

Water Harvesting for Community Survival

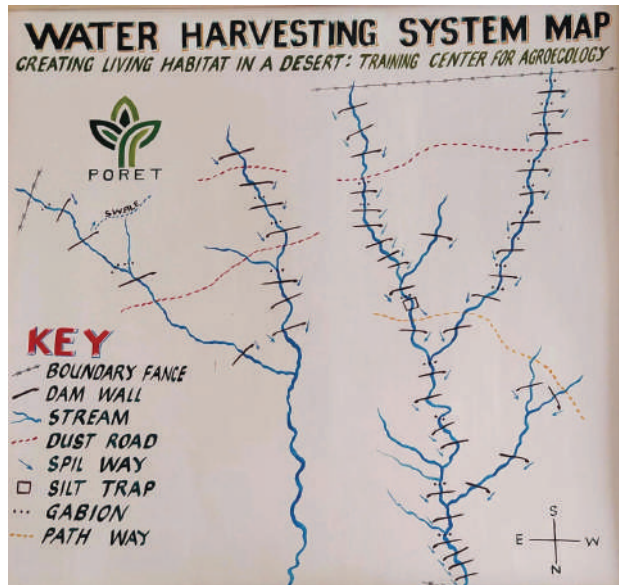
BY SARA DAVIES

In the semi-arid parts of Zimbabwe categorised as agroecological zone 5 (see *ZiMunda Farming Newsletter Issue 11*), much of the land lies bare, the rocky hard soil has lost its water absorption capacity, and water flows over it. Those living and farming in these areas mostly raise livestock, which graze across the land, further reducing the little existing vegetation cover that would otherwise protect the soil and reduce runoff. This is a challenge that **Participatory Organic Research and Extension Training Trust** (PORET) is aiming to address within its programme, by getting more farmers practising water harvesting to recharge the underground water table on their land.

Water harvesting forms a key part of the agroecology methods that PORET promotes. It refers to the collection of rainwater that would otherwise be lost as runoff, and conserving the water through watershed management. The main aim of the programme is to encourage farmers to implement water harvesting techniques that work to keep all water that falls as rain on their land, this is allowed to percolate down and recharge the water table. Water harvesting is a component of watershed management, which is focused on the collection of water during the rainy season. If the areas do not have vegetative ground cover a lot of the water and topsoil is lost through runoff. In a long-term programme to regenerate the land, PORET is working in parallel on livestock management to ensure that these areas are protected but also benefit from the action of the animals on the land.

A CASE STUDY IN CHASEYAMA

PORET's Learning Centre is based in Chaseyama on a hilly 20ha area, near Hotsprings, in the lowveld wards of Chimanimani District. Like other villages in the area, it receives a mere 300-400mm of rain each year, often in just a few storms. 300mm annual precipitation represents 300,000litres of water falling on a hectare of land each year.



Map of PORET's water harvesting system at the Learning Centre

Small dams in Chaseyama - PORET's director Julious Piti and his team spent some years observing water flow patterns across the 20ha of the Learning Centre. Based on these observations, PORET has now invested many hours towards constructing a system of swales, a long ditch dug along a contour line to slow the flow of water down the slope, and small dams to collect the water. 34 dams, with an average size of 12m long and 5m wide, have been constructed at the Learning Centre. Calculating against the average regional rainfall of 300-400mm/year, a total of 1,081,550 litres of water can be harvested in the dams. Kumbirai Dube, an outreach officer at PORET explains that due to the hot climate, the contained water does not stay that long in these small dams. However, he believes it is a good step towards climate change mitigation as the water sinks into the soil through the dam recharging the water table. *"If we have water bodies in our areas,"* explains Dube, *"then evaporation is higher, thereby improving the water cycle. We have found that the temperatures are cooler on our land."*



Above: Before - Preparing the dam



Right: After - the dam after the rains



Coupling dams with tree nurseries - An indication of the holistic nature of PORET's work is the coupling of the dams with nurseries for raising trees that are planted along the swales and below the dam walls. According to Dube, the trees play the following major roles:

- Strengthening the dam wall - *"If we plant trees below the dam walls then their roots bind the soil together and make the dam wall stronger by supporting the pressure of the water when the dams are full,"* says Dube.
- Enhancing the ecosystem - *"The leaves that fall and decompose enrich the soil, encourage micro-organism populations, and enhance the ecosystem,"* says Dube.
- Provision of shade - *"The trees provide shade which reduces the evaporation of the water in the dams hence water stays there longer,"* says Dube.

Social benefits of PORET's Learning Centre - Aside from the clear advantages being experienced, an additional benefit of the water harvesting system at the Learning Centre is that it serves as a demonstration to farmers in the area. PORET has secured funding to train farmers in a range of techniques, including water harvesting, both at its Learning Centre and in the community. The trained farmers have the skills and knowledge to share with their neighbours and communities. A good example is Mr and Mrs Mazungunye, farmers in Zvokuitirwa Village Mhandarume Ward 2, where water harvesting is becoming a critical part in their activities in their mission to regenerate the degraded land on their homestead. Having been trained by PORET, they have now dug swales along the contour across their land to slow the flow of water. They have also constructed a small dam that harvests the water from their neighbour's farm. As the rainy season begins, they have already managed to keep a lot of the water on their land, rather than it flowing to the verges of the nearby road as it usually did. Contrary to the people downstream complaining about water being harvested uphill, they are happy because, according to an observer, water flowed for more days. The work done by PORET is an inspiration to other villages, the village head in Jinga has also started constructing swales after visiting PORET.

Building Swales - The main tool required is an A-frame which is easily made with accessible materials. This allows the user to peg the line of the contour along which the swale will be dug. And of course labour is needed to dig the swale, it's not small feat but worth it in the long run. In 2019, PORET worked with 55



Dam wall planted with pawpaw trees

farmers in 18 villages to construct 125 swales with a combined length of 10,436m. If the swales are full, this translates to 3,158,850 litres of water that is prevented from running down the slope. The swales thus protect an area of 156,547m². 13 mini-dams were also constructed.

PRINCIPLES TO CONSIDER WHEN SETTING UP A WATER HARVESTING SYSTEM

- Understand the catchment area that you are working with by observing how the water flows over the land when it rains. Managing water should start from the top of the slope.
- Construct ditches along the contours, known as swales to slow down the movement of water run-off and spread water into different channels to avoid it gathering force.
- Access routes should not lead straight down slopes but follow contour lines, for instance roads, pathways and animal movements should be across the slope to reduce run-off.
- Devise mechanisms to sink or store water, which can be in the form of dams or tanks.

The small dams can be constructed in the farmer's fields without hiring an expert technician because the training obtained from PORET by the farmers is enough. Additionally, plastic liners are not required for dam construction as the water should sink into the soil down to the water table.

In an incredibly hot and arid landscape, the harvesting of water gives the villagers hope for the future.

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Images supplied by Sara Davies, PORET & Weltfriedensdienst e.V.