basic needs, should be provided at low rates. Discretionary water use, which is anything beyond the necessary amount, should be charged more,” Betsy Otto, director of the global water program at the World Resources Institute says to The national Geographic. She means that on a national level government should encourage these water saving issues, because saving water will always be cheaper than building or drilling for new sources.

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https://news.nationalgeographic.com/2018/02/cape-town-running-out-of-water-drought-taps-shutoff-other-cities/
https://www.usatoday.com/story/news/world/2018/02/03/cape-town-runs-out-water-day-zero-predicted-happen-april/303863002/
https://www.cnbc.com/2018/04/11/cape-town-water-crisis-cities-should-prepare-for-water-scarcity.html

LET'S BEAT DAY ZERO
WITH 50ℓ OR LESS PER DAY

This is a guide for 50ℓ per person per day. Your actual usage will depend on your appliances and personal preferences.

FOR MORE VISIT **CAPETOWN.GOV.ZA / THINKWATER**

FOLLOW @CITYOFCT ON FACEBOOK AND TWITTER

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Making progress possible. Together.

People queing for water in Cape Town.

SUMMARY PART 2

The research from this part has lead me to the conclusion that there are many risks threatening our convenient water supply. Changing climate and our use of the resources is worth thinking about. In many parts of the world the issue of water shortage is a painful reality. It is one of the things we take most for granted in our everyday lives. But when the supply is taken away it is also the most precious thing to us. For Renato from Bosnia it is one of the things that still affects how he thinks about water use today.

In the event of a crisis where we would not get water out of the tap there are many issues to be considered. The use of grey water is something to investigate. During one day I used water 41 times for different things. An average Swede uses 160 litres per day.

How can this be made more effective when you need to use the water Off the grid?

- MOST PRECIOUS - AND MOST TAKEN FOR GRANTED
- SAVING THE GREY WATER
- AMOUNTS OF WATER USED
- HOW CAN IT BE MORE EFFECTIVE OFF THE GRID?

Design something to help a Malmö city apartment household prepare for and manage a 72 hour shortage of water.

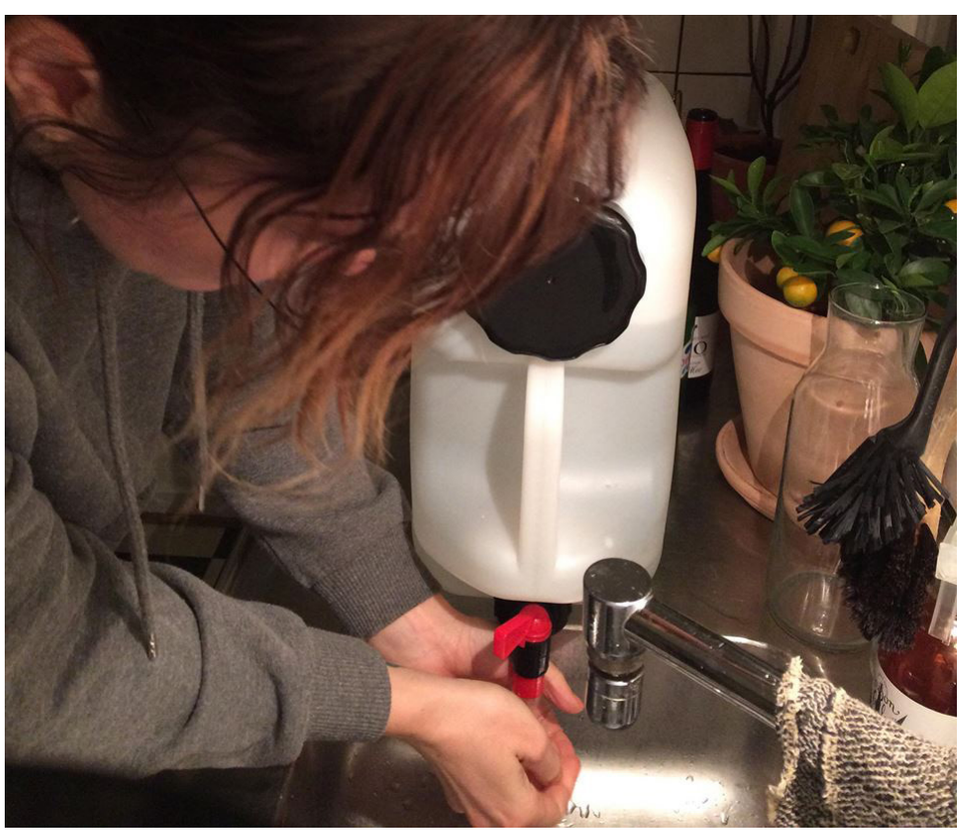

CLOROX

LEVEL OF DESIGN - HIGH

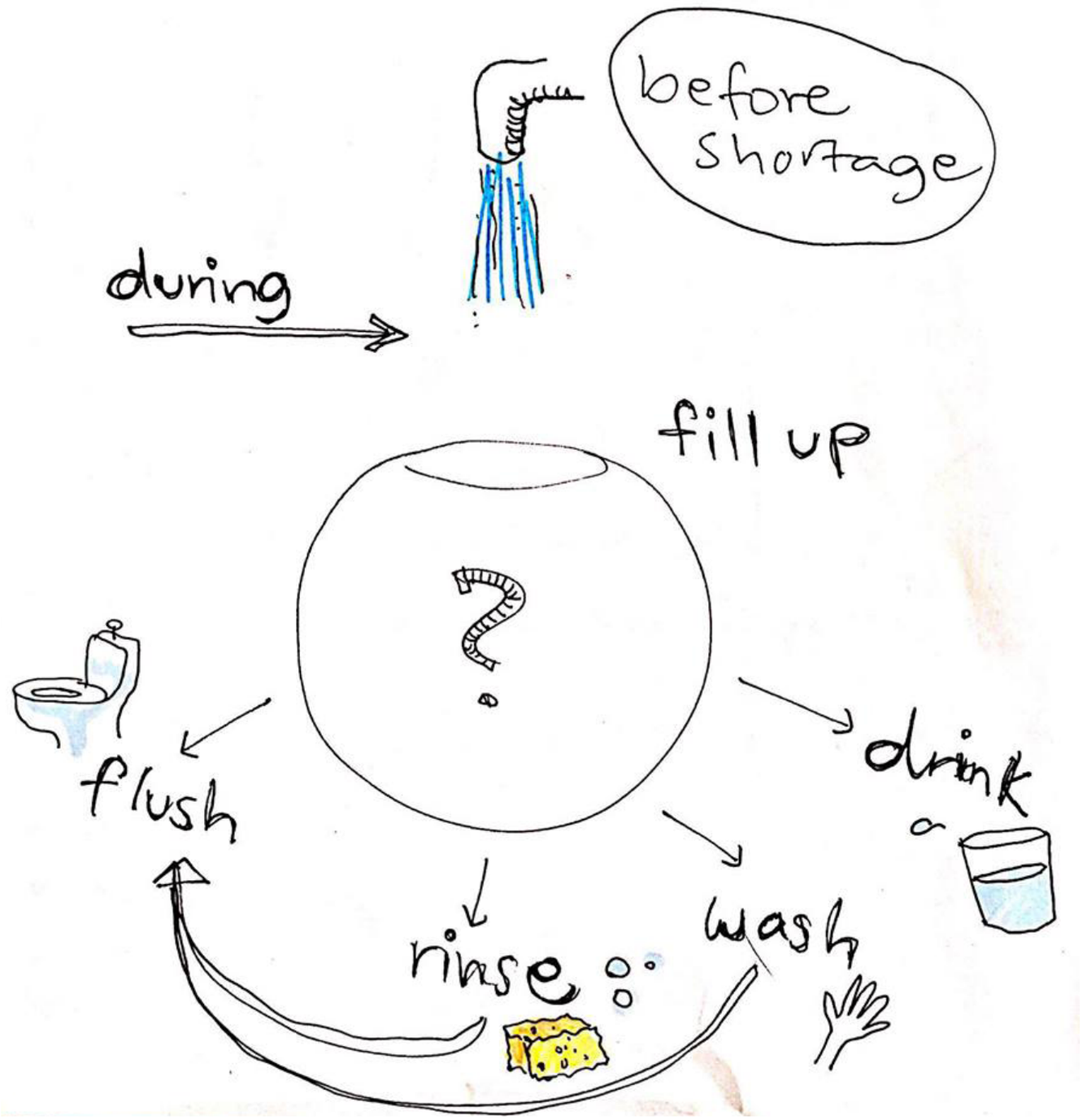
DESIGN +
FUNCTION
= MARKET

LEVEL OF FUNCTION - HIGH

The use of the water container by the sink has some difficulties. First, the tap needs to be at the bottom of the can which make it inconvenient to reach at use. Second the tap switch is hard to turn with one hand, and this also makes the water start running out before you can start washing your hands, and the same when you turn it off. It is quite a stressing feeling that the water runs out while trying to close the tap. If you fill glasses or pots the problem is not as big since you already collect the precious drops.



Hold water	MF
Portion water	NF
Be portable	NF
Be part of home environment	DF
Purify water	DF
Collect water (On grid or outdoors)	NF
Reduce consumption	DF
Save grey water	DF

