

Green Solar Powered Water Barrel

by [damoelld](#) on May 5, 2009

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Intro: Green Solar Powered Water Barrel

A Green way of using rainwater with the convenience of city water. The attached solar regenerated pump enables you to water plants with pressure, even when the water in the barrels falls low enough that it barely passes the level of the faucet. The sun-warmed water also aids in the growing of plants as it does not shock them. The twin 85 gallon barrels are raised onto a very sturdy 4x4 box assembly from recycled wood, held together with new carriage bolts because the total weight of all the water when full is approx 1700lbs. This frame is resting on eight 2 inch thick 18 inch square cement pads to prevent sinking. The barrels are raised to increase the head pressure and decrease the work load on the pump.

Vote for me if you think my idea is worth passing on to show people being green doesn't have to mean sacrificing quality or convenience . Thank you for taking the time to look at my instructable!



Image Notes

1. 5.5W solar cell
2. 1"pvc Upper interconnect pipe
3. lower 1/2" pvc manifold
4. 12v Battery and pump
5. water filter
6. water 'sight glass' (water gauge)

Step 1: Water supplied from mother nature

link barrel to downspout. ensure top of barrel remains below level of water entry. I found the Watersaver attachment for the 3x4 downspout pipe works perfectly. In order to enable adequate water flow to the barrel I adapted the Watersaver attachment by drilling out the side and adding a flange for a 1inch PVC fitting. I sealed this by using a rubber gasket and additionally using a silicone sealer. Ensure there is a downward slope between the downspout and the barrel entry.

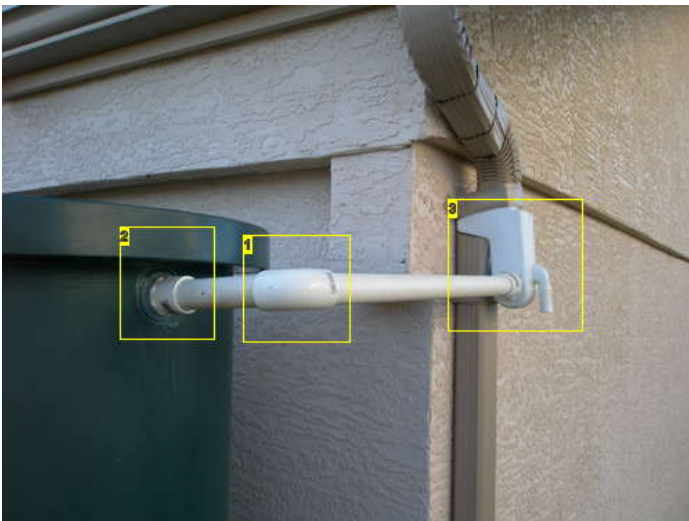


Image Notes

1. 90 degree 1" pvc elbow
2. 1" pvc fitting into water barrel. this fitting was standard on my barrel. could be installed onto any barrel
3. "watersaver" attachment with 1" pvc flange adapted onto side. notice original outlet on front is capped off.

Step 2: Overflow back to the downspout

ensure you have a complete path for water from the downspout to the barrel or barrels then from the overflow to the downspout again.

1" pvc overflow line from last barrel back to downspout. ensure you maintain a drain angle towards the downspout or sediment could collect in the line.



Step 3: Downspout drain connection

1" pvc entry back into downspout. ensure pvc pipe does not fully block 2"x3" downspout and keep the downward slope to the pipe to make the water flow towards the downspout.



Step 4: Manifold

common connection point for using water.

this photo of the manifold is before I put the water gauge on. (shown on intro and last step)

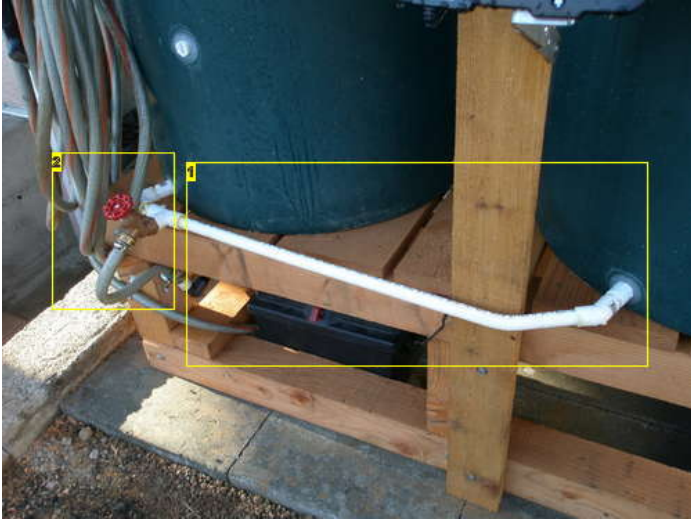


Image Notes

1. both barrel outlets joined together on a manifold. this helps to ensure that the tanks fill at the same time from the single inlet, and additionally that the water is used at the same rate from both tanks.
2. standard garden hose outlet faucet that leads to a water filter

