

## **Incorporating hydrological reliability in rural rainwater harvesting and run-of-river supply**

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**Abstract** Many households in rural areas obtain water from rainwater harvesting (RWH) and/or run-of-river (ROR) flow, but many of the methods used to assess the yield of RWH and/or ROR supply unrealistically aggregate data into monthly or annual time steps, and do not incorporate measures of reliability. Most approaches do not assess the improvement in supply that would be obtained from integrated utilization of the two sources. This paper demonstrates: (i) the incorporation of reliability for the widely applied mass curve method, and (ii) realistic incorporation of reliability and integration in RWH and ROR hydrologic analysis via behaviour analysis of household supply and frequency analysis of the annual levels (number of days) of supply. The behaviour analysis approach has the ability to simulate complex operating rules and configurations while including measures of performance comprehensively. It is therefore considered the method of choice for RWH and ROR supplies.

**Key words** yield-reliability analysis; rainwater harvesting; run-of-river; rural water supply; mass curve; behaviour analysis