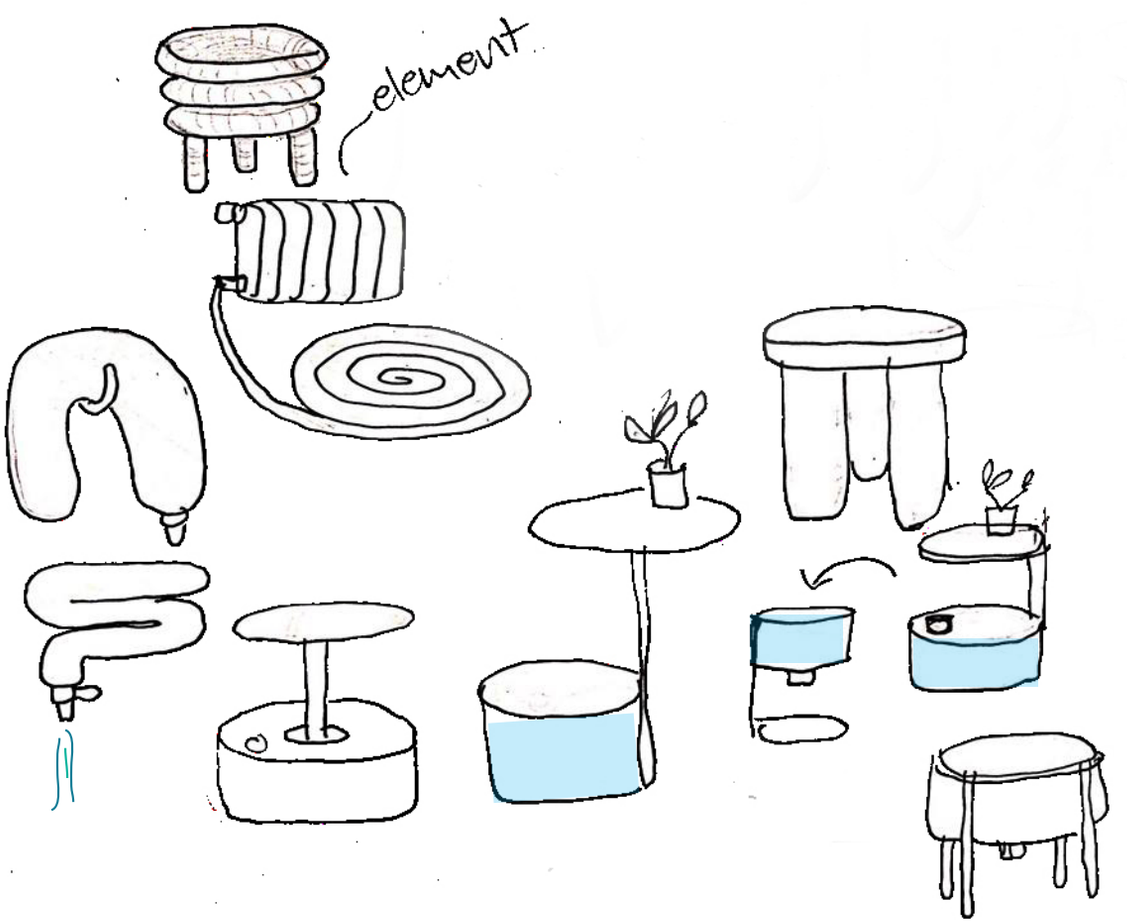

before shortage
during
fill up
flush
drink
rinse
wash

SYNTHESIS

STORING WATER

RE-USING GREY WATER

EASY HANDLING

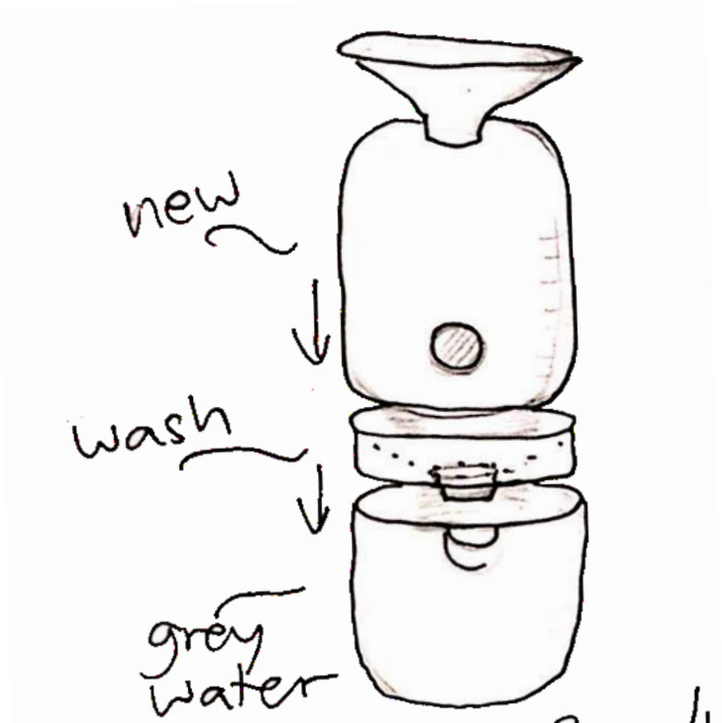


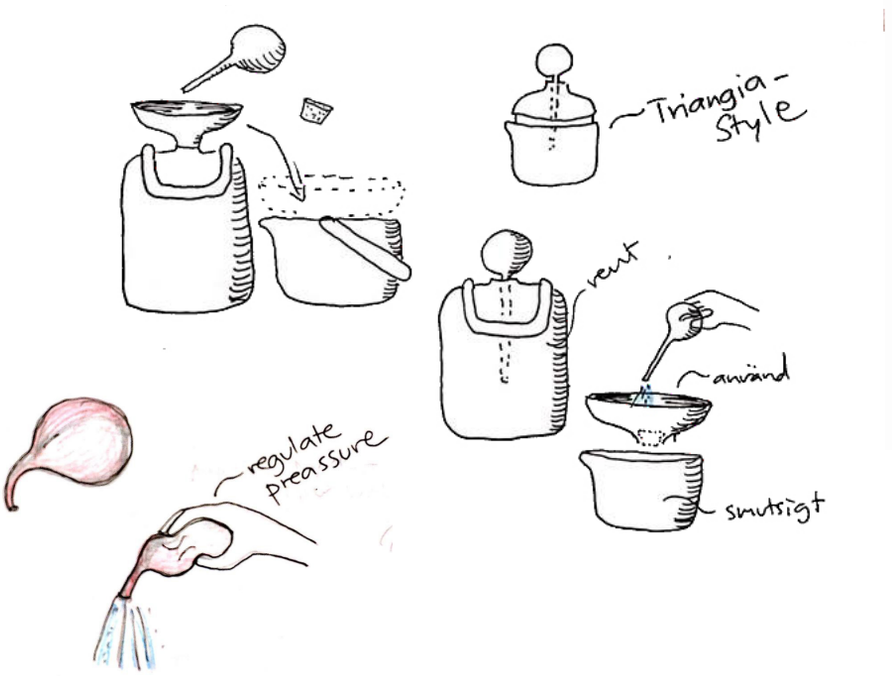
FURNITURE **FLEXIBLE** **UNOBRUSIVE**

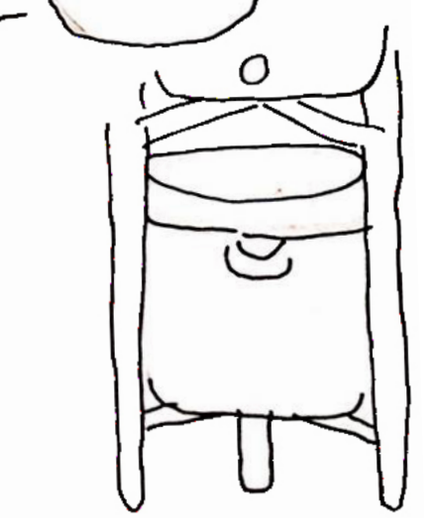
WATER PRESSURE

GREY WATER

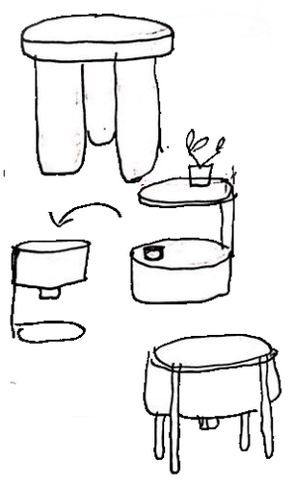
EASY USAGE



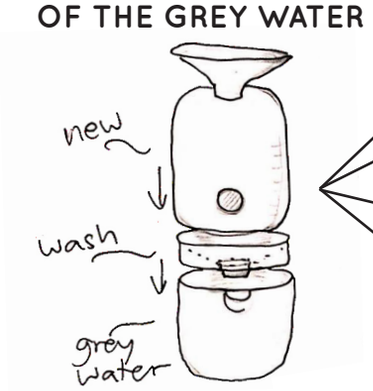




STORING WATER IN HOUSEHOLD OBJECTS LIKE FURNITURE



USAGE, TAKING CARE OF THE GREY WATER



USAGE, PORTIONING

Hold water	MF
Portion water	NF
Be portable	NF
Be part of home environment	DF
Purify water	DF
Collect water (On grid or outdoors)	NF
Reduce consumption	DF
Save grey water	

After focusing on storage and usage of water by including collecting the grey water it felt like something was missing. It seemed the ”feeling capable and independent” part could be emphasized. The saving of the grey water is off course a good thing, but it was a quite stationary solutions with big containers to move around. Also, waiting to fill up the grey water part to be able to flush the toilet seemed unnecessary. Because you want as little waste water as possible from your quite precious water, right?

I also thought about my aim to make things more obvious, easy and unobtrusive, maybe even fun. In best case also raising awareness around water use and a will to use only the necessary even under normal conditions. Sort of a respect for water.

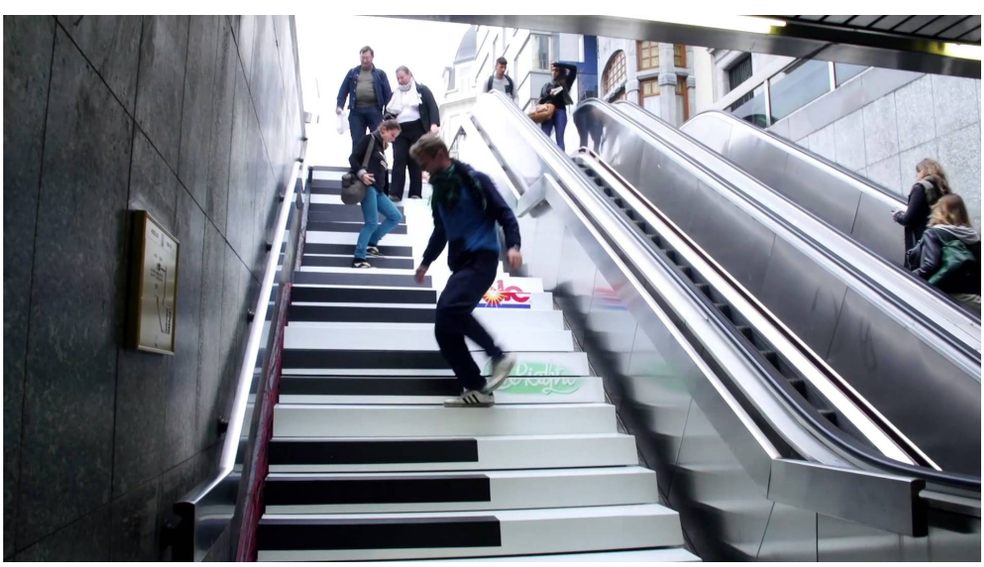
I researched what makes people aware and change habits and behaviour in other situations and came across IDEO’s thoughts around design for behaviour change. To sum it up it is about people wanting to change they just need new design to aid this or to teach them how. this thought is put into 3 principles:

1.Speak joy, not fear – focus on positive emotions

2.Use judo – piggybacking on existing behaviours

3.Create the crowd – enabling peer pressure.

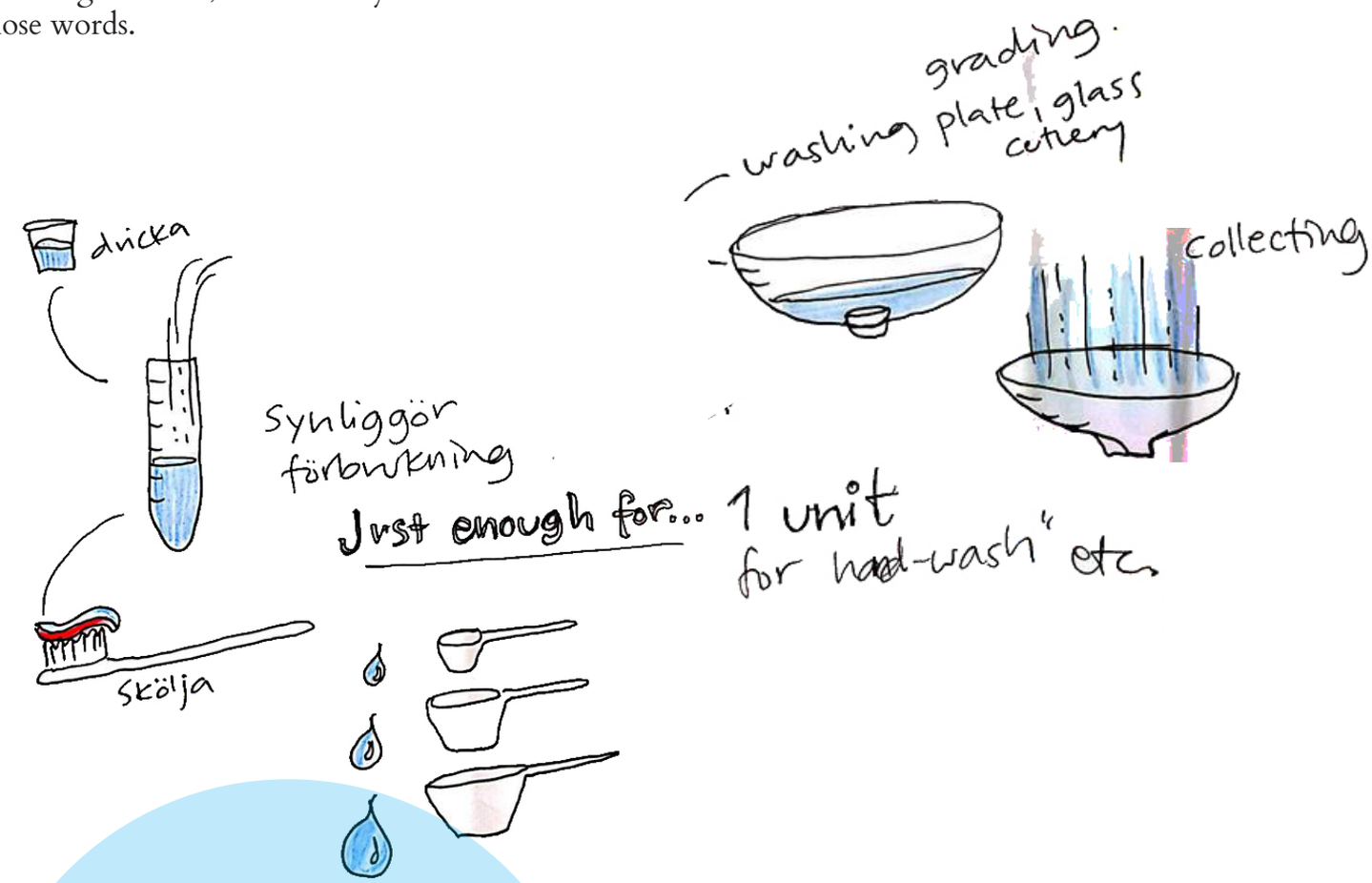
I want to make my design for water use off grid to be as similar to everyday use and existing behaviour as possible, to make it easy for the users to be prepared. Maybe even prepare by using only the necessary amount of water already. I think this would also contribute to the feeling of being capable and independent.



