WATER PLANNING - YOUR WATER NEEDS

PLANNING A WATER-HARVESTING SYSTEM

To properly size your property's water systems, you'll need to know what water resources are available to the property and what exactly your needs will be. In this guide, we'll calculate your water needs.

Like in any other design process, start by getting clear on your goals. You'll want to know what size of water storages you'll have to build.

Step 1. How are you planning to use the water?

Instructions: *think about whether you need water for household use, livestock, irrigation, fish production, fire protection, or recreation…? How you answer that question will largely determine the best way to harvest that water - be it ponds/dams, tanks or cisterns, or both. For example, if you plan to use harvested water only for potable use and washing, you'll need a water tank, while if you plan on using it for livestock and growing a market garden, you might need a pond and a water tank.*

Write down the activities you'll be using water for

Step 2. Calculate how much water you'll need

Instructions: *try to estimate how much water you'll actually need for each of the activities you outlined in Step 1. Use the web resources below to do your calculations.*

Sources:

- ➔ How much water does my farm need? https://agriculture.vic.gov.au/farm-management/water/farm-water-solutions/how-much-water-does-my-farm-need
- ➔ Water System Planning: Estimating Water Needs https://extension.psu.edu/water-system-planning-estimating-water-needs
- ➔ Farming and animal required water supply https://www.engineeringtoolbox.com/farm-use-animals-water-consumption-d_1588.html

➔ A common guideline for orchards and food forests (source Edible Forest Gardens book):

1 inch (25 mm) of water each week of the growing season.

- Orchard/food forest water requirement (English units) = size of the orchard/food forest (square feet) x 0.083 ft/week
- Orchard/food forest water requirement (metric units) = size of the orchard/food forest (square meters) x 0.025 m/week.

Transform the results into gallons or liters per month. Multiply by the number of months of the growing season.

More advanced calculations: You can estimate the water use of any specific crop by using the formula:
Crop Water Use (ETc) = Reference Evapotranspiration (ETo) x Crop Factor (Kc)

You'll have to find Eto and Kc values for your area online, then calculate ETc for each month and sum up everything. (See attached links for more information:
http://www.fao.org/3/S2022E/s2022e07.htm#3.2.1%20introduction
https://irrigationtoolbox.com/ReferenceDocuments/Extension/BCExtension/577100-5.pdf)

Get a ballpark estimate of how much water you'll need annually (megalitres/year) for each of these activities:

Note: people generally underestimate how much water they consume and how much water they'll need for their farm. The math around these numbers can be brutal. For example, a typical North American consumes 75 to 100 gallons (300 to 400 liters) a day per person. That works out to about 96686 gallons (366000 liters) a year of just personal water consumption.

When it comes to growing annuals, even a modest garden will require thousands of liters/gallons a week. Irrigating a 1000-square-foot garden (100 square meters) at the recommended rate of one inch (25 mm) per week will use 600 gallons (2270 liters) each time. If, for example, a garden is 5000 square feet (465 square meters), that's 3000 gallons (11 350 liters) a week!

Step 3. Sum up the numbers

Instructions: *group the activities you need water for into three different categories of use: 1. Human–potable and non-potable 2. Plants, and 3. Animals, and make a sum of each. This will give you an idea of your farm's overall water needs by different types of use and help you determine the size of the system you'll need.*

Group the proposed water needs into three different categories of use: 1. Human – potable and non-potable 2. Plants, and 3. Animals and calculate the totals for each category

CONTEXT CHECK: the process above will outline how much water you'll need and, consequently, what size of water storages you'll need to build. Before you proceed to PART 2. of this exercise, think about what realistically you can build. Consider what your budget is and how much space you have for your water storages so that you can stay grounded in reality instead of wishful thinking.