Step 5: Water filter

filter the water from the barrel to protect the pump. keeps the roof sediment from wearing out the pump. This water filter will last forever, as it has a reusable nylon mesh filter inside, that only requires periodic rinsing.



Image Notes

1. water inlet from barrel
2. water outlet from filter

Step 6: Battery box with power switch

keeping the battery and pump protected from the elements inside a full size battery case .



Image Notes

1. power switch with safety toggle

Step 7: Inside view of battery box with motor

An inside view of the standard size battery case and equipment layout. the solar cell was left with clamp connections in order to enable quick removal of the battery case lid for cleaning and maintenance.

The pump was recycled from an older sailboat. The battery is a standard size lawn tractor 12v, and with proper maintenance should last 6-10 years before being needing to be recycled at the depot.

An older car battery that just doesn't have the power to crank the car fast anymore would be more than adequate for this application, and a great alternative to buying a new battery.

The 5.5W solar cell was also recycled for a fraction of it's original cost from an online classified, and solar cells have a lifespan of aprox 15-20 years. I wanted this little project to last as long as possible before needing any repairs.



Image Notes

1. 10a fuse

Step 8: Flowjet pump

closeup of Flojet 4405-143 pump particulars

another pump that I have seen that is almost identical to this is made by shurflo

This type of pump is used in RV's or sailboats to supply water pressure, as well as for using as a wash down pump on boats.

I chose this type because it had an internal pressure switch that stopped it from running all the time, only turning on when the water pressure in the hose drops. In addition I got a super deal on it secondhand.

There are many different styles of pump available that will be more than adequate for this application. It depends on your budget, and availability of secondhand pumps in your area.

Other things to consider would be whether or not you want the pump running all the time (lawn sprinkler) or only when you press the trigger on your hose nozzle. Without a built-in pressure switch, the pump would run all the time as soon as you turned on power. In all types of applications, make sure the pump output pressure does not exceed the pressure rating of your hose/pipe or you might burst it if the outlet was closed or blocked unexpectedly.



Step 9: Water Gauge

As the water level changes inside the barrel the level inside the tube will follow the same level.

This was fun to install as I didn't want to waste all the nice rainwater and drain the tank before I drilled a 3/4" hole in the bottom of the tank to install the angled shut-off valve. Reminded myself to only use a battery powered drill :)

I reused some 1/2 inch plastic tubing that I had left over from another application and connected it to a 3/4 inch angle valve with a shut off (which came in handy during install)

I sealed around and under all penetrations into the barrel (valve and screws) with a two part epoxy that was a water proof filler and sealer.

It is important to not completely seal the tube or the level will not change to reflect the level in the barrel.