IDEO*s example how design can change behaviour. An interactive piano surface was installed on a public staircase resulting in more people taking the stairs.

https://behaviourchangingproducts.wordpress.com/2013/05/18/behaviour-changing-design-insights-from-ideo-change/

From my talk with Lina Ringberg at Malmö Stad i took the three key words *Prevent, Prepare and Handle.* To me this applied very well to the situation of Off the grid water, and I did my ideation around those words.

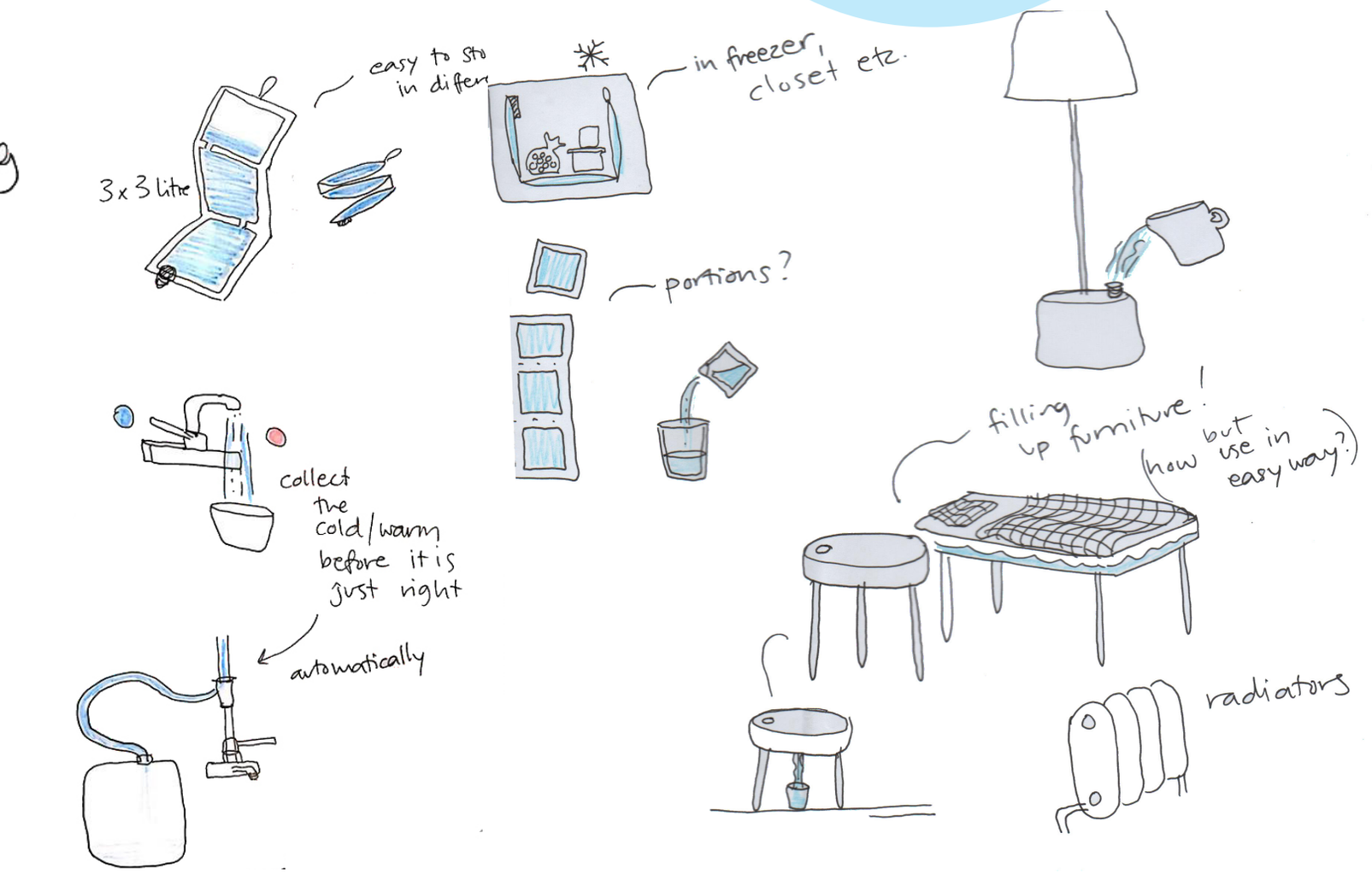


PREVENT

Prevent by cutting down on usage to soften the blow of water loss.

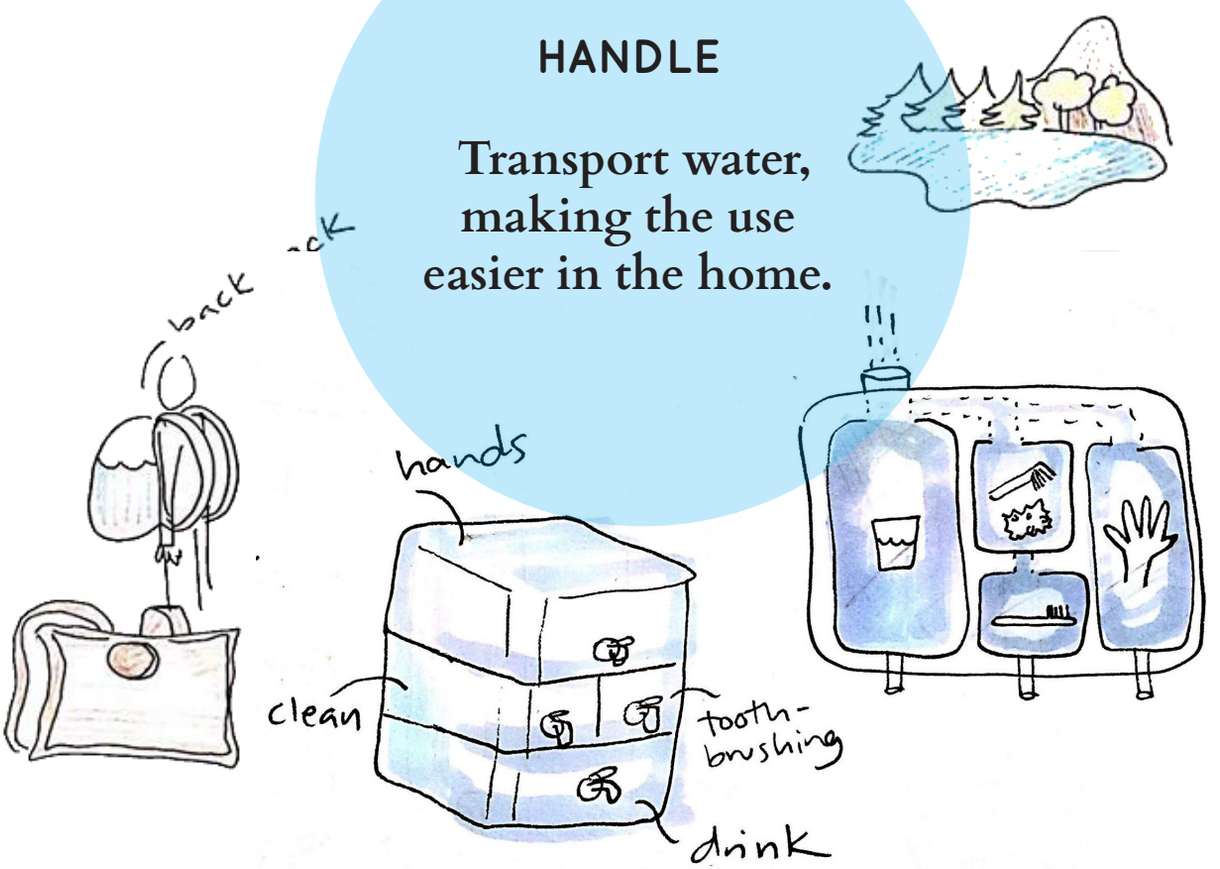
PREPARE

Fill containers before shortage.
Make it easy to store.



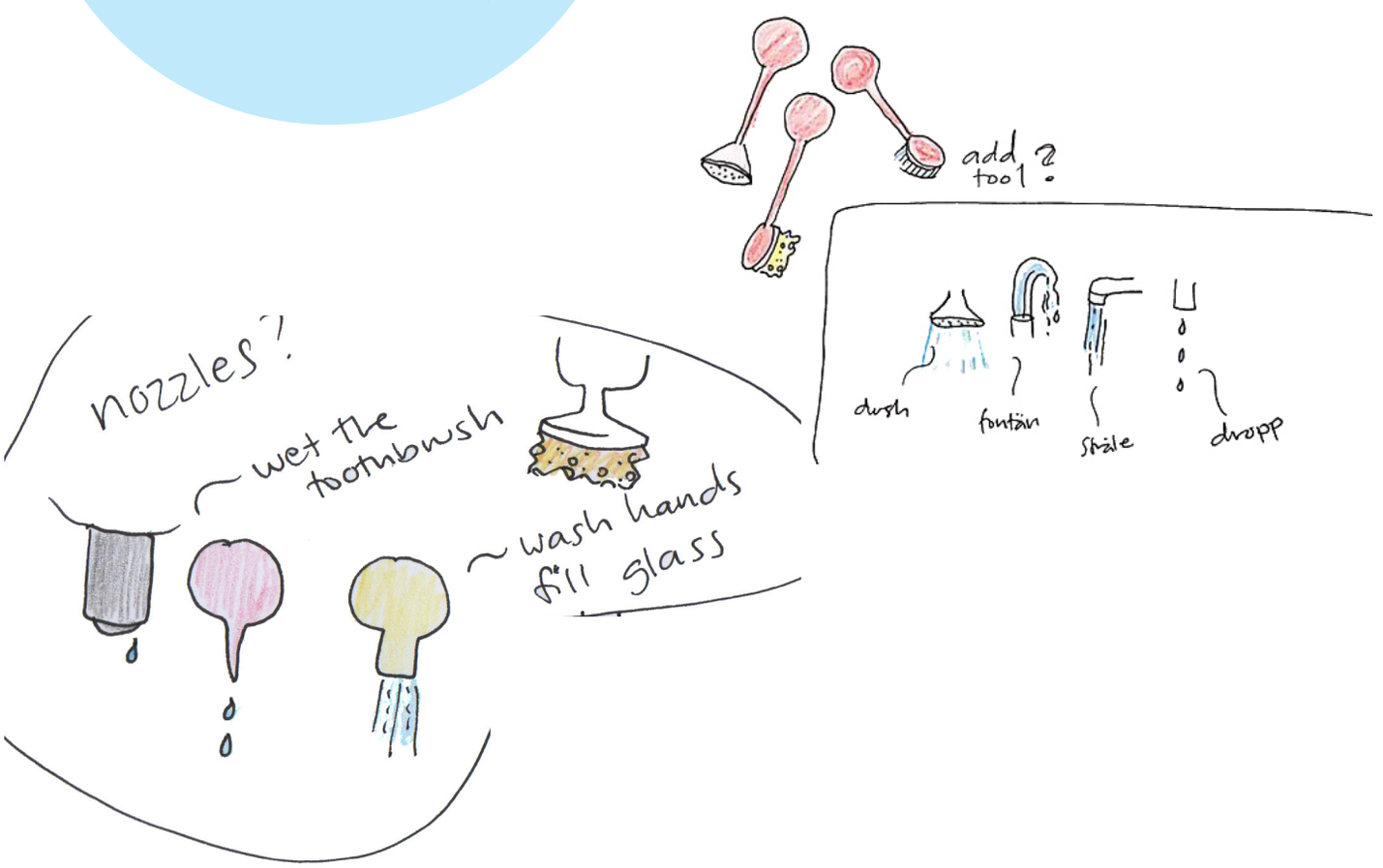
HANDLE

Transport water, making the use easier in the home.



