

WATER SOURCES AND FACILITIES IN SANGA

a case study on collecting, storing, harvesting and conserving water in Buhera, Zimbabwe

Mugumbate, J. R. and Tawodzera, P.



Research funded and published by Sanga Development Foundation (SDF), 2019

Lead Researcher: Dr Jacob Rugare Mugumbate, Bachelor of Social Work (University of Zimbabwe), Master of Social Work (Uni. of Zimbabwe), Doctor of Social Work (University of Newcastle, Australia).

Researcher: Paidamoyo Tawodzera, Bachelor of Peace and Governance (Bindura University, Zimbabwe).

How to cite this report in-text: Mugumbate and Tawodzera (2019) or (Mugumbate and Tawodzera, 2019)

How to put in list of references: Mugumbate, J. R. and Tawodzera, P. (2019). Water sources and facilities in Sanga: a case study on collecting, storing, harvesting and conserving water in Buhera, Zimbabwe. *SDF Research, Report 1, page 1-20*. Sanga: Sanga Development Foundation.



<i>Introduction to the research</i>	3
<i>Background to Sanga community</i>	3
<i>Research objectives</i>	4
<i>Methodology</i>	5
<i>Permission</i>	5
<i>How data and information was gathered</i>	5
<i>Dissemination strategy</i>	5
<i>Results</i>	5
<i>Rain water (mvura yekunaya)</i>	5
<i>Chadzire dam</i>	6
<i>Sanga dam</i>	7
<i>Boreholes (zvigojo)</i>	7
<i>Reservoir or well-dams (matsime-dziva)</i>	9
<i>Wells (matsime)</i>	10
<i>Mukutukutu dam</i>	10
<i>Sanga river small dam (Chidhamhu)</i>	11
<i>Deep wells (migodhi)</i>	11
<i>Mukono river dam</i>	12
<i>Mashingaidze dam</i>	14
<i>Mafuku (sand wells)</i>	15
<i>Pits (makomba)</i>	16
<i>Sand dams or pools (madziva emurwizi)</i>	16
<i>Springs (zvitubu)</i>	16
<i>Water collection and storage options</i>	16
<i>Water conservation options</i>	16
<i>Summary of water sources</i>	17
<i>Conclusions</i>	18
<i>Recommendations</i>	18
<i>Acknowledgments</i>	19
<i>Disclaimer</i>	19
<i>List of sources and references</i>	19

Introduction to the research

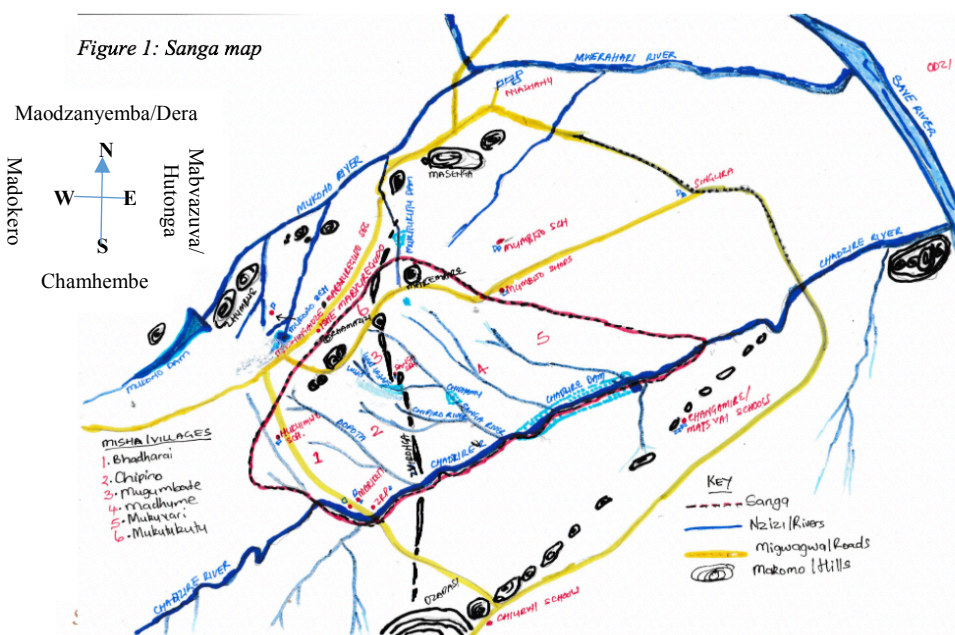
One of the main challenges in Sanga community is water of humans, animals and plants. This research was carried out in November 2019 to document sources and facilities for collecting, storing, harvesting and conserving water in Sanga community and surrounding areas. By documenting these sources and facilities, the community will be provided with a source of information to use to understand water issues, and to discuss and generate solutions to address water shortages in the area. In Sanga, perennial water shortage affects people, animals and plants. All the people of Sanga are farmers so a shortage of water contributes significantly to low food and income and consequently exposes people to malnutrition, hunger and poverty. This report provides background information of Sanga community before detailing the methodology employed in this research as well as water sources and facilities that were found. At the end, the results are summarised before conclusions and recommendations are made.