Image Notes

1. simple water gauge based on Pascal's law

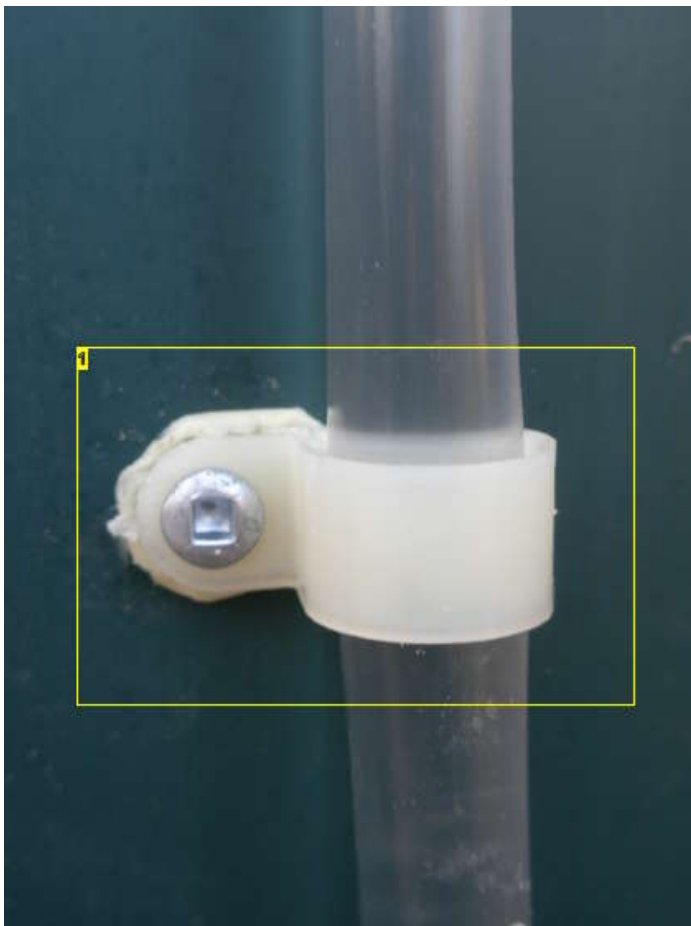


Image Notes

1. closeup of nylon clamps holding tubing. water curing epoxy behind clamp to seal hole from screw.

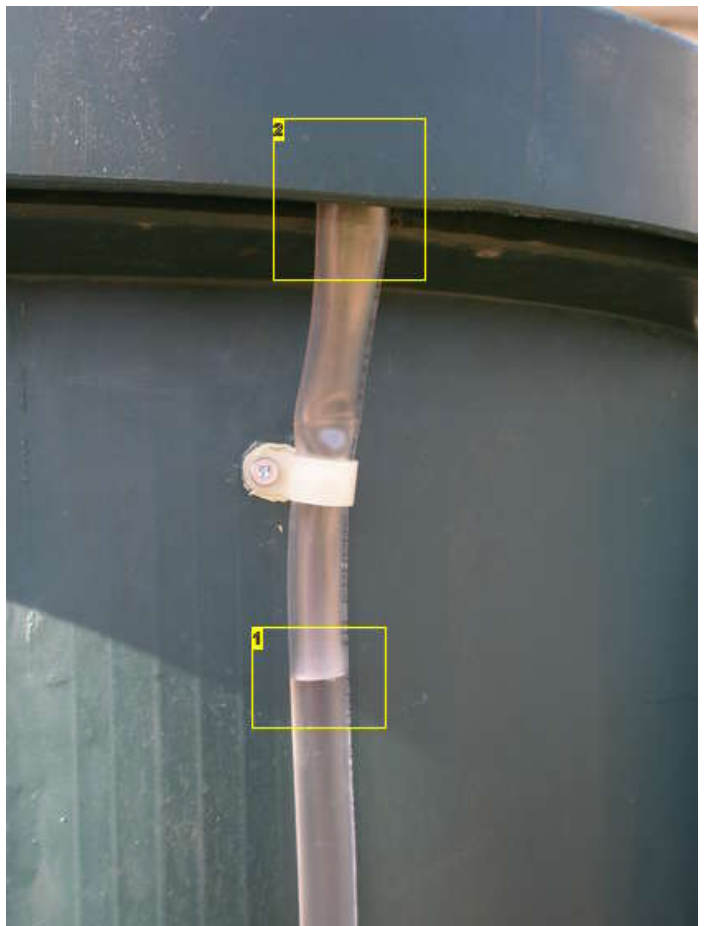


Image Notes

1. water level. I am going to add a small floating colored bead to make it more visible.
2. top of tubing open to atmosphere under lid to allow water level to change. will fit with small screened cap once I make one to prevent crawly things getting in.

Related Instructables



Rainwater collection & distribution system by mark11photograph



Tandem Rain Barrels by rhackenb



Redirect water from a raingutter to a rain barrel by rhackenb



Rain water collector water tower w/ automatic overflow by neffk



Easy Rain Barrel by cromdaddy



(Another) Easy Rain Barrel by Sunkicked

Comments

50 comments

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The Lightning Stalker says:

If you look around, you can find an all plastic pump that won't rust out from the rainwater. It's important that it's a jet pump so you get enough pressure to run the attachments. Or you can get a submersible and put it in the bottom of one of the barrels. That will give you huge pressures though so you'll need a regulator. Either way, never start the pump with the attachment(s) turned off or you will get cavitation which wears out the impeller(s). If you hear a louder "swooshing" sound, turn it off right away. That means it's cavitating and you don't have enough flow on the output for that size pump.