PREVENT + HANDLE

Use only the necessary in the best and most effective way possible.



FOCUS POINTS

- PREVENT + HANDLE
common denominators =
Only the necessary - just enough!

- Clean

- Water preassure

-"Speak joy, not fear-
Piggyback on existing
behaviour" (IDEO)

- New focus leaves no real need to save the grey water from the regular use.

These focus points give me the idea to design the water storage with the usage in mind, and to try to find out what amount of water is necessary for 72 hours. This is to minimize the amount, for easier transport and collecting, and above all of course saving. This amount can then be stored in different containers for different uses. In our home we have many ways we use water and basically two places to do so. This idea does not include what I previously found important; saving grey water for flushing the toilet, but I believe this is something that hopefully will not be as important if you use only enough and minimize the amount of water running down the drain. Also, you can always store water in buckets for that purpose anyway, in a bathtub or collect rain or lake water.

According to Livsmedelsverket (National food association) the recommendation is to have big containers to get water from the emergency water tanks. It may otherwise take unnecessary time and with a lot of spilling if everyone is to fill water in many small bottles. That makes sense, so besides the containers for dosage and easy use, there should be a big container to collect in and portion from.

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https://www.livsmedelsverket.se/globalassets/produktion-handel-kontroll/krisberedskap/krisberedskap-dricksvatten---vaka/operativa-atgarder-vid-vattenkris-med-nodvattenforsorjning.-handbok-for-insatspersonal.-livsmedelsverket-2011.pdf

RE-DEFINED BRIEF 2

Investigate how little water it could take to fulfil your basic needs for 72 hours. From that design a series of containers to help a Malmö city apartment household prepare for and manage drinking and sanitation in a satisfying way during a 72-hour shortage of water using, and wasting, as little water as possible.

HOW LITTLE WATER DO WE ACTUALLY NEED TO USE AND STLL FEEL CLEAN?

I tried different ways to dose the water. I then measured the amount of water in the sink. The spray was the most efficient, however it was annoying and time consuming to push the spray for every dose of water. The pipette was a bit surprisingly the least efficient. It also left an unsatisfying feel of not getting completely clean from the soap. Probably because of the difficulties adjusting the pressure.

One day dishes:
2 plates
1 glas
1 coffee cup
2 sets of cutlery
1 pot
1 spoon
1 knife

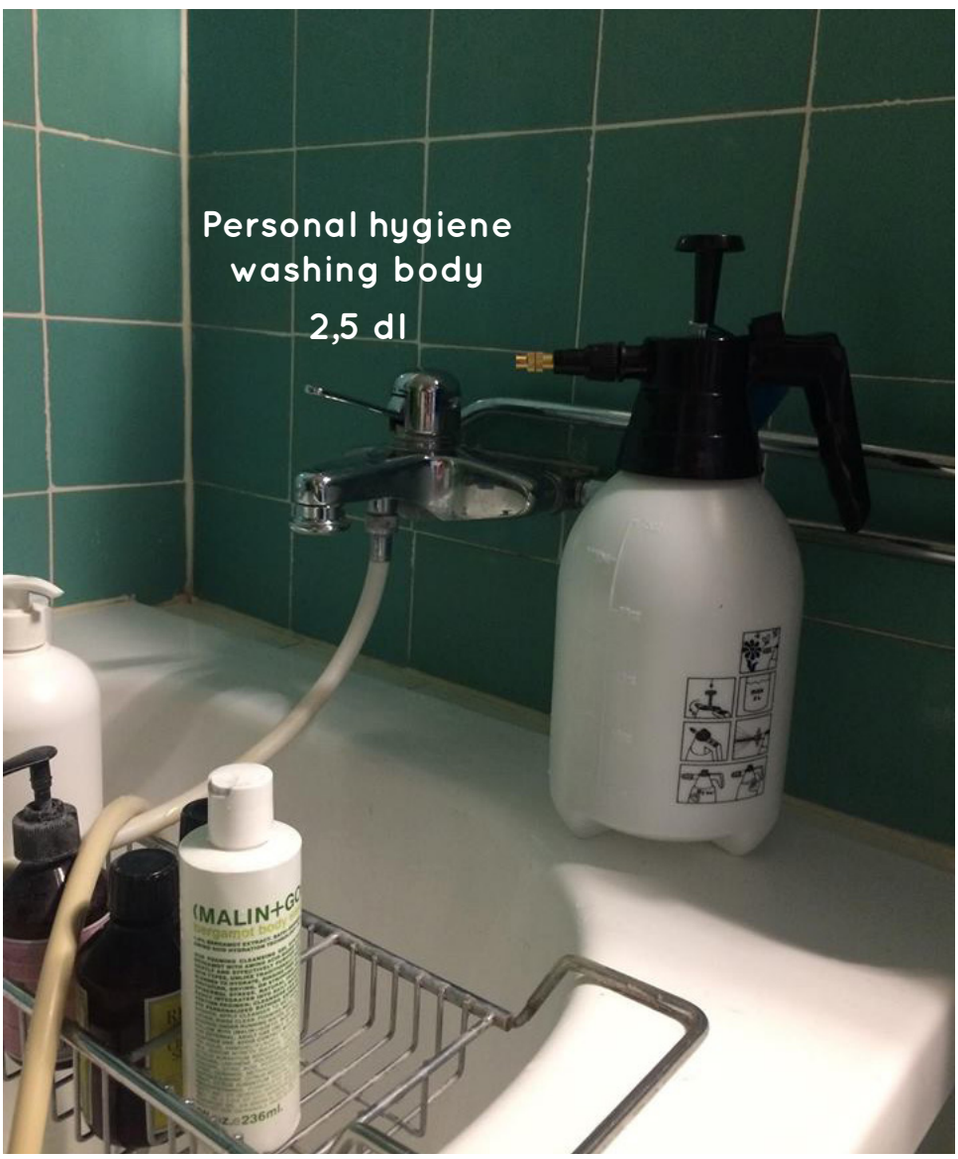
I decided to try out the spray some more. First, I tried if the amount of water coming out of the tap and the water can was the same by washing my hands both ways. Since it was basically the same amount running out, I did the dish washing test in the sink out of convenience.


Regularly
under running water
80 dl
Regular, but saving
40 dl


With spray
2,5 dl
Saving about
90 %

Since the spray bottle was not satisfying because of the time-consuming pressing of the handle, I tried a gardening pressure pump spray. The amount of water coming out was just as little as with the conventional spray bottle, but much more time effective and convenient. The amount used was also the same with both the misty shower spray and a more concentrated spray.

The pressure spray was also efficient in the shower. It used only 2,5 dl for washing the most necessary, a ”katta-tvätt” as you say in Skåne. Of course, it could be used for a regular shower as well, included hair washing. Even if you use a whole litre it would still be a small size container. The decision to wash only the necessary was my thought that for 72 hours that would be enough.


Personal hygiene
washing body
2,5 dl

Testing the function with a pressure spray mock up. The test persons found the hand washing to be very effective and that it had a nice, and even ”fun,” feel to it.


RAMLÖ

Mats Rundgren, senior lecturer and researcher at the Department of Physiology and Pharmacology at Karolinska Institutet, says there is no evidence that healthy adults do not drink enough under normal circumstances. Water is a solvent and transports salts, carbohydrates and proteins to the right place. Via the urine we get rid of waste products and regulate the salt balance in the body. Evaporation of water regulates body temperature, we sweat to cool ourselves, and we have to drink more. Mats Rundgren believes that it is usually enough to drink about 1.5-2 liters per day. The amount and color of the urine gives the best answer to if you drink too little, if the urine is light yellow and you pee a couple of times a day, you are getting hydrated enough.

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https://ki.se/forskning/sluta-klunka-du-dricker-inte-for-lite-vatten
Text: Helena Mayer, Medicinsk Vetenskap nummer 2, 2015.

1 PERSON

Brushing teeth	0,5 x 2 x 3
Washing hands	15 x0,5 x 3
Washing body	2,5 dl x 3
Drinking	1,5 litre x 3
Doing dishes	2,5 dl x 3
Other (filling a pot for cooking pasta, wiping of surfaces, extra drinking etc.)	15 dl x 3

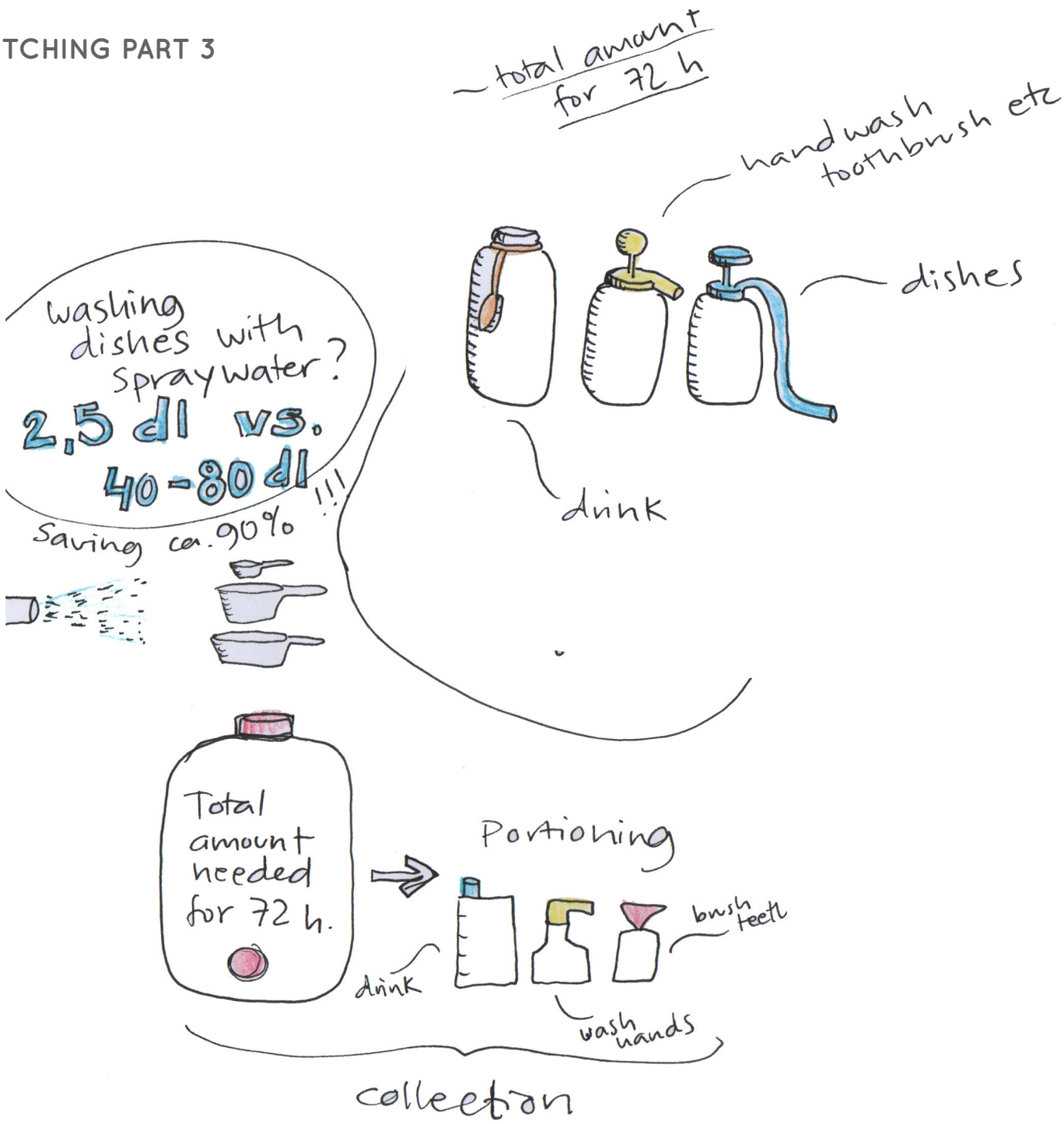
TOTAL AMOUNT
COLLECTING CONTAINER

30 dl
x 3 days
= 10 litres*

USAGE CONTAINER VOLUMES
(Amounts rounded up for margins)

