

# 10,000 RAINWATER HARVESTING SYSTEMS

Promoting an effective, simple and scalable decentralized solution to Lebanon's water scarcity



Lebanon receives between 600 and 1100 mm of rainwater per year, and if collected effectively this could contribute to an additional 23MCM of water per year (70 % of the current deficit in the domestic water supply).

8 years into the Syrian crisis, Lebanon faces structural challenges exacerbated by the influx of refugees, especially in relation to water resource management. 48% of public water supplies are unaccounted for, and due to over-extraction from private boreholes, coastal regions suffer from high salinity of groundwater. With over 70% of the water supplies contaminated, infrastructures outdated, and lack of capacities to rehabilitate them, host communities and refugees alike struggle to meet their WASH needs. **In this context, ACTED is promoting the installation of rainwater harvesting systems (RWH)** in line with the Ministry of Energy and Water Guidelines (Box 2.) as a complementary non-potable water supply to increase water availability and decrease pressure on water groundwater and networked water supplies. In 2019 ACTED has installed 44 RWH systems in residential and institutional buildings.

## SNAPSHOT OF RAINWATER HARVESTING SYSTEMS INSTALLED IN 2019



Installation of 34 residential RWH systems benefiting 707 individuals



Installation of 8 RWH systems at schools benefiting 4451 students and 497 teachers



Systems have a combined rainwater storage potential of 706m3



Savings of up to \$100 per month in winter for HH



Figure 1. Locations of systems installed by ACTED in 2019

In January 2019 ACTED started its first RWH pilot in Akkar. 35 RWH systems were installed in Berqayel, an area relying on shared boreholes and water trucking. This benefited a total of 707 people and reduced household expenditure on water per month during winter by up to \$100. An additional 15 residents in the village self-financed a rainwater harvesting system in their building after witnessing the success of the intervention.



Figure 2. Rainwater harvesting systems installed in the municipality of Berqayel, Akkar.

## POTENTIAL FOR RAINWATER HARVESTING IN LEBANON

Research\* found that if widely adopted in Lebanon, RWH could help in:

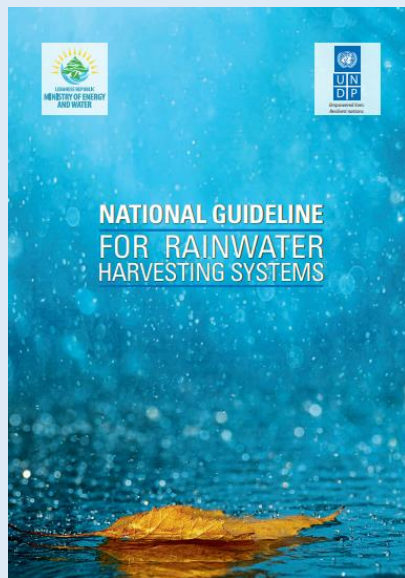
- (1) Collecting around 23 MCM (70 % of the current deficit in the domestic water supply) of rainwater and thus increasing the available water per m2 of building by 0.4 m3 per year,
- (2) Saving around 7 % of the amount of electric energy usually needed to pump water from an aquifer well and ground or underground tank, and
- (3) Considerably reducing the rate of surface runoff of rainwater at the coastal zones where rainwater is not captured at all and goes directly to the sea..
- (4) Harvesting as much as 196 m3 a year if installed on a rooftop of 400 m2 receiving an average yearly rainfall of 765 mm like the city of Beirut in Lebanon.

\*Rooftop level rainwater harvesting system (2015), Hayssam Traboulsi Faculty of Agronomy and Veterinary Sciences, Lebanese University and Marwa Traboulsi, Department of Mechanical Engineering, American University of Beirut.



Figure 3. Installation of RWH storage and roof guttering

## Box 2. Ministry of Energy and Water RWH Guidelines



The Guidelines were created by the Ministry of Energy and Water in Lebanon in 2016, with support from UNDP. These guidelines provide a comprehensive overview of the design and installation of RWH systems. The Guidelines state that: *“In the eventual occurrence of water metering in Lebanon at the consumer premises, thus introducing the “pay as you consume principle”, rainwater harvesting will definitely reduce the water bill. Rainwater harvesting may easily cut by half the municipality water requirements of a household.”*

The simple system transfers rooftop rainwater straight to a ground level water tank, where it is filtered and pumped to rooftop water tanks and then provides non-potable water directly through the household plumbing network

RWH systems consist of roof guttering, downpipes, water tank, water filtration and a water pump. The **Average cost per installation:**

- Public: Schools, municipalities, SDCs: \$4100
- Residential Buildings (average of 4 HH): \$1200

ACTED's technical team conducts **ongoing follow up visits of the systems installed** to ensure that roofs are regularly cleaned from debris, water filters are cleaned and pumps are well maintained. In December 2019, ACTED **installed**



**water meters** on 9 residential systems, 3 schools, 1 SDC and 1 municipality to quantify the volume of water collected over the winter months.



## NEXT STEPS IN 2020 &gt;&gt; 10,000 RAIN WATER HARVESTING SYSTEMS CAMPAIGN



Launch the *10,000 Rainwater Harvesting Systems Campaign* with the Ministry of Energy and Water



Install additional systems for vulnerable households and institutions relying on unsustainable water sources



Create online database of existing RWH systems in Lebanon, including those installed by ACTED



Increase awareness about RWH and water efficient fixture with municipalities who provide building permits



Train communities and local NGOs to design and install RWH systems and water efficient fixtures and host demonstration days



Conduct technical assessments for residents, business and institutions interested in installation



Collaborate with existing local NGO environmental networks to support target of 10,000 RWH in Lebanon



Promote training of plumbing installation of RWH systems and water efficient fixtures through technical schools, increasing green jobs



Iterate design of system to determine most cost efficient system and encourage rapid scale up



Conduct national campaigns to highlight benefits of RWH with support of 10,000 RWH system network