Background to Sanga community

Villages, history, climate and farming

Sanga community is made up of five villages (*misha*). These are Chipiro, Madhume, Bhadharayi, Mukuviri and Mugumbate but people from surrounding villages of Mukutukutu, Mabvuregudo, Mumbijo, Homora, Hukuimwe, Kwenda and Masvingo share borders and services with people in Sanga. Most residents of Sanga belong to the Museyamwa clan of Shava *mutupo* while residents of Mugumbate village belong to the Remba clan of Mbeva *mutupo*. Sanga community is under Ishe Mabvuregudo of the Shava *mutupo*. Communities near Sanga are Masenga, Matsvina, Guwanda, Dzapasi, Vhiriri, Mugombe and Njinja. Ishe Mabvuregudo reports to Mambo Nyashanu. Sanga was a forest area for hunting with very few families living in it around before white colonialists invaded the area in search of gold in the 1890s. Most families who live in Sanga today used to live and farm in the middle part of Zimbabwe (areas around Midlands and

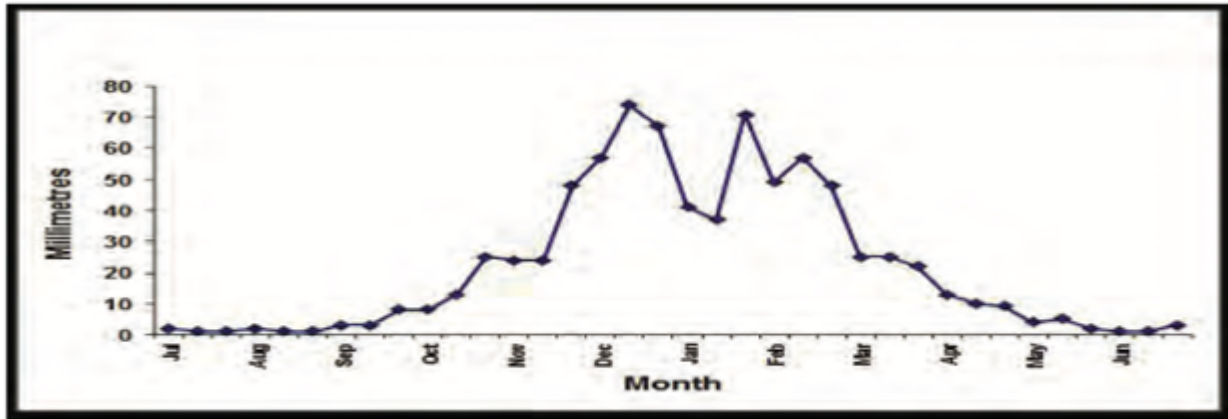
Chivhu) where there was enough rainfall and good soils but were forcibly pushed by white colonist settlers to low rainfall areas of Gutu, Njanja and finally Uhera. But the whites did not give back Sanga Estate, which they had occupied in the 1890s. They later opened Sanga Farm for black people to use again in the



1950s. The whites probably left Sanga Estate because of low rainfall (see Figure 2), poor soils, high

temperatures and failure to find gold. The land size per farmer is very small. When they left, families moved in from nearby communities or villages of Masiya, Vhiriri, Nechavava, Mabvuregudo but also from Gutu to form Sanga community.