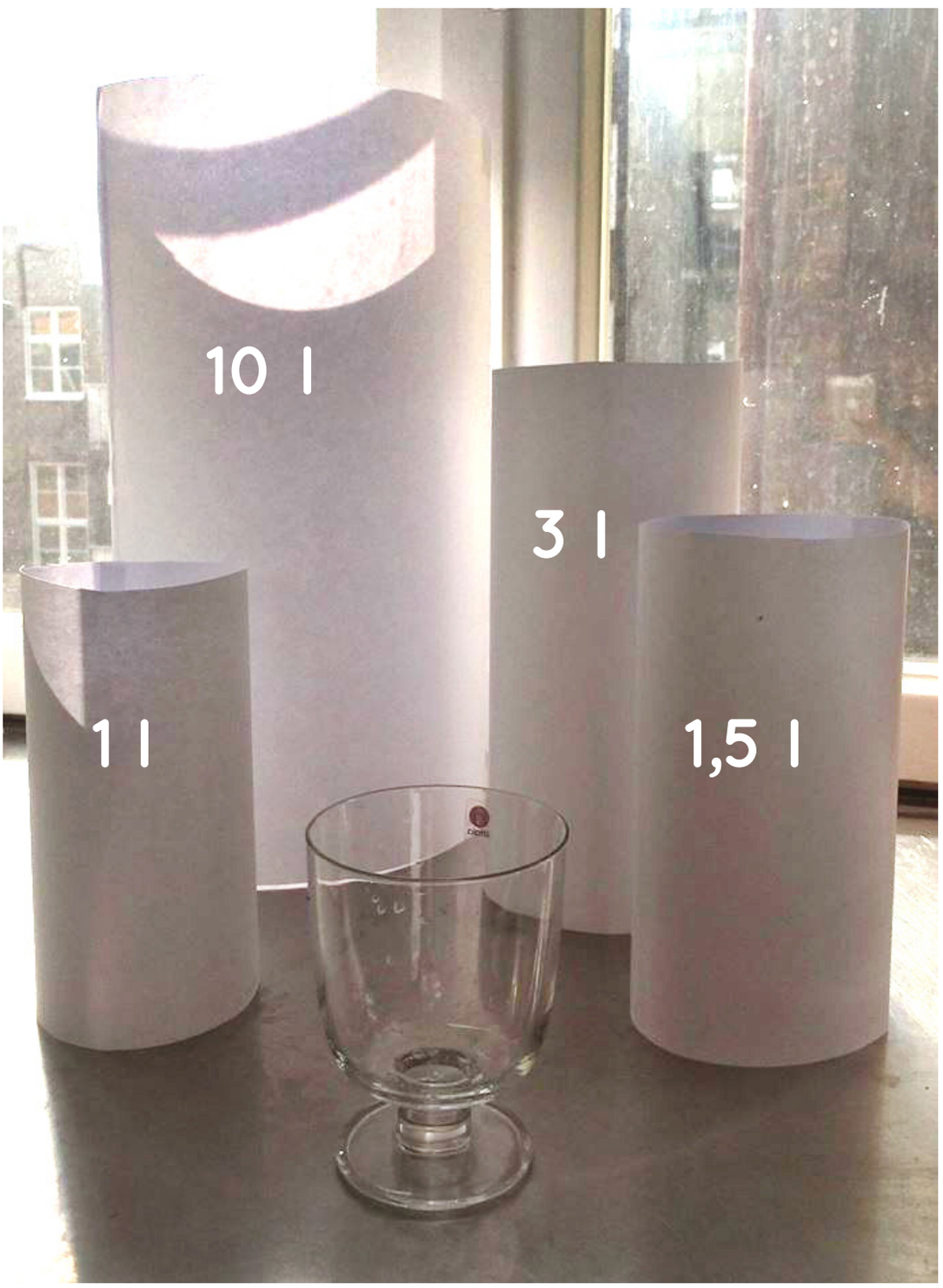
Hygiene	3 litres
Washing dishes,	1 litre
Drinking	1,5 litres

* All amounts are based on experience and estimation and there are of course no definite or totally true number. It will be individual and depending on person, living situation and the nature of the Off the grid situation.



Hold water	MF
Portion water	NF
Be portable	NF
Be part of home environment	DF
Purify water	DF
Collect water (On grid or outdoors)	NF
Reduce consumption	DF

SKETCH MODELS - VOLUME AND WHEIGHT



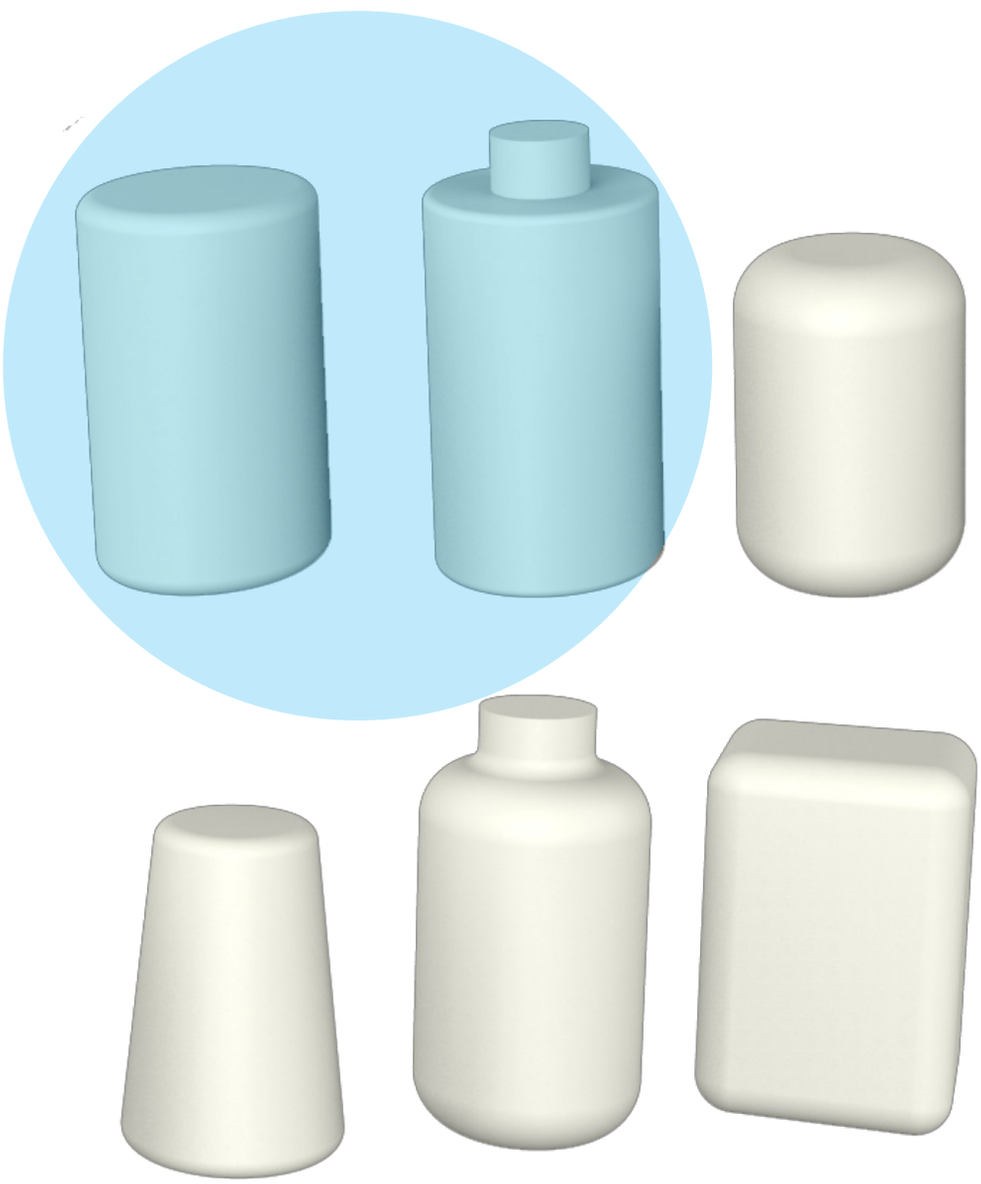

NATURELL
YOGHURT
TÁNICO


10 l =

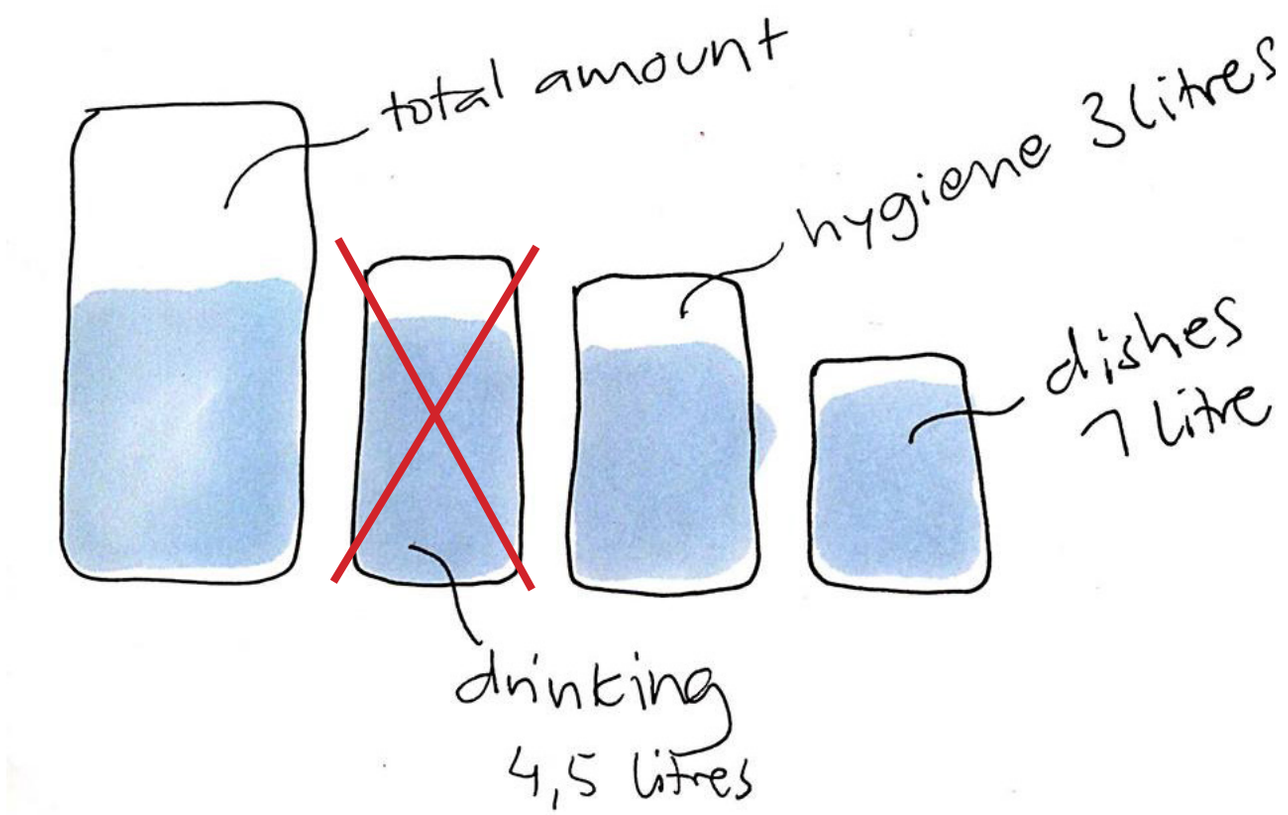
What should the containers look like to fit in a home? How do you get a feel for the use, and a reliability fot storing water to use for drinking and hygiene? A google search for common denominators in water containers showed that the containers are often blue, white or clear. It feels like an important feature to be able to at least slightly see the water through the container wall. The drinking bottles have a tall and slim and ”clean” feel.

