Box 2.3. Calculating Rainfall Volumes

CALCULATING RAINFALL VOLUMES IN ENGLISH UNITS

To calculate the volume of rainfall in *cubic feet* that falls in an average year on a specific *catchment area*, such as your roof, yard, neighborhood, or other subwatershed:

CATCHMENT AREA (in square feet) multiplied by the AVERAGE ANNUAL rainfall
(in feet) equals the TOTAL RAINWATER FALLING ON THAT CATCHMENT
IN AN AVERAGE YEAR (in cubic feet)

(or)

CATCHMENT AREA (ft^2) $\times$ AVG RAINFALL (ft) = TOTAL RAINWATER (ft^3)

If you normally measure annual rainfall in inches, simply divide inches of rain by 12 to get annual rainfall in feet. For example, folks in Phoenix, Arizona get about 7 inches of annual rainfall, so they would divide 7 by 12 to get 0.58 foot of annual rain.

Once you get your answer in cubic feet of annual average rainfall, convert cubic feet to gallons by multiplying your cubic foot figure by 7.48 gallons per cubic foot. The whole calculation looks like this:

CATCHMENT AREA (ft^2) $\times$ RAINFALL (ft) $\times$ 7.48 gal/ft^3 = TOTAL RAINWATER (gal)

For example, if you want to calculate how much rainwater in gallons falls on your 55 foot by 80 foot (4,400 square feet) lot in an normal year where annual rainfall averages 12 inches the calculation would look like this:

4,400 square foot catchment area $\times$ 1 foot of average annual rainfall $\times$ 7.48 gallons
per cubic foot = 32,912 gallons of rain falling on the site in an average year

CALCULATING RAINFALL VOLUMES IN METRIC UNITS

To calculate the volume of rainfall falling on a specific catchment area in liters:

CATCHMENT AREA (in square meters) $\times$ AVERAGE ANNUAL RAINFALL
(in millimeters) = TOTAL RAINWATER FALLING ON A CATCHMENT
AREA IN AN AVERAGE YEAR (in liters)

CALCULATING THE VOLUME OF RAINFALL ON A SPECIFIC CATCHMENT FOR A GIVEN RAIN EVENT IN ENGLISH OR METRIC UNITS.:

Use the calculations above, but enter the amount of
"rainfall from a given rain" in place of "average annual rainfall."

Note: Appendix 3 "Calculations" provides more detailed information on conversions, constants, and calculations for water harvesting.