Pakistan, at present, is experiencing an exponential shift in its water profile, from being water abundant to reaching the verge of water scarcity. According to a recent report by the International Monetary Fund (IMF), Pakistan ranks third in the world among countries facing acute water shortage.

To address the depleting water resources and to create awareness about the need to conserve water resources, WWF-Pakistan, in partnership with PepsiCo., is engaging stakeholders to implement water replenishment techniques to offset percentage use of freshwater. By implementing the replenishment techniques, this project intends to achieve the following goal and outcomes:

**Goal:**
To develop a replenishment system in the catchment of Lahore and Multan districts by 2024 that has the potential to replenish 331,000m³ of water per annum.

**Outcomes:**
1. Implement water replenishment techniques for the communities to contribute to the recharge of groundwater as well as utilize the treated water for different purposes.
2. Create awareness among local community members and concerned stakeholders on the need to conserve rainwater, reuse conserved water for secondary purposes and facilitate recharge of groundwater.

The following replenishment methods have been identified for PepsiCo.’s Snacks Plant watershed in Lahore and Multan districts:

1. Rainwater harvesting system
2. Ablution water reuse system
3. Improvement of wastewater quality via floating treatment wetlands (FTW)
4. Groundwater recharge via recharge well
5. Land cover management
6. On/Off-farm water management practices

**Rainwater harvesting system**
Rainwater harvesting is a technology used to collect, convey and store rain water for later use from relatively clean surfaces such as a roof, land surface or rock catchment.

On an average up to 60m³/year of rainwater is captured through a RWHS installed at the rooftop of a 5 marla house.

**Ablution water reuse system**
Ablution grey water (AGW) is discharged in large quantities from mosques owing to wudhu. In comparison to domestic grey water, AGW is relatively clean and contains low levels of physico-chemical and biological contaminants. Hence, the AGW has a great potential for recycling and reuse for non-potable water applications after desired treatment.

On an average up to 2.5 m³/day of water is estimated to be reused in a mosque with approximately 500 worshippers per day.
On an average 2,200 m$^3$/year of groundwater is estimated to be recharged from a catchment area of an acre.

On an average 19,000 m$^3$/year of wastewater is estimated to be treated through a FTW installed in a wastewater pond with the size of an acre and depth of 1 meter with an average daily wastewater flows of approximately 50 to 70 gallons per person per day.

Recharge wells are considered as an efficient option to filter and redirect rainwater directly into the underground aquifer for replenishment purposes.

Floating treatment wetlands are a relatively new wastewater treatment approach, whereby plants are vegetated on soilless buoyant mats in a manner that underground biomass hangs freely in the water column flowing underneath the mat. Research has reported them to be a highly effective approach towards improving the quality of contaminated water.

On an average 19,000 m$^3$/year of wastewater is estimated to be treated through a FTW installed in a wastewater pond with the size of an acre and depth of 1 meter with an average daily wastewater flows of approximately 50 to 70 gallons per person per day.

Groundwater recharge via recharge well

Recharge wells are considered as an efficient option to filter and redirect rainwater directly into the underground aquifer for replenishment purposes.

Groundwater recharge via recharge well

On an average 2,200 m$^3$/year of groundwater is estimated to be recharged from a catchment area of an acre.

On/Off-farm water management practices through laser leveling and lining of water courses

Laser leveling is a simple operation to prepare the land before sowing that can reap massive returns such as increasing yields, saving water and reducing greenhouse gas emissions.

Lining of Water Courses includes complete demolishing of community channel and its re-aligning according to the engineering design to increase conveyance efficiency by reducing seepage, evaporation, and operational losses.

Real-time monitoring system

Water quality and contamination in the aquifers and other surface water bodies can be detected by installing a real-time monitoring system. This system can be used as an early warning system that detects any anomalies in water, through sensors that measure physico-chemical parameters that are then communicated wirelessly as real-time data on an online portal. With this intimation, timely solutions can be implemented to prevent contaminants from entering the aquifer.

Land Cover Management through riparian buffers and block/linear plantation

A riparian buffer is a vegetated area near a stream, usually forested, which helps shade and partially protect the stream from the impact of adjacent land uses. It plays a key role in increasing water quality in associated streams, rivers, and lakes, thus providing environmental benefits.

Laser leveling

Lining of Water Courses

Real-time monitoring system

*Note: The capacity and replenishment volumes may vary depending upon design specifications, catchment, rainfall and water usage trends.*