May 7, 2009. 9:59 PM [REPLY](#)



damoelld says:

I've found that a Diaphragm pump such as this one works great, it puts out 35 psi at a constant rate, is very quiet, unlike a jet pump and is very small, unlike a jet pump that would be capable of 3.3 GPM (12.5 lpm). This model of pump has an internal pressure switch and bypass to prevent water surging and hammer (pulsation) when the hose or attachment(s) are turned on or off. I have saved my pump from the rainwater by mounting it inside a waterproof battery box. Originally I thought of using a submersible or fountain pump, but the extra connections would have to be mounted internal to the barrel (aka more hassel) and I did not need to have the capability of emptying the barrel in a matter of minutes.

May 8, 2009. 6:45 AM [REPLY](#)



The Lightning Stalker says:

May 8, 2009. 10:30 PM [REPLY](#)

I'm not attacking your pump or your instructable or anything. I'm just trying to help out people who don't know anything about the pipe and the pump and the ppppp... If all someone can afford is a used jet pump, then it works good enough.



damoelld says:

May 8, 2009. 11:10 PM [REPLY](#)

no worries, didn't mean to make it sound like I was mad. I appreciate all comments.....even the ones that contradict my opinions, gets me to thinking in a less linear fashion, and sometimes another solution to the same problem. This is after all a forum, and not a podium :)



jerhpk says:

Aug 12, 2010. 9:05 AM [REPLY](#)

I'm looking for a part-time pump for a smaller application. What is the flow rate on the pump you have? I'm not planning on running the pump for more than 30 minutes at a time, and maybe once a week. (The planned height of this project is about 8 feet, maximum. It does not need to be high pressure at this location, but it does need to spray slightly. Yes, I realize this is contradictory.) I do appreciate this instructable; I find I reference it frequently for a variety of projects. as a question, do you have the "sight level indicator" going into a hole in the top of the barrel, or just tucked under the lid? And is the top of the tube higher than the "overflow" holes?



damoelld says:

Jan 12, 2011. 7:17 PM [REPLY](#)

Sorry for the delay, was away.

The tube is tucked up under the lid. This prevents the crawlies from getting into it yet allows the outside pressure from the water column to equalize.

Cheers



T3h_Muffinator says:

May 27, 2010. 2:41 PM [REPLY](#)

This is really neat! The pump was a great idea!

Do you think the water's drinkable? If not, maybe adding a purifier might help with that. (I understand that this is just for watering plants, etc., but the prospect of a rainwater purifier is tempting)

Awesome work!

-muffin



swilus says:

Dec 14, 2010. 12:12 AM [REPLY](#)

If you add a sediment filter and uv this water would be perfectly fine to drink. Rain water is naturally soft. If you are really nervous about drinking, add an under sink reverse osmosis system: <http://jandjpumps.com> or any hardware store!



toogers says:

Sep 17, 2010. 7:05 AM [REPLY](#)

i'd use quite a few filters on this, it was, after all, sitting in a storm drain.



DavidM45 says:

Sep 2, 2010. 9:06 AM [REPLY](#)

great project! I have found that valves on a plastic line are so much better with a support like a 2x4.



jerhpk says:

Aug 16, 2010. 12:47 PM [REPLY](#)

FYI: Lee Valley has a downspout adapter for sale for under \$20. It has two garden hose fittings on it, to hook two rain barrels up simultaneously. Biggest reason I'm considering it (the adapter) is that it is something that does not need to be removed to shut off water flow to the rain barrels. (Local codes state that rain barrels are ok on homes as long as they are emptied and disconnected during the winter months. "Winter months" is an unspecified length of time in the code as of last time I checked, but I assume it to be when the temperature is low enough to warrant frost warnings, or similar. Codes have no such restrictions on "Non residential or non commercial" buildings, such as workshops or garages.)



Boyd Carl says:

May 16, 2010. 2:49 PM [REPLY](#)

Good idea! What is Make & model of water filter? What is good source(s)?



damoelld says:

Aug 3, 2010. 4:19 PM [REPLY](#)

Hi Boyd, located an alternate place to buy the filter that should be available to everyone. Home Depot DripMaster 3/4 In. Mpt X Mpt Y-filter; Clm Model:: 61062 \$20.99 hope this helps



Boyd Carl says:

May 16, 2010. 2:52 PM [REPLY](#)

Does the water saver attachment have a strainer to keep leaves, etc. from getting into barrel?



damoelld says:

May 27, 2010. 4:00 PM [REPLY](#)

no it doesn't, however it would be to easy to insert a piece of mesh in front of the pvc outlet.



pickford78 says:

You can find cheap 50 cent filters that go into the gutter to filter leaves out.

