This project is co-funded by the European Union

SUSTAINABILITY FACTSHEET #04

Rainwater Harvesting and Sub-Metering

Improving the efficiency of water usage and water conservation practices within the clay brick sector will significantly contribute to the preservation of South Africa's limited water resources.

This factsheet describes how to identify and document opportunities to reduce water consumption during production through sub-metering. It also reviews alternative sources of water to reduce dependence on potable water from the national water mains.

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THE NEED FOR INCREASED WATER EFFICIENCY

The Department of Water and Sanitation designates, South Africa as a semi-arid, water-stressed country due to the low rainfall averages, low stream flows in rivers and the large-scale, long-distance transfer of water for urban and industrial uses.

Water is a key resource in the clay brick sector. It is used in the extraction of the clay as well as the production of clay bricks. Therefore, it is crucial that the sector efficiently utilizes and conserves the country's scarce water resources through sourcing water from non-mains sources and water sub-metering to identify areas for water efficiency improvements.

SOURCING WATER FROM NON-MAIN SOURCES

Rainwater Harvesting

Supplementing portable water from the mains with rain water greatly reduces the pressure and overdependence on the water grid. This can be collected form the roofs of factories and warehouses as well as the surface runoff. This water is either stored in tanks or diverted to an artificial recharge system and used for non-potable water requirements as well as within the production process of clay bricks. Some of the large-scale techniques of capturing and storing rainwater include: vertical rainwater collection tanks and underground water storage.

Vertical rainwater water collection tanks:

With the average rainfall in South Africa at 464mm, up to 23 000 litres of rainwater can be harvested from a 50 square meter roof area in a year (Rainharvest, 2013) which volume increases with larger roof areas. The rainwater tanks can be of varying capacities depending on the roof area as well as the non-potable water requirements. They can be made from plastic, steel or concrete, and are fitted with filters that clean the rainwater of micro-organisms and turbidity.

Figure 1 – Vertical Rainwater Collection Tanks Source: H_2O Building Services (2018)

Underground water storage (lined and unlined water storage):

The lined water storage requires earth excavation, into which a water tank is installed or constructed. After which, the area on top of the tanks is completely covered and can be used for different activities such as a parking lot and landscaping except for the manholes required for maintenance purposes. Underground tanks are advantageous because they help in saving on the above ground space, do not affect the general aesthetics of the buildings and can greatly vary in sizes depending on the water requirements. However, their major disadvantages are the higher installation costs compared to the vertical tanks and more complex to monitor and maintain in case of any leakages.

With the unlined water storage, the earth is excavated and rainwater, together with surface runoff, is stored in these pits and allowed to infiltrate into the soil. The pits can also apply to those where clay for brick making was excavated. There are two major advantages for this method: the natural ground water level is replenished, and water can be extracted in close proximity to these pits and used in clay extraction or other non-portable water uses.

Figure 2 Underground Water Harvesting Tank Source: H2O Building Services (2018)

Other proven methods that can recharge ground water aquifers are filtration tanks, infiltration wells and percolation tanks, among others. These are advantageous for replenishing ground water sources for boreholes which are reliable alternatives to water supply from the mains.

Claytile (Pty) Ltd in the Western Cape is a local brick manufacturer that is harvesting and utilising rainwater to reduce its dependence on potable water during production. Its water conservation initiative was awarded the EcoStandard EcoProduct certificate from EcoStandard South Africa.

WATER SUB-METERING

Municipal water meters can be supplemented by multi-secondary meters that allow manufacturers to monitor and measure their individual and specific water consumption per production process. This quickly and easily detects usage fluctuation from leaks and damage, reducing water wastage in different phases. With this information, faulty equipment and pipes are identified and repaired/ replaced thus reducing the water that would have been lost.

In addition, sub-metering raises awareness of water consumption practices within a company as real time data is visualised. With this data, the embodied water measurements per brick can be established as well as the water footprint of a company and thus areas for better performance within the production chain can be identified. According to research, consumption awareness encourages users to reduce water usage by up to 35 percent.

CONCLUSION

Increasing water usage efficiency as well as water conservation practices within the clay brick sector can significantly contribute to the preservation of the scarce water resources within South Africa. The practices discussed recommended ways of documenting and identifying areas within the production process where water consumption can be improved through sub-metering and the collection and use of alternative sources of water such as rainwater. All of these reduce the overdependence on potable water from the national water mains.

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For further information:
The Clay Brick Association of South Africa
Website: www.claybrick.org