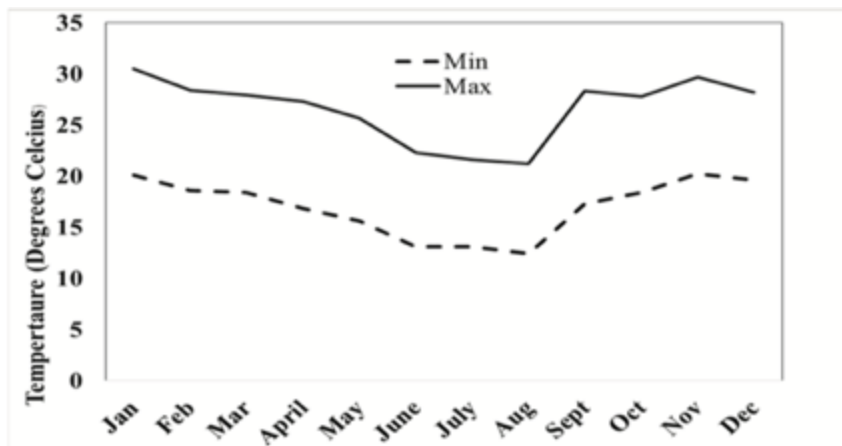
Figure 2: Average rainfall for Buhera area



Source: Meteorological Services Department, Zimbabwe

Sanga people are farmers who get their income and livelihoods from small cereal grains, nuts, maize, cotton, sunflower, fruits and garden vegetables but also cattle, goats, sheep, chicken and turkeys. Their farming uses rain water from November to April, and hand irrigation using water from rivers, boreholes, wells and deep wells between May to November. The rain season used to start around 15 October but it is now unpredictable, starting anytime late October to November and reaching about 80 mm in December. On average Sanga receives about 600 - 780 mm rainfall per year and temperatures averaging 25°C annually. It is usually very hot, temperatures as high as 40°C throughout the year except in May, June and July when temperatures can fall to 15°C. High temperatures and low humidity mean that water is in short supply for people, plants and animals.

Figure 3: Average temperature Buhera



Source: Meteorological Services Department, Zimbabwe

Research objectives

This research was initiated to understand this water shortage and the facilities that are available to store, harvest and conserve water. Storage and harvesting mean keeping water

during the rain season to use during the dry season. Storage also means taking water from underground or from water sources that are not near and put it in a tank, reservoir or other container. Conserving water

means storing and using available water sparingly including but not limited to covering sources to avoid evaporation, covering plants to reduce evapotranspiration and drip irrigation to avoid wastage.

The objectives of this research were:

1. To document water sources and facilities.
2. To make community members aware of current and historical water sources and facilities.
3. To initiate conversations around conserving water.
4. To initiate dialogue around increasing water facilities.
5. To make recommendations about increasing water sources in Sanga.
6. Generate lessons useful for other rural communities.

Methodology

The strategies used in this research are shown in the following sub-sections.

Permission

Permission for the project was obtained from the committee of the SDF. The committee is made of community members from the various villages of the community. Before a water source or facility was photographed, permission was obtained from relevant owners or leaders.

How data and information was gathered

Each facility was identified, photographed and described. Community members were asked to help with description. A few descriptions were obtained from the internet.

Dissemination strategy

The report used more pictures to help those who cannot read in English although a Shona (local language) version of the report will be made. Pictures will be presented to Sanga community members at community development workshops that are run every four months in the community. The photographs will be printed in large print and displayed in the office and hall of Sanga Development Foundation to for an exhibition to ensure they are constantly discussed. Copies of the final report will be printed in full colour and made available in the library of the SDF that is accessible to the community. Copies will also be made available to the Ward Councilor, *Ishe*, and village leaders. An academic report will be published on online platforms, and journals focusing on development.

Results

Rain water (mvura yekunaya)

The main source of water in Sanga is rainfall which is used for growing crops and for livestock drinking but also for human drinking and domestic uses. It rains usually from October until April although *gukurahundi*, the last rains come around May. Most of the runoff water flows away because there are no dams or storage facilities although some families have small reservoirs in their fields. This is a big loss.

Figure 3: Water flows away in Sanga river during the rain season



Chadzire dam

Figure 5: Chadzire river dam wall (broken)



These pictures show the broken dam wall of Chadzire river dam. It is about 50 metres wide and 10 metres deep. It was built using stones, cement and concrete. It was probably established in 1953 by a white colonialist settler only remembered as Muputa. Muputa wanted water for irrigation and for livestock production. Labour for this big project came from black people, who were not paid or paid very little for their hard work, *chibharo*. The dam was washed away due to heavy rains in 1972 and it's not useful up to the present day. Animals that walked on top of the side walls, created a path that water used to escape the dam, resulting in the side wall bursting. The dam was also used as a bridge for students to and from Changamire School. There is need for the dam to be rebuilt or put on a new location.