Jun 11, 2010. 9:41 AM [REPLY](#)



LancePenney says:

Do you have a charge controller between the solar panel and battery? Or maybe the panel has a charge controller built in? Excellent project by the way.

May 12, 2009. 9:40 AM [REPLY](#)



damoelld says:

the panel has a built in charge controller and thank you!

May 12, 2009. 8:10 PM [REPLY](#)



Entropy512 says:

Are you sure, or is it just the "panel not large enough to damage battery with overcharging" approach?

May 28, 2010. 7:44 AM [REPLY](#)

Most people have used 5 watt panels with car batteries without any charge controller. (I do for maintaining my rarely driven convertible's battery.)



pbhound says:

you could put a small colored float in the tube to make it easier to read from a distance.

Apr 11, 2010. 11:05 AM [REPLY](#)



damoelld says:

good idea, just have to add that to my ever growing 'honey-do' list :)

May 27, 2010. 4:05 PM [REPLY](#)



TangerineB says:

Ok, jumping in here late in the game - and I'm just beginning to learn how to garden (and build things!). Wondering if there is any use for my old garden hose that split at the end when we didn't get all the water out over winter. I'm looking at longterm plans for rainwater collection and underground watering - it's just going to take a while during our remodel. Should I keep the hose or toss it?

May 16, 2010. 9:39 AM [REPLY](#)



bunglesmate says:

I hope I'm not stating the obvious but can't you just reterminate the end of the hose. It'll be a little shorter obviously but should be good. Or use a set of adapters to create a short extension for the long length left after the split.

May 27, 2010. 2:46 PM [REPLY](#)



SinAmos says:

I've been wanting to do something like this for a while. I have my tank, but I have yet to get the run-off adapters. Thanks for the inspiration.

May 27, 2010. 1:09 PM [REPLY](#)



depotdevoid says:

Awesome project! I've added this to my ever growing list of things to do around the house!

May 27, 2010. 7:10 AM [REPLY](#)



rayzentz says:

I like this. However, where I live, it is illegal to collect rainwater. How stupid is that?

May 7, 2009. 10:06 AM [REPLY](#)



WilderLust says:

most places that say it is illegal mean open containers... if you have a closed tank then they are ok. i live in one such place... it is illegal to have a rainwater collection but if you have a closed system it is ok. it is cold in winter here so i have a couple of 1000Gal tanks under ground which allow me to water all my fruit trees, flowers, greenhouse plants with only rain water with exception of rare extra long rainless summer months. i have old hoses underground watering the trees at the roots to minimize evaporation too... it is very efficient.

May 11, 2009. 1:05 AM [REPLY](#)



ecarrilloalbarran says:

Hi WilderLust, could you post some pictures of the system you described?

Apr 10, 2010. 5:05 PM [REPLY](#)

Thanks



WilderLust says:

hehe... well... it is all underground so pics are of no use; i did not take pics when i was making it years ago anyway. it is not really that hard, just dig a big hole, bury a big tank (or more depending on volume needed, and \$), run pipes from your gutters, place a pump in the tank to pump out the water when in need, and you have it. of course i have a pre-filter (55gal barrel) to get the junk cleared from the water before it gets to the big tank. you do not want to fill your tank with dirt, leaves, and other stuff washing off your roof into your tank. i also use a DC pump which i power with solar recharged batteries but that is an optional thing. some day i will make a wind powered pump too since we get decent wind around here. for big tanks, look at your building supply warehouses... they are not cheap when big but they are a permanent investment for you that will collect water for decades. i use PVC pipes in my system

Apr 12, 2010. 1:15 AM [REPLY](#)



Sn-Dlouwwho says:

May 18, 2010. 11:05 AM **REPLY**

Some of you out there might be able to find someone in your area that sells used containers cheap. The pop companies in your area is a good place to start, I think you could pick up the barrels for 6.00 - 10.00 each. You'll have to rinse them out! Check online... Mr. WilderLust, Your idea sounds great!!! What state are you in? Is your pump used to pump out the h2o when needed, is that for the 55 gal. drum when it gets full to release for over flow? For the filter, what kind of filter? Where is it, at the top circle opening where the rain water comes in? Could you draw pictures of how you did it, laid it out in your yard. Can you take pictures of what is above ground. I don't understand how you have hoses or pvc connecting all over your yard to the tree roots, and gardens etc. Did you drill holes in the big tank, and connect pvc pipes tunneled underground to the locations? My husband is always squawking at me, about leaving the garden hose on after water my plants and flowers. This sounds like the perfect solution... I'll be a good woman, and be able to save him money!!! haha! Thanks so much!



