Clay-pot-irrigation system (Aranya Agricultural Alternatives method)

Use a clay pot berried in the ground and low-tech to irrigate young trees to:
• Improve irrigation efficiency, • Improve young tree survival rate, • Rehabilitate degraded areas.
Rehabilitation of the forest offers many other benefits such as soil rejuvenation, life-friendly microclimate development, biodiversity enhancement, water retention and so much more.

Difficulty **Easy** | Duration **30 minute(s)** | Categories **Food & Agriculture** | Cost **10 USD ($)**

Contents

Introduction

Acknowledgements

Young trees need care such as protection (e.g. fencing), nutrition and watering! Lack of proper care lead to high death rate in young trees. I visited some projects with 80 to 90% death rate in young trees because of lack of water… Water is precious and human action has often lead to and keeps on aggravating water scarcity issues. During our journey through Africa and India, we acknowledged how severe the issue is and truly understood the value of water… Some irrigation solutions use a lot of water and, in dry climates, evaporation make those systems inefficient. Some irrigation solutions are costly and require technology that are not accessible to some communities in dry areas. On the other hand, protracted thoughtful landscape work and adapted irrigation solution can improve the situation and, with the rehabilitation of the degraded area, lead to solving the water scarcity issues. Many examples of “greening the desert” are available and documented.

Our solution and its expectable benefits

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- Rehabilitate degraded areas.

Rehabilitation of the forest offers many other benefits such as soil rejuvenation, life-friendly microclimate development, biodiversity enhancement, water retention and so much more.
"If we could only understand what a tree does for us, how beneficial it is to life on earth, we would (as many tribes have done) revere all trees as brothers and sisters." (B. Mollison)

Materials

- Parts:
  - (1) Clay pot,
  - (1) Concave clay plate (to close the pot),
  - (1) Rope (use biodegradable rope, e.g. coconut fiber rope);
- Consumables:
  - Water,
  - Seeds (leguminous);

Tools

- Tools (see FAQ & Troubleshooting? For other alternatives):
  - (1) Hammer,
  - (1) Nail (thin),
  - (1) Nail (thick);

Step 1 - Make a hole in the clay pot

Do NOT make the hole on the bottom of the pot. The objective of this clay-pot-irrigation system is not to empty the clay pot but to keep the soil moist. Make the hole on the side of the clay pot, on the lower part of the clay pot.

Do NOT make the hole too big. If the hole is too big, the water will leak from the caly pot. The hole should be the same size as the diameter of the rope.

1. Use a small/thin nail to make a hole (pre-hole) on the side of the clay pot,
2. Use a big/thick nail to make the hole the same size as the diameter of the rope;

Step 2 - Install the rope in the clay pot

1. Insert the rope in the hole in the clay pot,
2. Make a knot on the rope at several centimeters of the end of the rope inside the clay pot,
3. Make a knot on the rope outside the clay pot to secure the rope with the clay pot,
4. If you want to irrigate more than one plant, repeat the steps above;

Make sure that both knots are tight against the ends of the clay pot. The objective is to use capillarity to irrigate the tree over a long period of time. If the knots are not tight against the clay pot, the water might leak from the clay pot. If the water leaks from the clay pot, the clay pot will lose water quicker and the tree will receive water for a shorter period. Capillarity is a physical phenomenon. As a result: if the moisture level in the soil is the same as in the pot, water will not move from the pot to the soil, irrigation will stop. If the moisture level in the pot is lower than the moisture level in the pot, water will move from the pot to the soil, irrigation will flow.

You can irrigate more than one plant with the same pot. For instance, you could make four holes on the lower side of the clay pot to irrigate four young trees. If you decide to irrigate more than one plant, you will probably need to add water in the irrigation pot more often.

Step 3 - Install the clay pot

1. Define the planting location to define the zone where you want to install the clay pot:
    1. Make sure that the pot will be above the plantation pit,
    2. Make sure that the rope will come out of the clay pot at an angle and go down to the young tree root system (↘or ↙);
2. If possible, define if you want to burry most of the clay pot or not,
3. Dig a hole for the clay-pot irrigation system,
4. Dig a trench for the rope of the clay-pot-irrigation system at an angle to go down to the young tree root system (↘or ↙),
5. Install the clay-pot irrigation system in the hole;

> We install the clay pot above the planting pit and the rope at an angle to optimize the drainage to the root system.

> If you decide to burry most of the pot, you will probably increase the efficiency of the clay pot irrigation system. Indeed, the soil will protect the clay pot from the heat and the clay pot should lose less water to evaporation.
> If you decide to not burry most of the pot, you will make it easy to reuse the pot for other young trees after irrigation is not needed for the current young tree anymore.
> We recommend to not burry the pot. If risk of evaporation is high, cover the clay pot with a jute bag.

Step 4 - Refer to the applicable procedure to plant the tree

Tree planting (Aranya Agricultural Alternatives method)

Step 5 - Add water in the clay pot

Step 6 - Close the pot

1. Install the concave clay plate on the clay pot,
2. Add water in the concave clay plate,
3. Plant legume seeds around the clay pot.

> We close the clay pot to reduce evaporation.

> We plant legumes to cover the pot with vegetation. The vegetation cover should create a microclimate around the clay pot and keep it cool. We want to keep the clay pot cool to reduce evaporation and increase the efficiency of the irrigation system.
> Moreover, the legumes are nitrogen fixers. The legumes will make nitrogen available for the young trees and, thus, actively support the growth of the young trees. Moreover, as the legumes grow, they provide biomass. We invite you to chop the legumes and mulch directly on the young trees.
> NB. The nodule system of legumes allows to usually not require irrigation. The moisture around the clay pot should be enough to irrigate the legumes without competition with the young trees. Thus, the legumes should not require extra irrigation: you can focus on your young trees.

> We add water in the concave clay plate to attract birds. As birds drink they might defecate (apparently, birds often defecate as they drink). The bird feces will act as manure and bring nutrients for the legumes.

Notes and references

FAQ & Troubleshooting?

In our “acknowledgments” introduction, we mentioned landscape works. We want to provide you with a DIY procedure to build swales – coming soon! Feel free to ask questions and suggest other topics ☺

Go further…

Please share with us with your remarks, comments, improvements, achievements, etc.
DIY tutorial “Tree planting preparation (Sadhana Forest method)” procedure:
http://wikifab.org/wiki/Tree_planting_preparation_(Sadhana_Forest_method)

DIY tutorial “Tree planting (Aranya method)” procedure: http://wikifab.org/wiki/Tree_planting_(Aranya_Agricultural_Alternatives_method)
Blogpost about the Permaculture Design Course at Aranaya Farm: https://sustainable-autonomy.weebly.com/blog/pdc-at-aranya-farm
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