Sanga dam

Figure 6: Sanga river dam wall (broken)



These pictures show the broken dam wall of Sanga dam, built across Sanga River using clay and stones. It is about 20 meters wide and was expected to be 100 metres long at full capacity. It was put built in 2008 by the Sanga community as a development project facilitated by the Ward Councilor, Mr. Titus Wadzenenga. The dam is 300 metres away from the Sanga Primary School. The project was not successful because after its completion the dam wall collapsed after heavy rains. This could be because the dam wall was weak or water ran over the wall because the spillway was too high. There is need for resources such as cement for the project to be successful.

Boreholes (zvigojo)

Figure 7: Old Sanga market borehole pumps (two)



Sanga boreholes are estimated to be about 30 metres deep. They are about 200 metres apart. The boreholes are about 300 metres from vaNyandoro's homestead. They were drilled around 1963 by Muputa. Heavy drilling machines were used to dig deep until underground water was reached. His idea was to solve water shortage in the area which had a big market place. There used to be a large brick and cement tank at one of the boreholes. Water from this tank was taken out using pipes that fed smaller tanks where cattle drank from. The boreholes are located 300 metres away from Sanga Primary School. Both boreholes are currently in use mostly by the surrounding people and the school as well. Some use the boreholes to do their projects such as gardening and brick molding. There is need to fence in the boreholes to improve hygiene.

Figure 8: Tokotore borehole pump

Tokotore borehole is located about 100 metres away from vaTokotore (vaKocho)'s homestead. It is about 40 meters deep and was donated by the Chinese in July 2019 to solve water shortage in the area. The borehole is very useful to many people because it covers a big catchment area. There is need for the provision of garden fence in order for people to start their income generating projects such as gardening.



Other boreholes in Sanga include:

1. Dhozi borehole (private)
2. Sanga Market borehole
3. Hukimwe School borehole
4. Homora borehole
5. Madhume borehole
6. Chikaka/Rukonhi borehole
7. Muvheyi borehole
8. Mukuvari borehole

Figure 9: Chipiro borehole pump



Reservoir or well-dams (matsime-dziva)

Figure 10: Baba Neria (Mr. Daniel Madhume) dam



These large *tsimes* or reservoirs are expertly located so that they collect running water which is directed into them by a trench or pipe. They are located near swamp areas to allow swamp water to drain into them. Unlike ordinary *tsimes*, at times they get so full so an overflow exit is required. They are located where there is clay soil to reduce seepage. Mr. Madhume's large *tsime*'s deepest point is approximately 5 meters deep and about 50 meters wide. It was built in 1988 by Baba Neria Madhume and his family. They dug and removed clay to create a water reservoir and used the clay to build a dam wall. This means that this water source is a mixture of *tsime* and dam. They are using the water source for gardening and also for their livestock. Due to soil erosion, there is now a lot of sand in the water source and as a result water is not lasting longer.

Other well-dams include:

Charakupa
(akawanda)

Nyandoro

Mukono

Mukuze

Mukuvari

Wells (matsime)

From discussions with the community, they named some wells that keep water up to August each year, some even further. These are:

- | | | |
|-------------------|-------------------|-----------------------|
| 1. Nyandoro well | 7. Chimone well | 13. Nhubu well |
| 2. Mugumbate well | 8. Mukuze well | 14. Charakupa well |
| 3. Mugumbate well | 9. Nhombo well | 15. Mukuvari well |
| 4. Tororiro well | 10. Mujakari well | 16. Muvheyi well |
| 5. Manzvanda well | 11. Dondo well | 17. Musarurwa well |
| 6. Zvinoguma well | 12. Tokotore well | 18. Daka Masango well |

Mukutukutu dam

Figure 11: Mukutukutu dam

The pictures in Figure 8 show Mukutukutu dam built from 2017 to 2018. It is about 100 metres long, 20 metres wide and 5 metres at its deepest point. It was built manually with clay, gravel and stones. It was established in 2008 by the Sanga community as a community development project facilitated by the Ward Councilor as a water source for livestock. The dam is about 500 metres away from Muchada homesteads and Mukutukutu shops. It was washed away in 2019 by Cyclone Idai so there is need for refurbishment of the dam. It was located at a central point where most of the surrounding livestock can have access to water.