WilderLust says:

May 18, 2010. 12:47 PM **REPLY**

i get my 55gal barrels for free from a laundry department that gets their laundry detergent, bleach, etc in such barrels then recycle them. The gutter downspouts are routed (under ground) to the tanks. the 55gal barrel is the filtration tank with layered media to trap larger impurities. i use bug screen on top and polyester batting below it and clean it out a couple times a year. this keeps rocks, leaves, etc out of your storage tanks. this barrel sits on the manhole access port to the storage tank and the filtered water just drip into the storage tank. in fact the collection of water is all gravity fed. the pump is in the storage tank(s) and is used to pump the water up to the plants (through pvc pipes).
i am developing a smart watering system which is microprocessor controlled and allows me to control how much water each zone gets but this involved electronically controlled valves and severely increases cost. i need it because i have an acre which will be nearly all under cultivation of food bearing plants so i need much more control than if you are watering typical gardens. most of you can get away with a simple timer on the pump to dictate how long it will run and water your garden. for most gardens, i would recommend a drip watering system... you can buy them at most home & garden stores. my system is a glorified drip system... in fact for most of the plants it is a drip system but for my fruit trees, i have made a pvc pipe into a circle, drilled tiny holes in it on the bottom, and buried it under ground where it delivers the water to the drip line of the tree. this eliminates evaporation and helps weed control and gets the water directly to the place most needed thus requiring far less water to be used.
As mentioned before, there are no signs of any of this from above ground because it is all underneath. the only thing you see is a manhole cover which gives access to the filters and the tanks for cleaning if needed.
The web is full of info... many commercial sites that can give you great ideas for doing it yourself. Some sites to visit for ideas:
<http://www.darcoinc.com/>
<http://www.plastic-mart.com/>
<http://www.ntotank.com/begrwata.html>



Sn-Dlouwwho says:

May 18, 2010. 3:28 PM **REPLY**

Thank You for the information.... The next time you put this together (maybe for your kids, neighbor or help someone from church), you could take step by step pictures and/or videos. hint, hint!!! That would really help alot of people.... When you develop your microprocessor controlled system don't forget to take pictures and/or videos... Thanks again!



ecarriilloalbarran says:

Apr 12, 2010. 1:43 PM **REPLY**

Thanks for the info, i'm an engineer living in Mexico and I want to implement some simple sysytems in new homes, so thanks



WilderLust says:

Apr 12, 2010. 3:50 PM **REPLY**

here is the kind of tank i use <http://www.ntotank.com/begrwata.html>
the best deal is the 1450 Gal @ \$979 and 1700 Gal @\$1149 both of which are .68/Gal



andy1917 says:

Jul 31, 2010. 7:54 PM **REPLY**

MAY I ASK , HOW DO YOU KEEP THE WATER FROM BECOMING STAGNET? i HAVE BEEN TRYING TO DESIGN A SYSTEM FOR MY FAR HERE THAT I COULD STORE WATER FROM THE WINTER FOR UP TO THREE MONTHS DURING DRY TIMES. MY CONCERN IS THE WATER WOULD STAGNET AND BECOME SEPTIC. DO YOU HAVE ANY ADVICE?



WilderLust says:

