

Rainwater Harvesting

Relevance for climate change adaptation



The majority of Tanzanian smallholder's coffee production is rain fed. Optimal conditions for Arabica coffee include 1200 to 2000ml of rainfall per year, for Robusta coffee around 1500ml. Precipitation needs to be well distributed in the rainy seasons according to the cropping cycle. Tanzania and the whole East African region has recently become drier and rainfall has become less predictable. There is a particular downward trend in precipitation levels between March and September, which interferes with the

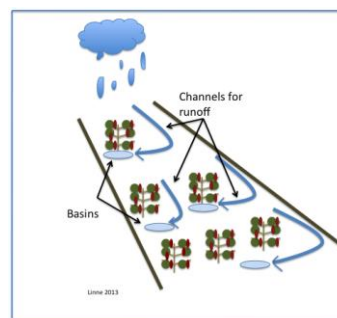
flowering of the coffee tree. Therefore these unreliable rain patterns strongly affect coffee productivity in the country. Additionally temperatures are expected to rise by between 1 and 2.7°C by the 2060s.

Less rainfall coupled with increasing temperatures is likely to lead to water stress for agricultural purposes as well as for household use. For coffee water stress means a reduction in photosynthesis and ultimately in yield quantity and quality. Finally this may translate into declining income for coffee farmers. To prepare for water deficiencies during some periods of the year and thus minimize negative impacts caused by water stress, rainwater harvesting is a suitable adaptation option. It prolongs the moist period and reduces the drier period between March and nowadays October in Tanzania.

Rainwater harvesting by basins

There are several ways to harvest rainwater (*see also Adaptation Option Rainwater Harvesting for Brazil*). One option is to channel surface runoff to basins with a depth of about 10cm or more around trees and between the coffee rows. This helps to protect topsoil from being washed away, to hold rainwater on the field and it allows for more water to infiltrate into the soil, thus keeping it moist for longer in the case of dry periods. To avoid the excavated basins to fill up with soil again moved by heavy rains, this practice shall be combined with groundcover (*see also Adaptation Option Groundcover*).

The channels or ditches need to be located at the top of the field and then lead the runoff by gravity to the dug basins. In the case of a slopy field the coffee rows should be planted across the slope, i.e. along contours, and the channels or ditches need to guide the runoff water gently towards the basins as to avoid causing damage by the channelled water in neighbouring fields. Terracing is another option to effectively hold water on the coffee plot if the slope is steep. In cases where the gradient of the slope is above 40% some of the excess water may simply run off the channels. Securing them by planting Vetiver grass on the lower edge of the channel and practicing slashing as a method of weeding throughout the field, may help to minimize this risk. Slashing will also prolong the life span of the open water basins by only allowing grass filtered runoff water into the basins. However, weeding by a hoe will not support this practice as the basins will easily be filled by washed away top soils. Further information is available at www.coffeeandclimate.org. Local agronomists can support in identifying the best option for rainwater harvesting in a specific field as it always depends on the gradient of the slope, the amount of rainwater, the farming system and the available resources.



Version: April 2013 | References: Baker 2013, ICP Tanzania 2008; Pictures: Ambrose 2012, ICP Tanzania 2008; Graph: Linne 2013