

Water Conservation with Aquaponics and TransFarming



Components of a TransFarmed Yard

A publication of the Texas Aquaponic and TransFarming Center

Water Conservation with Aquaponics and TransFarming

Here in Texas we face many obstacles to growing food in a “sustainable” fashion. What does sustainable mean? Well, it has a lot to do with producing food in a manner that is not interrupted by “outside influences”. One of the major outside influences here in Texas is the weather – long seasons of heat, extended periods of cold, rapid changes between those two conditions, and no rain in between.

The entire premise of TransFarming (the process of transforming a backyard into a farmyard) was started on the realization the weather here in Texas can be brutal and a different approach must be taken to combat the elements in light of our modern challenges.

At the core of all this is water. Without water, nothing prospers. TransFarming is about “re-thinking” traditional gardening methods to address *regional environmental challenges* like droughts and water restrictions, while keeping in mind techniques for prosperous food production. These approaches involve growing food in ways that conserve water.



Weather wise, not much has changed from the days of our ancestors, but they used vastly different approaches to dealing with the climate than we do today. Following are a few techniques used to conserve water on a TransFarm.

Wicking Beds

Wicking beds have proven to be a viable solution to the Texas heat and water conservation. These simple structures, based on a raised bed garden, incorporate a reservoir underneath the bed to store water. The garden is watered through an exposed pipe which then wicks water upward through the soil to the roots where water is needed the most. There is minimal evaporation.



Traditional Raised Bed Gardens

Traditional raised bed gardening involves selecting the correct structure and materials for a specific outcome based on environmental factors such as shading, sun path, wind direction and desired crop. Additionally, soil composition will play a very large part in crop success and water conservation. A simple small hoop house may be desirable to protect from direct sun and winter cold.



Aquaponics

Aquaponics is the combination of aquaculture (fish farming) and hydroponics (soilless plant production). With Aquaponics, the nutrient-rich water that results from raising fish provides a source of natural fertilizer for the growing plants. As the plants consume the nutrients, they help to purify the water in which the fish live. A natural microbial process keeps both the fish and plants healthy, and helps sustain an environment where all can thrive. Both the plants and fish are harvested.



HugelKulture

A HugelKulture is a type of raised bed garden that allows one to use organic materials that are too big to go in the compost. Over time, that is 3- 5 years, the materials in the bed decompose, and provide a slow release of nutrients for garden plants.

Because of its three-dimensionality, a HugelKulture raised bed garden combines the multiple functions of rainwater harvesting, catchment, and irrigation using no cistern, pumps, or pvc pipes. Done properly, there may be no need to water all summer!



Keyhole Gardens

A keyhole garden uses the same principle as a HugelKulture in that decomposing matter is used to absorb and retain water in the soil. Large amounts of “rotting” wood and kitchen scraps are used in the soil which is stacked within layers of cardboard and paper. Kitchen scraps are also added to the bed via a foot-wide tube which nourishes the entire system. A wedge is cut in the circular bed to access the tube, which makes the garden look like a keyhole when viewed from above.



Hoop House/Monkey Huts

One of the major concerns with growing food (and fish) in the winter is the cold. The wind does not help much either. Greenhouses are expensive, and any constructed structures tend to be somewhat permanent.

Enter the simple Monkey Hut. These structures are by their very nature flexible, and designed to withstand strong wind and rain (dust too). Built correctly, they are easily dis-assembled in the Spring, or used to support a shade cloth in the Summer.



Tank Gardens

These wonderful structures are perfect for small yards and, like a Hugelkultures and Keyhole gardens, use compost as its method for growing great food. The perimeter is simply rolled metal available at any home improvement store. Since the border is made of metal, it will last for many years, only getting better each year due to the decomposition process.



Vermiculture and Constructing a Worm Bin

Worm Composting is an excellent way to create organic matter for gardens and Aquaponic systems. They can be added directly to gardens and Aquaponic media systems, and also used to feed fish and chickens. Worms are important in the garden because they aerate the soil which helps lock in moisture. Worm farming includes choosing a worm and bin type, setting up the worm composting bin, maintaining the system, harvesting compost and worms, making and using worm tea, and such activities.



Of key importance in any sustainable food growing effort is backup and redundancy. It is highly desirable to have as many different components available in case stressful conditions. For example, if a prolonged heat wave and drought were to occur that wiped out your traditional raised bed gardens, you would have your Aquaponic systems to harvest. Additionally, if there was a disruption in the water supply, Aquaponic water could be used. Should the Aquaponic system be disrupted, the gardens and