Sanga river small dam (Chidhamhu)

Figure 12: Chidhamhu

The picture below shows Chidhamu, it is about 120 metres long and 3 metres deep at its deepest point. It was probably established around 1949 by Muputa. It was built using stones and concrete. The local people contributed their labour but the dam belonged to Muputa. It is located about 500 metres away from Mucheka homestead. The dam filled with sand resulting in a large water fall that is 3 metres high being formed. When sand filled up to the level of the dam wall, it could no longer contain water. A strategy was found to get water from the bottom of the sand that had filled the dam. An opening was made in the middle of the wall so that water could seep through from the sand to the lower river bed. The opening was closed with hard wood and the dam wall was supported with concrete pillars. Most of the surrounding people are using the water source of gardening and as a source of water for their livestock. There is need for refurbishment of the dam so that it can store water which last longer. An alternative is to improve the collection of water that seeps through the sand.



Deep wells (migodhi)

Figure 13: Mugumbate deep wells





Figure 14: Mukarati deep well



Man in the picture is Mr. Mukarati

Mukono river dam

Figure 15: Mukono river dam wall, dam and cooperative garden

These are some of deep wells that do not dry up quickly. They are approximately 6 meters deep. They are dug manually by Welldiggers. The diggers at times use dynamite to blow off rocks in the well but this can be very dangerous as fumes from dynamite can kill.

1. Mukarati well
2. Mugumbate wells
3. Rukonhi well
4. Maringire well





These pictures show Mukono dam located about 2,5 kilometres from Mukono Primary School and approximately 10 kilometres from Sanga community. It is approximately 500 metres long, 100 meters wide and 10 metres at its deepest point. It was established in 1992 by the Government of Zimbabwe with the office of the District Development Fund (DDF) and also with the help of the community. The dam is currently in use, people are doing their projects such as fishing and gardening where there are growing mainly vegetables and tomatoes for commercial purpose. There is engine and piped irrigation. The dam is a source of water for livestock in the area.

Mashingaidze dam

These pictures show Mashingaidze dam and Homora dip tank. Most farmers in Sanga use this dip tank. The dam is about 120 metres long and 5 metres at its deepest point and it is located about 700 meters away from Mabvuregudo Secondary School. It was constructed manually using clay that was dug out to form a big reservoir for water. It was established in 1988? by the community as a development project with the idea that it would be a water source for their livestock and for gardening projects. The dam supplies water to the dip tank. The dip tank is a large concrete tank that stores water. Chemicals are added to the water before cattle dip to kill ticks. The challenge with the dam is that there is a lot of mud and sand in the dam. A solution that has been used in the past is to dip the mud and scoop the sand out on top of the dam wall.

Figures 16 and 17: Mashingaidze dam and Homora dip tank



Mafuku (sand wells)

There are two types of *mafuku*. The first type is the rain season one which is made when the river still has some water on the surface. The second one is the dry season *fuku* which is dug when the water in the river has disappeared deep into the sand. Because dry season *fuku* is deep, it has to be supported by a metal or plastic drum or wooden poles.

Figure 18: Sand wells (photo was taken from Oxfam-UNDP/GEF, 2015).



Pits (makomba)

Our research found another water source that was not intentionally made for that purpose. These are *makomba* or large holes that were created when people were mining clay soil for molding bricks or gravel for making roads. The District Development Fund (DDF) did road works that left a lot of these holes in the 90s. The holes reserve water during the wet season. The water is mainly for livestock drinking but also swimming.

Sand dams or pools (madziva emurwizi)

These are found in rivers usually during or after the rain season. When water flows at high speed, it displaces sand and creates large pools of water usually where a river course changes direction or bends. They are a good source of water for watering gardens and livestock. They are mainly found along Chadzire River but also small rivers like Dopota, Sanga and Mutorahuku. Popular sand dams along Chadzire river are Kubu, Bakorengwe and Kona (corner). **While these dams are very useful, many lives have been lost in them as people especially children swim in them. They are usually very deep.**

Springs (zvitubu)

These are small wells carefully dug where water springs out during the wet season. The research showed that there are several of these in Sanga. Indigenous knowledge of where to put a *chitubu* and how to construct it so that the spring holes are not closed is an important piece of knowledge passed on from our esteemed ancestors.