The bigger containers all have a more similar look. Maybe it is the fact that they are quite heavy and need to be carried that limits the variations in look.

To keep the tall clean feel I chose to focus on a straight basic cylinder shape. Also, the more rounded shapes made me associate to soap bottles, something I wanted to avoid.

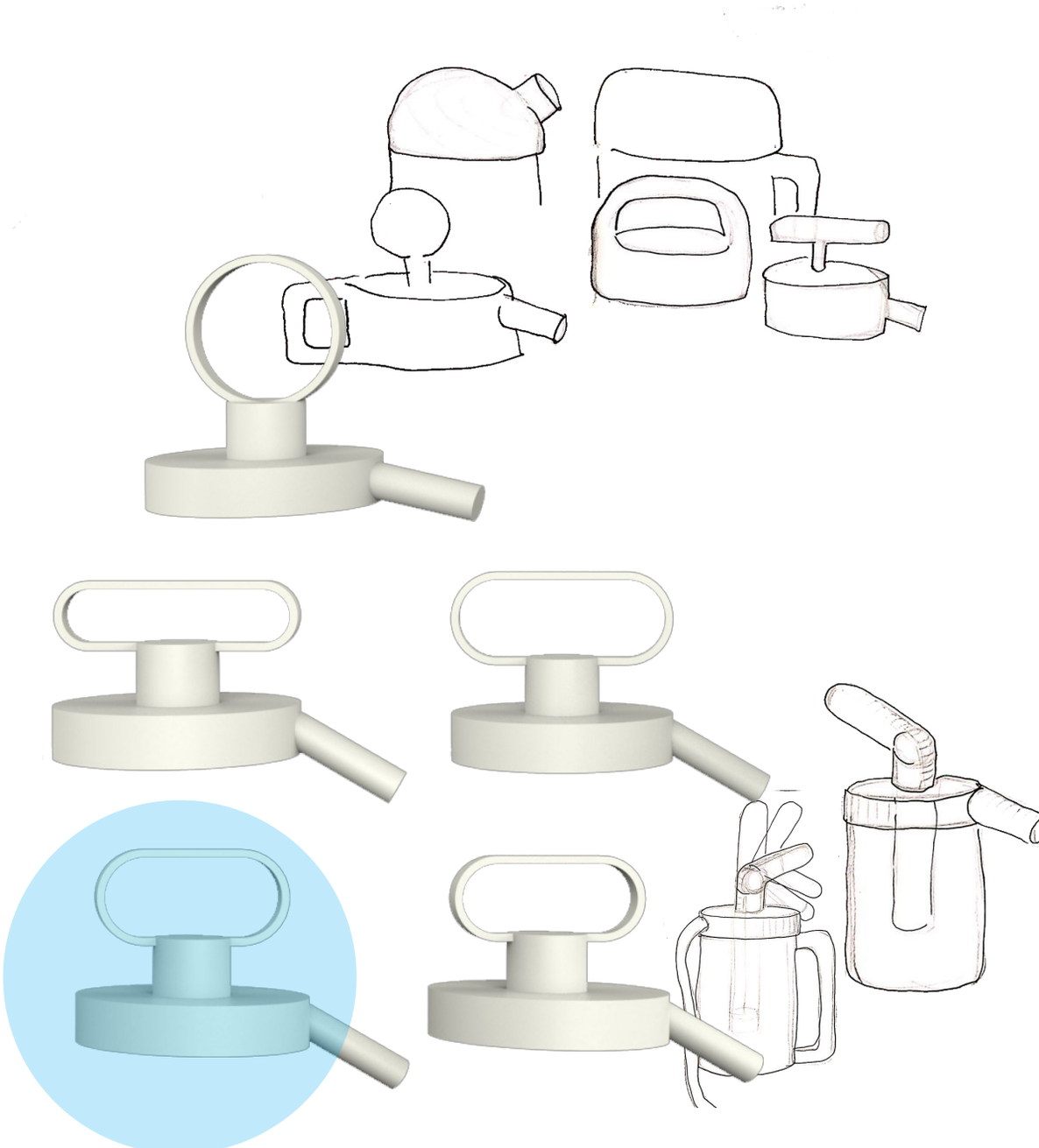


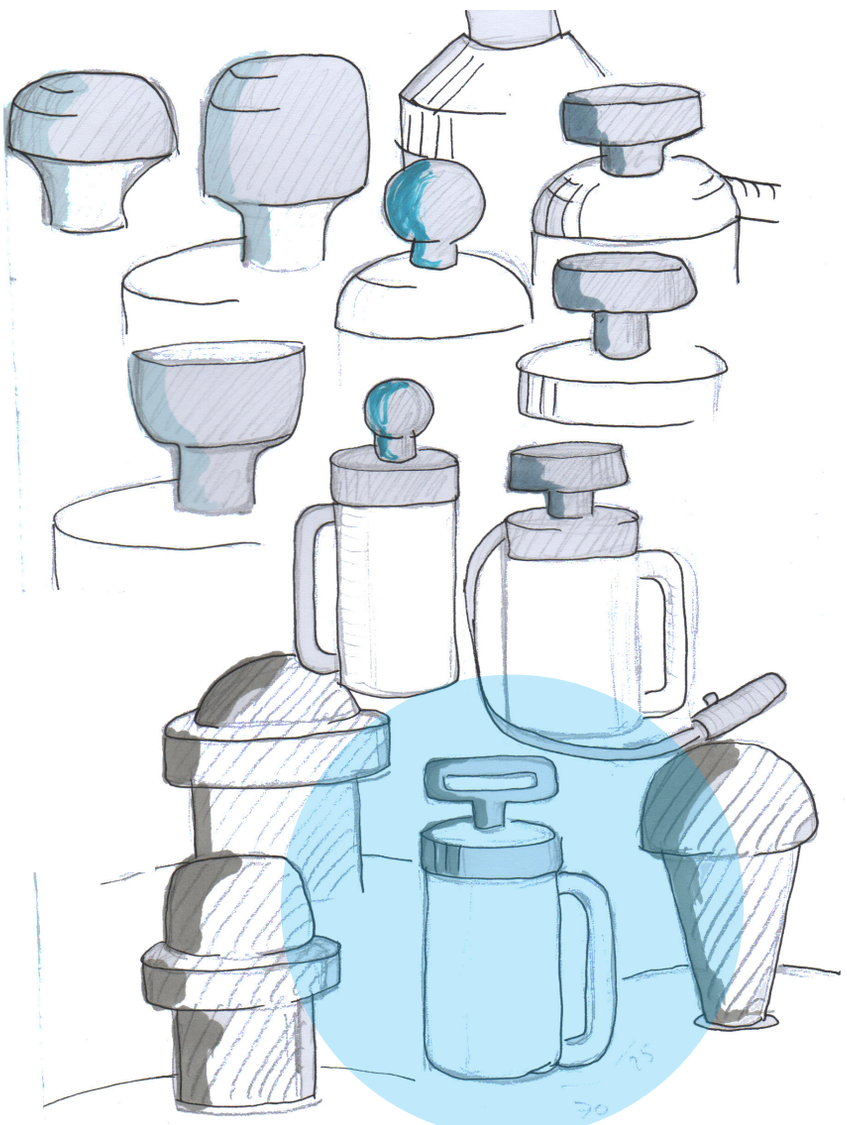
The calculation of the amounts of water for every container made me question the choice of the bottle for the 1,5 liter drinking water. The other two bottles contained more becuse I wanted to fill them only once during the 72 hours. That meant 1 litre for doing dishes and 3 litres for personal hygiene. I first made the bottle for the drinking water contain only one day use, 1,5 litres. Simply because it is a good size to pour from. If I should be consistent, wich I want to be, the drinking bottle should contain 4,5 litres, but hat made the bottle big and hard to pick up and move, and one might as well keep that water in the bid container with the tap.



Sketch models were made for trying out the shapes and sizes of the containers.The aspects of carrying and transporting them is important. A round shape was not suitable for the bigger container since it will be heavy and needs to be carried in one hand. Therefore I chose a rectangular shape with rounded edges, and instead make the handle and lids speak the same language. The 3 litre container for personal hygiene also need a handle since it can be quite heavy for most people to lift in one hand otherwise.

The first thougt of having the handle beside the lid on the big container had to be changed in order to keep the container balanced when carrying it. I decided to make the handle go along the whole side of the containers for easy grabbing and to go better together with the tall feel. I also associated the smaller handle more to a coffe pot on the 3 litre container, and I wanted to avoid associations to other products and preferably give the parts a personality of its own.

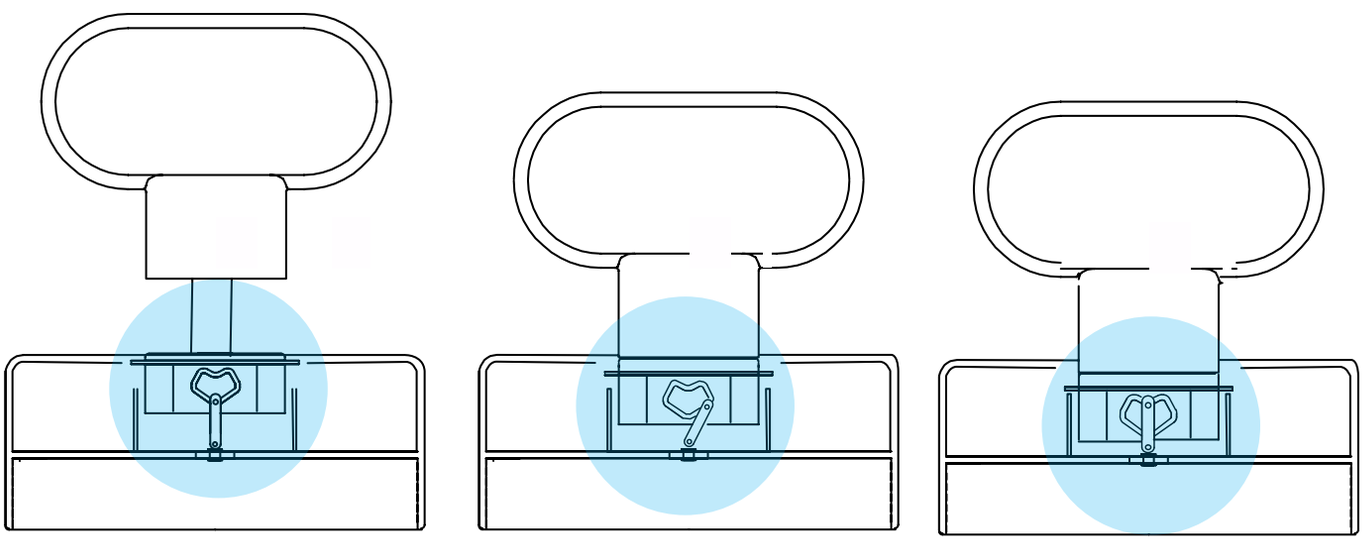




REALISATION

PUSH-PUSH FUNCTION

The pressure sprayers on the market are designed to be used in a garden or similar situations, holding the container while working. The nozzle is aimed away from the user, straight forward. This is not optimal for use in the home for personal hygiene and cleaning. I wanted to, besides changing the direction a nd angle of the nozzles, reduce tha amount of buttons and features, as well as making it possible for the spray to have a continous flow of water to enable the user to wash both hands, for example. I therefore chose to use the pump-handle as the thing pressing down the button. Also, the button would work with a so called *Push-push-function.* This is the same way a regular ball-point pen works; you push the button once to open the flow, and push it again to close.