Aug 1, 2010. 12:01 PM **REPLY**

Water stagnation is actually due to the loss of oxygen in water. An oxygenated water will not become stagnate... this is why the Quran taught the Arabs to not drink still water... only flowing water. Understanding this, you can see the solution easily... there are actually a couple. the cheapest is an aquarium air pump and air stone in your reservoir... i did this in the beginning but now i have designed and built an aerator which was actually an old aquarium filtration system i had designed and built many years ago when i had a lot of fish. it is easy to build and works very well... i started to give directions here to make it but then i bet people would complain that i should make an instructable; unfortunately i designed and built most of this stuff decades ago when even public net did not exist so i would have to build an extra one or make technical drawing to show everyone. i am in the middle of a major long term project which will keep me busy for years and just do not have the time to recreate old things again but i promise to do an instructable when i have to make new things. most of what i am doing now is remodeling of the house and the land so i don't think i can give any instruction that is not available already all over the web. For now just do the air pump and air-stones... you will have to brush and clean the air-stones at least once a year to ensure proper operation. i also have my aerator system operating from wind power so whenever the breeze is there, for my area i have 5mph+ breeze 90% of the year, the reservoir is aerated. i used the old American water pump idea for this... these days the wind pumps are seen as decorative but i have revived them for this and am planning to use the same setup for my pond waterfall system i am planning to put in later. cheers :-)



andy1917 says:

Aug 2, 2010. 9:55 AM **REPLY**

thanks and that makes since.



rayzentz says:

Nope. Here it is actually a "Water Rights" issue. I could understand the open, standing water issue, but this is just ridiculous. Sounds like you've got a great system going.

May 11, 2009. 6:46 AM [REPLY](#)



WilderLust says:

well... i didnt tell the city i was doing this because they have stupid prejudices for this stuff. once in, the system is not detectable very easily since it is all under ground :-)

Dec 18, 2009. 12:06 PM [REPLY](#)



pickford78 says:

My city not only encourages rain water collection but will sometimes give you the stuff to do it free.

Dec 21, 2009. 11:46 PM [REPLY](#)



WilderLust says:

Lucky guy :-)

Dec 22, 2009. 12:10 AM [REPLY](#)



Lordboogar says:

You probably live in Denver huh? Yeah.. that is stupid, since you are going to be passing that water along anyway. Do it anyway and hide it.

Oct 1, 2009. 12:50 PM [REPLY](#)



tab907 says:

Although I have no idea on your situation, I recommend going to your local library and watching the film "FLOW." You can find out more at <http://flowthefilm.com/about> .

May 8, 2009. 2:52 PM [REPLY](#)

It's odd that, considering the water collected in residential rain barrels is used to water the plants (thus going back into the water table), there is any concern of temporarily storing water. As long as it ends up where it belongs, what's the diff?



The Lightning Stalker says:

They're afraid you'll be breeding mosquitos.

May 7, 2009. 10:05 PM [REPLY](#)



rayzentz says:

No, It's not that. I live in Utah. Desert state, and it has to do with water rights. If I collect rainwater, then the water is not going into the "watershed", and I am "stealing" someone elses water. Just another symptom of Government interference into private lives, and of course, greed

May 8, 2009. 6:05 AM [REPLY](#)



telboyo says:

If this is really some one elses water find out who the "legal" owner is and send them a bill for trespassing on your property when it rains, if they do not come up with the money, surely you are allowed to retain their property until such time as they pay up. If you parked a car in a car park and did not pay the bill you would get clamped.

Oct 16, 2009. 10:33 PM [REPLY](#)



Foxtrot70 says:

I live in near Des Moines, Iowa. Collecting rain water seems not to be a problem. The problem we have here is fertilizer runoff soaking into the water table and, cattle weather beef, swine, or poultry sewage soaking into the watertable or polluting the streams. Folks don't realize when they have a hamburger, pork chop, fried chicken, or roast turkey the size of these confinements produce sewage in the amounts of small cities. The odor at times can get rather heady!

May 8, 2009. 8:11 AM [REPLY](#)



chrwei says:

even driving by a pig farm can be unpleasant. even the ones where they don't mass-raise them in barns, pig tear up the land, leaving only dirt and very beat up trees. sucks because bacon is soo tasty!

Apr 11, 2010. 7:43 AM [REPLY](#)

I was a bit confused for a bit at "cattle weather" (cows have seasons?) since this i'ble is about rain. A little mnemonic for you: use whether, with a WH, when you could say what, which, or whom, also with WH's, about the things you are listing.



Foxtrot70 says:

as to "cattle weather" ...ARGH my fingers were blind that day. As my computer says to me when I make mistakes in operations " The problem exists between the monitor and the keyboard which is always attributable to human error!" Thanks for the correction

Apr 11, 2010. 9:36 AM [REPLY](#)



damoelld says:

There is hope in the future for you under Utah Bill 128- Rainwater Rights
Thu, Feb 5, 2009 US News, World News
Here is the link.
<http://www.deseretnews.com/article/1,5143,705272050,00.html>

May 8, 2009. 7:38 AM [REPLY](#)

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