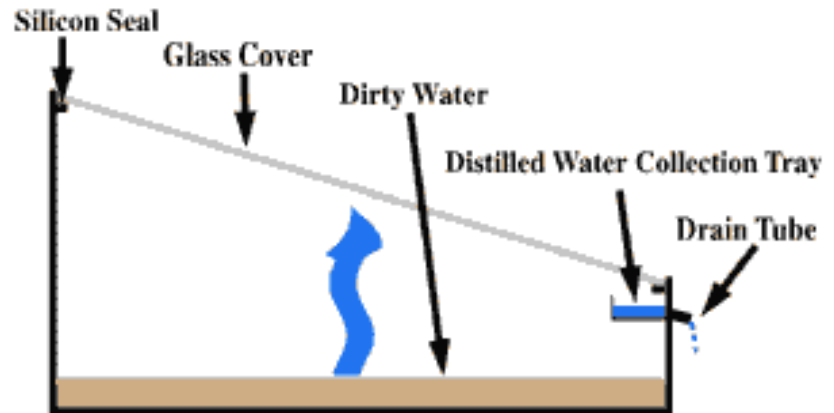


# Solar Distillation

## How Does It Work?

Solar stills purify water through distillation, where pure water is vaporized out of collected dirty water and then condensed. In some cases, such as extremely poor quality or salty water, solar stills may be the most practical way to treat the water. The basic concept of the typical solar still starts with the sun's energy going through a glass (or Plexiglas) window and evaporating the water in the pool at the bottom of the still. The evaporated water condenses on the glass and flows along the glass surface to channels at the bottom where it is collected.



## In Practice

When designing a solar still, the glass must be tilted at least 20° to assure that the water flows along the glass surface and does not fall back into the pool of water. The performance of solar stills improves as the temperature inside the solar still increases and care should be taken to assure that joints are tight and the sides and bottom are well insulated. An approximate method to estimate the output of a solar still is given by:

$$Q = \frac{E \times G \times A}{2.3}$$

where,

Q = daily output of distilled water (L/day)

E = overall efficiency (a simple basin solar still operates at about 30% efficiency)

G = daily global solar irradiation (MJ/m<sup>2</sup>) (global average = 18.0 MJ/m<sup>2</sup>)

A = aperture area of the still (m<sup>2</sup>)

According to this equation, a simple basin solar still with an area of 10 ft<sup>2</sup> would produce approximately 2.1 L of water per day on average. This is barely enough drinking water for one person per day.

**Time to Treat:** Typically, about 2L per day per 10 ft<sup>2</sup>

**Cost:** Varies greatly depending on materials and size

Advantages	Disadvantages
Can be used with salt water	Impractical as a primary drinking water source
Simple to maintain	Very slow treatment rate
	May be difficult to acquire glass or Plexiglas