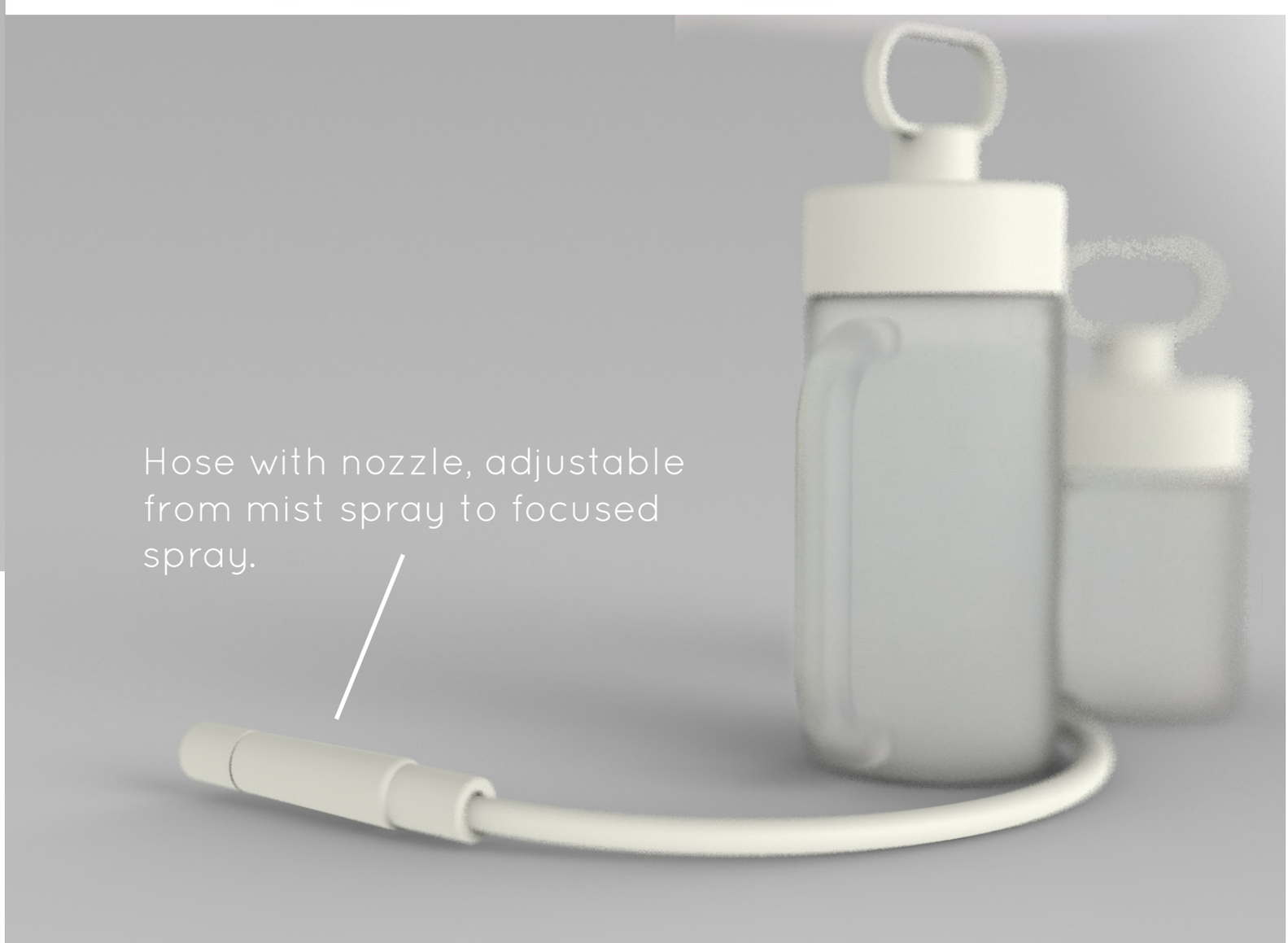


Push the button by pressing down the pump-handle once. The picture illustrates the mechanism with which the button stays in that position until pressing the button again. The second push reverses the action.


10 litres for personal
hygiene


Total amount of 10 litres for 72 hours. Including 4,5 litres of drinking water, and water for cooking.
1 litre for washing dishes

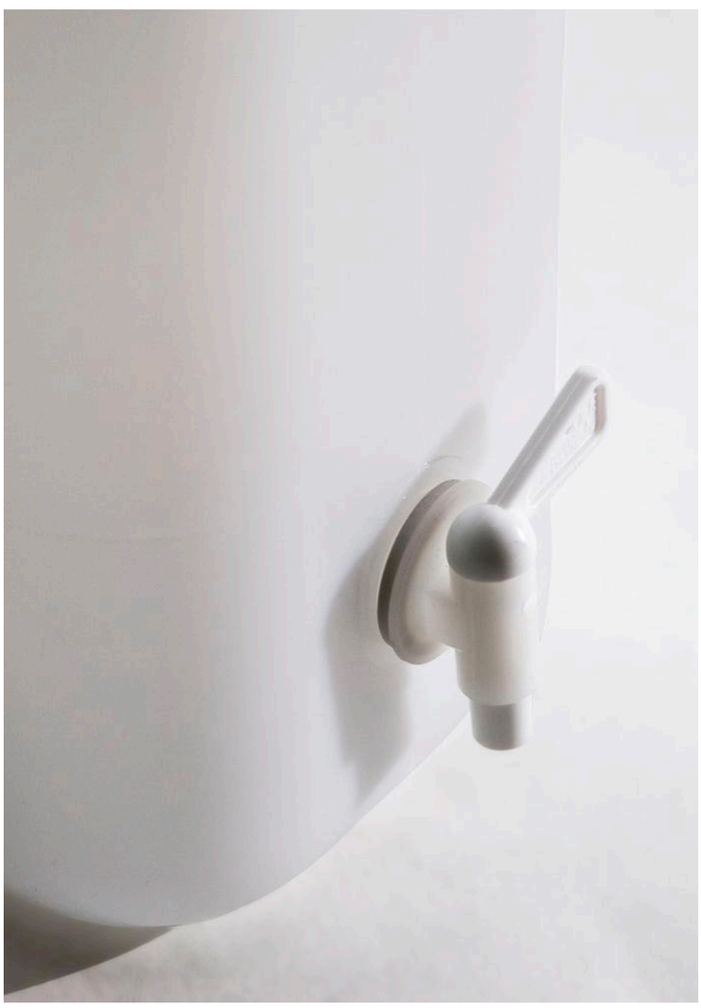

Preassure spray,
adjustable nozzle
from mist spray to
focused spray.


Hose with nozzle, adjustable from mist spray to focused spray.

Polyeten, PE

Plastic was chosen because it was for me the only thinkable material. Glass and porcelain would be to fragile and also heavy to carry. Metal could be light, but I felt it was important to be able to see the water level a bit through the material.

However, the choice between different plastics was not easy, there are many posiible plastics with different properties. However, the choice was mainly between PET and PE. PET has many advantages such as easy recycling, but it is mainly to be used for containers for temorary use. PE is by far the most common plastic in water containers for longer storage. It is a versitile plastic, transparent or semi transparent It is suitable for injection molding, and resistant to most chemicals. Since it is a thermoplastic it can be heated, cooled and reheated again without significant degradation. which allows them to be easily be injection molded and then recycled.

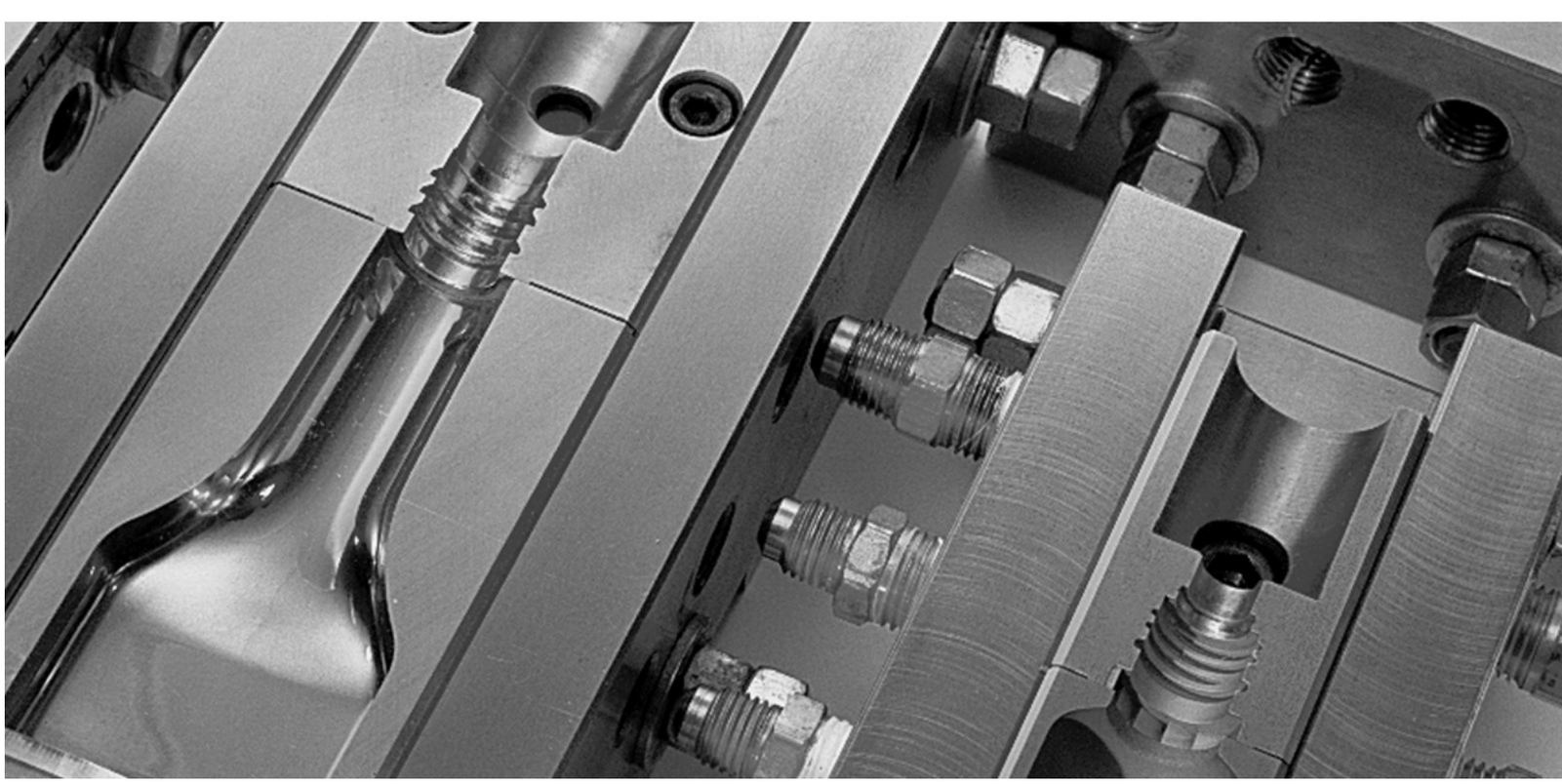


https://www.creativemechanisms.com/blog/polyethylene-pe-for-prototypes-3d-printing-and-cnc

Injection blow molding

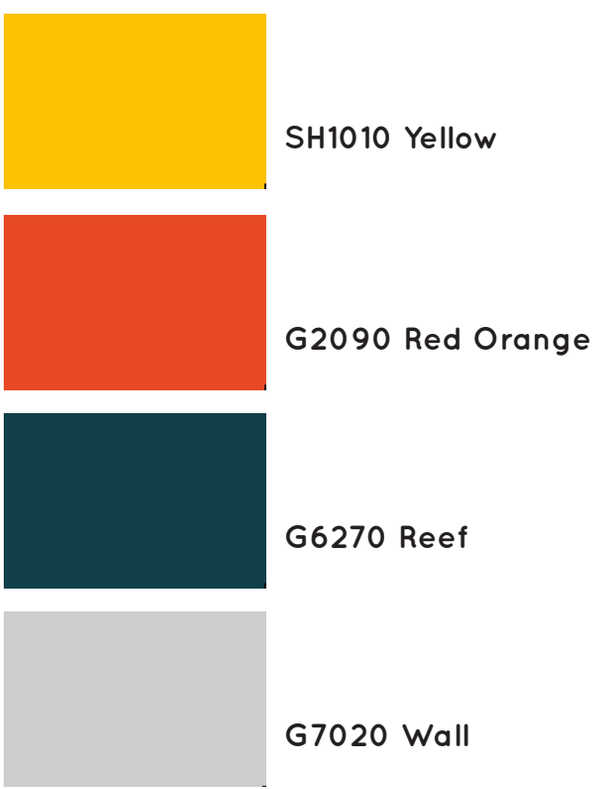
Injection blow moulding is used for manufacturing plastic hollow objects in large quantities. The main applications are bottles and containers. The products can be thin walled and strong and the surface finish is high. All scrap can be directly recycled.

