

Sustainability Platform

A sustainable supply of food and water

This concept might be a key to widespread local sustainability. It is a cistern installed beneath a garden. THIS IS ONLY A THEORY AT THIS TIME. But I offer my current ideas, and will provide updates as the project progresses.

The primary physical components of the project would be these:

- 1) An impermeable membrane is buried beneath both the garden and the cistern to prevent moisture from either from being dissipated into the surrounding earth.
- 2) The tank itself is laid up from unmortared cement blocks, and covered with landscape fabric so that water can pass through, but garden soil cannot.
- 3) The portion of the membrane under the garden slopes gently down towards the tank, so all water soaking downward from the garden – whether from rainwater catchment or intentional watering – can be captured.

The theory is that if enough water is stored when it is available, it could see the crops through until harvest during months when it is no longer available.

Whether by distillation or other means of purification, this project could also provide emergency water for domestic use. Once established, its low-maintenance needs would make the garden practical for remote rarely-tended property, as well as backyards. A degree of natural rain water catchment would augment this storage, and make the system even more low-maintenance.

As described, this is an experiment limited to the space and resources of the author. Hopefully, the experience and information gained will enable calculations for greater scales and more realistic proportions. Sometimes an experiment “fails” and exposes us to some hidden reality. In either case, this is what makes them even more valuable.

There are multiple problems I can see before even getting into the physical work: (1) How will we keep the water and the soil from becoming stagnant? (2) How likely will the stored water turn into compost tea? Off hand, it may be inevitable, but I guess we'll find out. (3) Would compost tea be a bad thing? (4) How would we clean whatever the water becomes, well enough to use it for domestic use? (5) How would we prevent the stored water from becoming a mass-breeding ground for mosquitoes?

Frankly I have a few ideas but no proven answers to the above problems – let alone to those problems yet to be discovered. On the dubiously positive side, even as a young man (I was twenty three), I consciously realized that my modus operandi in life was to “bite a sleeping bear on the ear, and then improvise.” I expect to discover answers as each attempted step takes me to another horizon from which I can see just a little farther. So read on if you dare.

There are also great potential opportunities afforded by this project. (1) How about making more than one of them so water could be cycled back and forth among them to allow the soil to periodically drain. (2) If one or more were conventional gardens and if one or more were hydroponic beds, compost tea would be a naturally occurring good thing. (3) Why not include an aqua feature in this loop to consume other categories or pollutants and and replace them with other categories of nutrients? (4) Could certain categories of domestic waste water be allowed to enter such loops? (5) With the shallow nature of the available water, economical solar electric panels could passively power small pumps to automatically handle all this in proportion to the available sunlight. (6) Suppose you had a passive still exposed to the moisture in the soil and tank, that would continuously fill a container. When full, the container could continue to overflow back into the tank through a filter near the top; This could help aerate the returning water. Otherwise, the container could be periodically emptied for domestic use.

Meanwhile, in view of the importance of the project, I will be sharing my theories and progress through a series of updates.

I could use a little help during this development phase, so I am going to allow brief access to my email account for input and comment. My email for this period is "village@technosmith.com". Be sure to re: "sustainability platform," so I don't ignore you as junk mail.

This begins on the shoulders of another project in this catalog called Captive water table (#03020). Other than scale, the difference is that a permeable cistern replaces the gravel bed, and the underlying membrane material is that which was designed for outdoor structures in the project called "Durable covering" (#01020). The difference in the membrane used here is that it will be backed by black plastic, to further eliminate potential leaks.

Planned dimensions

A theoretical garden design is circular, 16' in diameter, having a bed raised 16" above the surrounding ground. The height of this raised bed should be more precisely calculated. Ideally, it would be high enough to contain the earth to be removed from the cistern volume below it. With a circular format, you could use a wire mesh perimeter supporting the membrane, rather than using far more expensive wood.

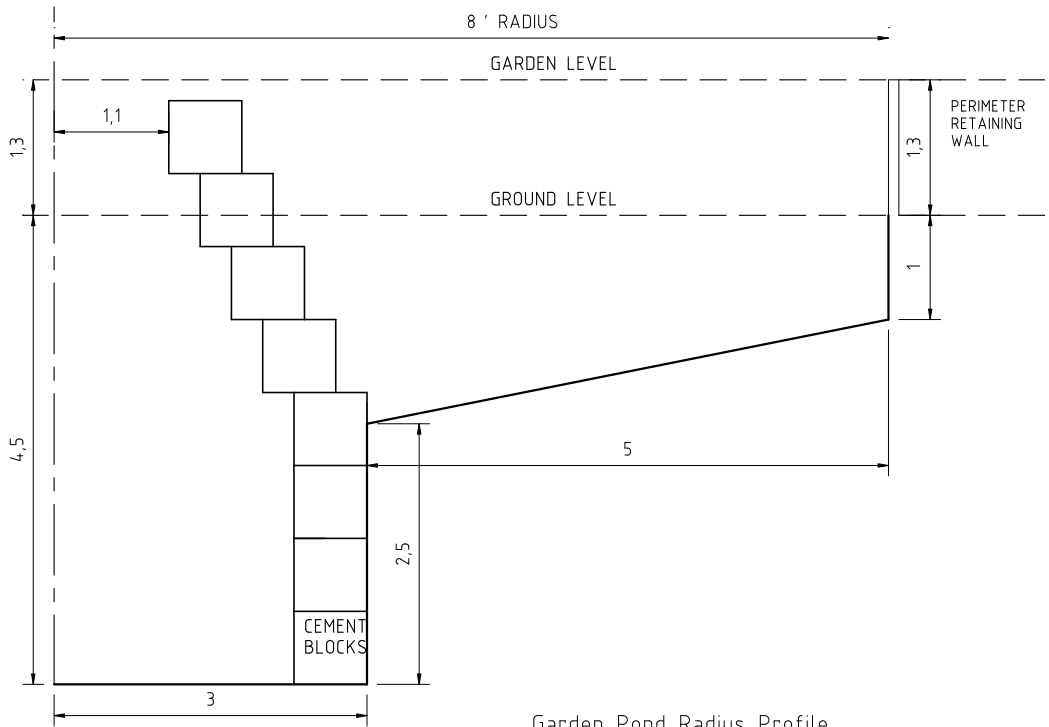
The top of the tank I envision is about 2 feet below the current ground level, and extends an additional 2-1/2 feet downwards. I would expect to make it 6 feet in diameter, which would give it a capacity of about 530 gallons. I would probably build it from the wire mesh and masonry cement that I used for a structure I called "[The Cozy](#)". I would expect to then seal the inside by covering it with a tough landscape fabric (AKA "weed block," painted with a long-lasting solar roof coating).

The entire garden area (to include sides) would be lined by an impervious membrane consisting of this weed block that has been attached to 6 mil black plastic by painting it with either a solar roof coating or an asphalt emulsion. The bottom of this garden would slope downwards towards the tank from all directions, to return any water not used by the plants, to the tank.

There would be an internal structure laid up from unmortared cement blocks within this tank. This would taper the top to a small opening, and be covered with weed block to keep out the garden soil.

The above dimensions are quite arbitrary, and relate only to the space and ambition I feel I can afford. I have not yet sat down and made actual calculations concerning exactly how much water I would need to store for various purposes. The excavated areas and the raised portion will be back-filled with garden soil, and planted per a separate project.

Granted, the effort may be monumental, but I don't begin projects with silly questions like: "Can it be done?" Keep in mind that this is a task in progress, and I will add updates as the project proceeds – or not.



Garden Pond Radius Profile