Water collection and storage options

1. Buckets and bottles – these range from 5 litres to 30 litres made of plastic or metal. Water is transported on the head, by hands, wheelbarrows or carts pulled by cows or donkeys. Water can also be collected from roofs during the rain season.
2. Drums – these range from 30 – 200 litres. They are made of plastic or metal. Water is transported by rolling the drums or in carts pulled by cattle or donkeys.
3. Water tanks – there is only one at Sanga school build in the ground with bricks and cement. Opportunities include plastic tanks, cement tanks and corrugated tanks.
4. Rockholes (*guvi*) – water collected from holes found on *dwalas* (*ruware*). Most of the holes are now filled with soil.



Figure 19: Destroyed water storage tank at Sanga borehole

Water conservation options

1. Micro-irrigation systems - in 2018, an irrigation project was started by several households after they contributed their resources. They bought 100 litre drums, long polythene horse pipes and drip irrigation pipes. They received training in running the drip irrigation system.
2. Grass or leaf covering – garden plants are covered with grass or leaves when it is too hot to reduce the beds from drying quickly.

Figure 20: Mukarati family drip irrigation

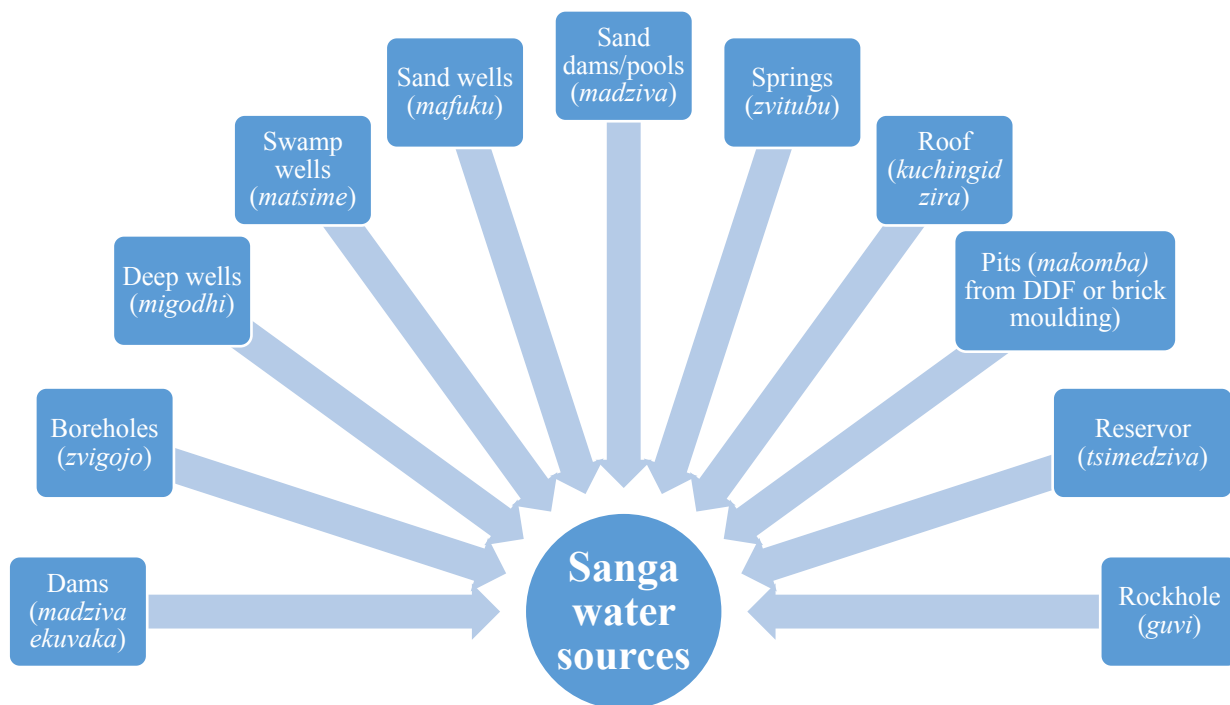


By the time of the research in 2019, only Mukarati family were using the drip but not very well because they did not have a pump to take water from the deep well into the drums from which water goes into the pipes and drips to plants.

Summary of water sources

There were 11 types of water sources apart from rainwater found in Sanga as summarised in Figure 21.

Figure 21: Types of water sources



However, all the 11 sources are failing to provide adequate water for the people, animals and plants of Sanga community. Based on these findings, conclusions and recommendations were reached and presented in the following sections.