Thompson, R. (2012) Manufacturing for design professionals



The color chart chosen is based on wanting the product at same time be blending in in a home, but also be basic red blue and yellow to signal attention, and also with the blue, water.

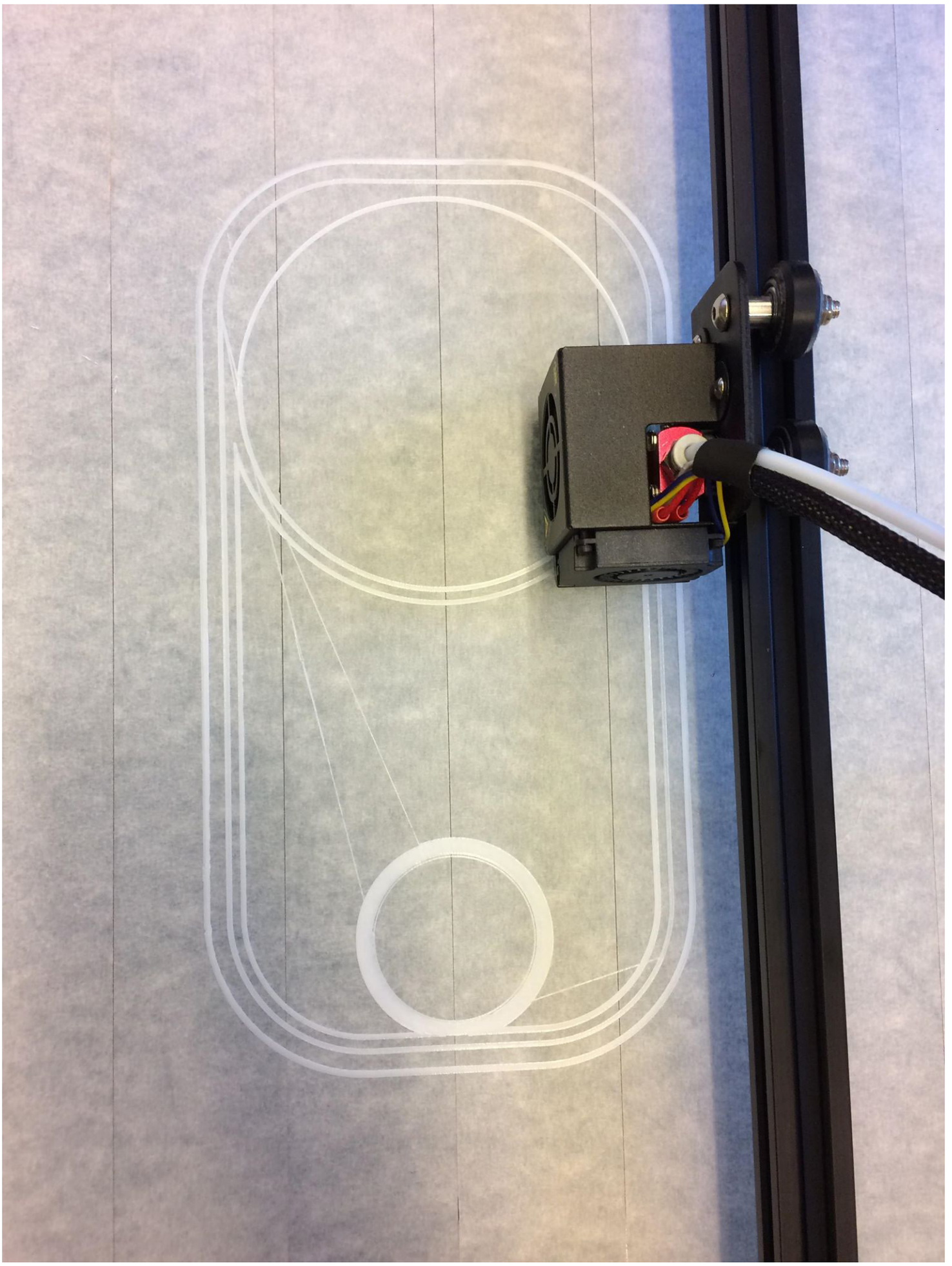
I made a moodboard with the desired expression of the containers to further help me choose. The plastic material should be semi-transparent to show the level of water to give a reliable feeling.



Montana Gold Colors

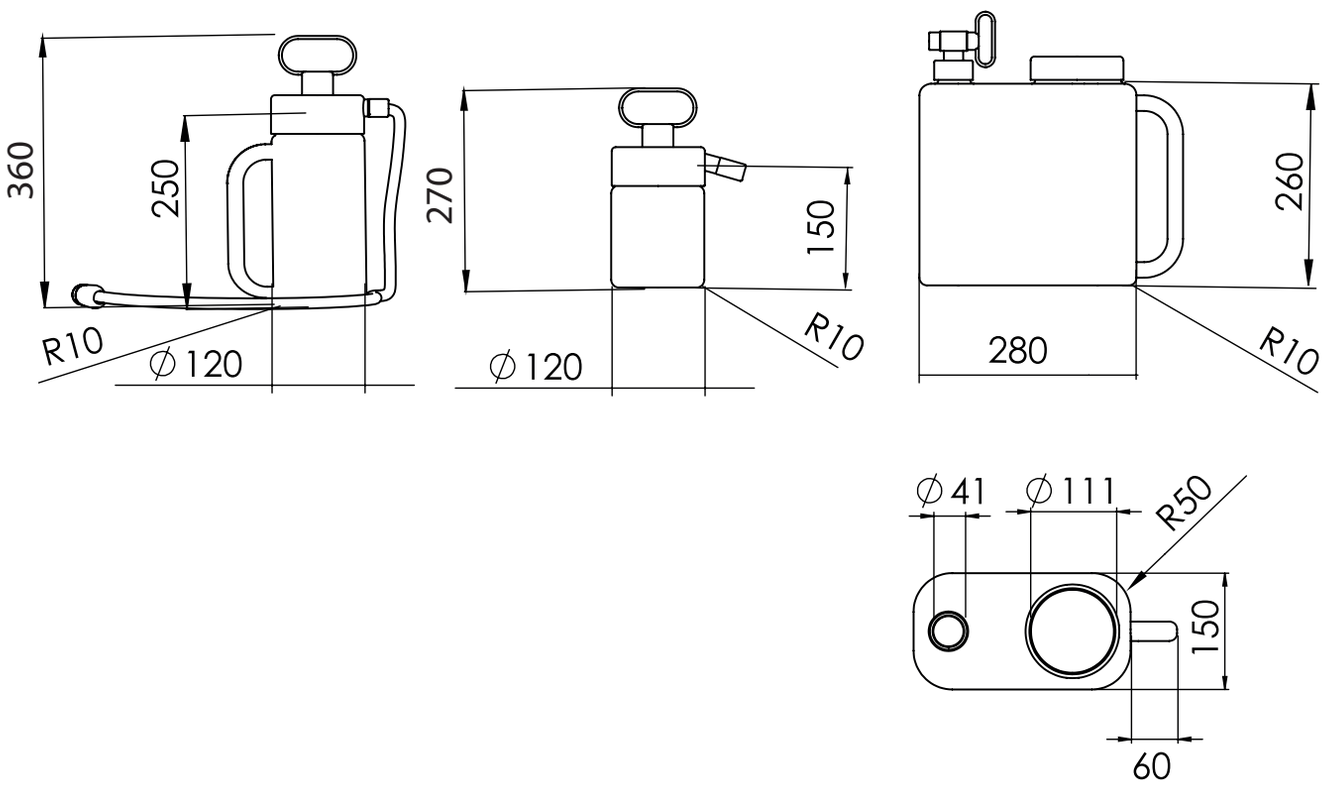
The model making was a large and difficult part. It was hard to find a way to make the prototype in plastic and in one piece. Moulding plastic is extremely costly. 3d printing was the only option if I wanted the containers to look as much as possible like they would if they were produced commercially.

The best solution was to print some parts with SLS in the schools workshop, and some with filament.



FINAL RESULT

TECHNICAL DRAWINGS



ANALYSIS AND DISCUSSION

Method and research

The methods used for the research phase included many ways to approach the Off the grid topic. It was necessary to dig in to all the aspects, even if only on the surface, to get the ideas for a design project, since the choice of topic did not come from the heart but was given to us from IKEA. I feel the choice to take on the topic was however a good one, since it felt relevant for the future to be able to go through a process and not having chosen the topic myself to begin with. It was also good for me personally since I can sometimes have problems in feeling confidence in my own choice of path, and also it is hard to make a choice when you have all the possibilities in the world for this quite short period of time. Quite soon in the process however I found the direction of Crisis preparedness to be an interesting way to take the project. All the methods that were used contributed to taking the project forward. I don't believe other methods would have been more appropriate. Especially the 72-hour experiment gave me a good foundation to stand on for the synthesis part, since I could always go back and think about the experience and what really seemed important or realistic in such a scenario.

I redefined my own brief a couple of times during the process. I felt it was a good way to move forward and helped me to boil down the research. Although, I feel I could have moved forward a bit faster though since I needed more time in the end. It was however impossible to know since it was the fact that the plastic containers were difficult to make in a nice and not too expensive way that became the troublesome part.

Synthesis phase and result

I got stuck for a while in thinking about re-using water and I am happy that I killed some darlings and moved forward from there. It could be a nice solution as well, but I missed the easy handling that we have in our everyday life and realized that the solution as it looks now has a bigger potential to not only be used in a crisis. I enjoyed experimenting with the water amounts and it was rewarding to see that I could find a way to really make a difference in that area. I would have liked to have more time to really make the product ready for production since it is such a simple technology, and I would have liked to make functioning prototypes. I think I could have made some decisions earlier, such as settling on one or two of the containers, at least to start with instead of waiting to get all of them done. Overall, I am happy with the result. It is something that could really make a difference in a crisis, but also in an everyday life of grid. The reactions from Renato who I interviewed about his experience in Bosnia, when he heard about the result of my project, was so positive that I got even more confident in the result.

Personal process

I started off the project by having the worst flu I ever had and was very stressed that I would be behind in the work process compared to my classmates. I managed however to work in a disciplined way, and in retrospect I wish I would have stressed less in the beginning, and enjoyed work more, I could have needed the strength in the end. It was a tough last month of the project and I did not think I could follow it through, mostly because of the problems making the model. I many times asked myself how I could let it come to that point, after trying so hard to keep the schedule and the ambition to have a nice, fun end of my last school project. I also would have wanted to spend more time working hands on in the workshop, being more in control myself, but since the model needed to be 3d printed that was a bit of a disappointment. However, I learned a lot with this as well, in 3d CAD and plastic manufacturing. The lasting experience is a fun project overall and a very useful experience.

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