Conclusions

1. There is inadequate water in Sanga most of the time but especially during the dry season. This means that people spend a lot of time and energy looking and carrying water from far places. It also means people end up drinking and using water that is not very clean at home.
2. Large water facilities in Sanga like Chadzire, Chidhamhu, Mukutukutu, Sanga dams have all broken and they are not able to store water. This means the community cannot do medium and large-scale farming projects.
3. Underground water from boreholes and deep wells is an important source of clean water. But some of the boreholes and wells are not very deep so they do not last the whole year with water.
4. Water from river beds (sand water), during the rain and dry seasons, is used a lot. An innovative water source is the collection of water from the sand that filled Chidhamhu dam but this source needs improvement.
5. During the rainy season, the community depends on rainwater collected from roofs, springs, sand wells and flowing water from rivers but yet others use water from boreholes and deep wells. However, much of the water just flows away because there are no dams, tanks or reservoirs to collect and store it.
6. There is one source that store more water throughout the year but is not in Sanga community, this is Mukono River Dam at Zhumbwe. The dam is equal in size to Chadzire dam. If Chadzire dam could be repaired or rebuilt on another location, this could give Sanga people a large and reliable source of water for crops and livestock.

Recommendations

1. Design and implement a program to restore, rehabilitate and recover water sources. The SDF is recommended to mobilise the community for this work and seek help from the Councilor, Ishe and the District Office as well as NGOs.
2. Build a water collection point at Chidhamhu to collect seepage water during the dry season. This water will be used for gardens and livestock. This requires 5 x 50kg bags of cement only.
3. Drill more deeper boreholes and dig more deep wells.
4. Repair Mukutukutu dam.
5. Build a new dam along Sanga River at a good location using stones, cement and concrete.
6. Build a new dam on Chadzire River at a good location using stones, cement and concrete.
7. Find locations for new dams so that each village has at least one small dam.
8. Write a pictorial manual/book showing how to construct and maintain small and large dams, small and large *matsime*, *zvitubu*, how to conserve water and how to store bulk water.
9. Use large storage tanks to harvest water from roofs during the rain period.
10. Dig more *matsime* but make them deeper and cover them.
11. There is need to find historical records about Sanga community from Buhera Office and from National Archives.
12. Community members, especially those of working age are encouraged to assist with cement to construct dams, dig deep wells, drill boreholes and storage tanks.

Acknowledgments

1. Sanga Development Foundation (SDF) for funding this research.
2. Paidamoyo Tawodzera for photographing.
3. Dr Jacob Rugare Mugumbate for a few photographs.
4. Mr Ignatious Mukono for editing.
5. vaDaniel Madhume for permission to photograph his dam.
6. vaMukarati for permission to photograph his deep well and drip irrigation.
7. Mugumbate families for permission to photograph their wells.
8. SDF committee members for editing.
9. Community members for reviewing and correcting.

Disclaimer

Some information provided through oral and internet sources might not be 100% accurate. There were no historical records to refer to. However, researchers endeavored to provide reliable information.

List of sources and references

Meteorological Services Department of Zimbabwe. Annual standardized precipitation and temperature values for Buhera. Harare, Zimbabwe Department of Meteorological Services

Mugumbate, J. R. (2019). *Kunzwisisa budiro/Understanding development*. Training booklet. Sanga, SDF.

Oxfam-UNDP/GEF (2015). *Scaling up Adaptation in Zimbabwe, with a focus on rural livelihoods (2015)*. Profile of the Save sub catchment in Buhera District. Technical report. Harare, Oxfam.

Sanga Development Foundation (SDF) (2018). *History of Sanga Community*. Large display poster. Sanga, SDF.

Oral sources: Various community members who allowed their water sources to be interviewed and described their sources.

Poem

Just like the
broken walls
of Chadzire dam,
the hearts of farmers
and children of
Sanga
break
kuti tsemutsemu
every single day
Why?
Because
they have no water!

Detembo

Sekutsemuka
kwakaita chidziro
chedziva remuna
Chadzire,
mwoyo yevarimi
nevana veSanga
inotsemuka
kuti tsemutsemu
mazuva ese
Nemhaka yei?
Nekuti
vanoshaya mvura!

“Kuti tibudirire nekuderedza urombo muSanga, tinoda mvura inokwanira varimi vese gore rese”.

(For Sanga to develop and reduce poverty, we need enough water for farmers throughout the year).

Sanga Development Foundation

Picture: Chadzire Dam wall, Sanga, Buhera