



June 6, 2022

To Dr. Carrie Waterman, University of California at Davis;

My name is Darryl Cotton, and I am the owner and operator of 151 Farms located in San Diego, CA. We are an urban farm that runs a closed loop, constant flow of water between our plants and our fish that when comparing our soilless farm, utilizes 95% less water than traditional soils crop cultivation.

We developed a completely scalable system that relies on a dual root zone so that flowering plants such as hops, moringa, avocados, figs, and a variety of cash crops, can now be successfully included in an aquaponic system farm without causing harm to the fish. We have shared the design, construction, and maintenance of these systems online so that anyone interested in converting to this type of farming can do so as a 151 Farmer or under any entity they choose to do so as. We never got into this to get rich. We simply want to help feed the world and this is certainly one way to do it.

We recognize that we are experiencing a looming climate crisis, the demand for climate-smart commodities, practices, and production is increasing. Scientists and climate change policy-makers are struggling to find immediate solutions and opportunities to positively impact the adverse effects of climate change by creating systems to limit and reduce the emission of greenhouse gas or enhance the sequestration of carbon. Addressing the climate crisis domestically and internationally will require an intersectional approach, enlisting the collaborative support of the whole of government, agricultural, and forestry, including farmers, ranchers, and producers. Unfortunately, over the past 100 years, traditionally marginalized communities, specifically BIPOC peoples, have faced systemic barriers that have prevented equitable access to the marketplace.

Operating at a severe disadvantage, many black and minority farmers, ranchers, and producers have been systematically limited access to resources and opportunities due to various, inhibiting factors. These include rigid laws around farming practices, ability to legally farm and supply products to market, and qualifications; compounding fees and economic barriers to entry; unfair practices and distribution of local, state, and federal resources to farmers and producers; limited access to proper education or to acquisition of grants based on lack of previous experience or capacity. We can no longer tolerate this.

Dr. Waterman we continue to support your efforts to improve conditions in these areas. In keeping with our motto: **If you eat, you're in**, I invite you and your colleagues to share and collaborate with us in any research that helps further improve these methods and to expose more people to the sustainable global farming techniques we have developed, and our world so desperately needs.

We'll see you at the farm!

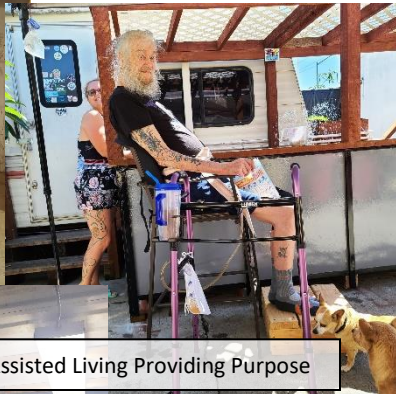
Darryl Cotton, President, 151 Farms
151DarrylCotton@gmail.com
619.954.4447

Enclosures: 151 Flyer & Executive Summary

6176 Federal Blvd
San Diego, CA 92114
619.954.4447
www.151Farmers.org



Transitional Housing



Assisted Living Providing Purpose



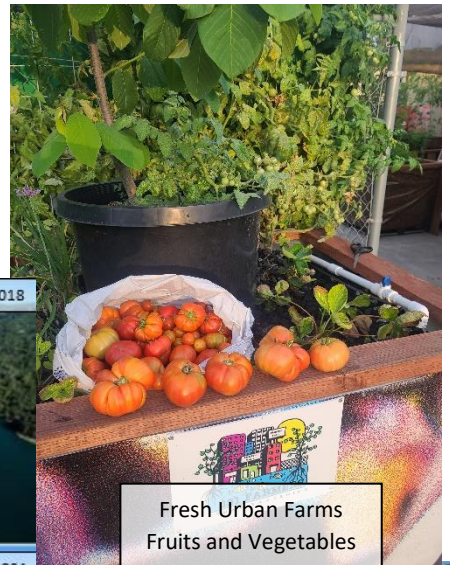
Lake Oroville, CA April 27, 2018



Lake Oroville, CA April 27, 2021



Lake Oroville, CA July 16, 2021



Fresh Urban Farms Fruits and Vegetables



Give our Homeless Opportunities on Urban Farms



Mobile Farm & POD Housing

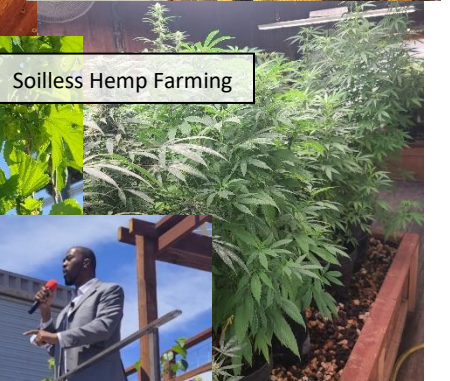
We co-cultivate: Koi, Tilapia, Bass, Prawn/Shrimp, Murray Cod, Trout and Bluegill.



Micro Greens



Cash Crop-Hops for Breweries



Soilless Hemp Farming

Using only 5% of the water we grow: Leafy Greens, Avocados, Oranges, Tomatoes, Moringa, Cherimoya, the list goes on and on



Education & Outreach



Micro Greens



Soilless Hops Farming

Passion, Purpose & Partners MAKE IT ALL WORK!



[Learn More @ 151 Farms](#)
Changing the World, One Garden at a Time!



EXECUTIVE SUMMARY

151 Farms is a for profit, bio-technology research enterprise that, as a working farm, strives to expand the market for social equity economic opportunities in environmentally conscious and sustainable urban and rural organic farming techniques within our communities. These farms lead to jobs creation, training and education, transitional housing and supported services for; justice impacted, veterans, elderly, local and state government partnerships. In addition, our non-profit 501(c)(3) partners will create awareness for these programs while providing private sector tax incentives to those who wish to contribute to these causes. To become a 151 Farmer we have one strict requirement; **If you eat, you're in!** Which comports nicely with our stated mission:

“We Really Can Change the World, One Garden at a Time”

DETAILED SUMMARY

- 1) Our primary facility is a 10,000 sq-ft commercial property located in San Diego, CA which consists of a working farm with all the aforementioned elements available to be seen during tours of our facility.
- 2) We highlight a technology which we refer to as Rock Farming. We developed this technology which relies on a closed loop, constant flow of oxygenated water that courses over lava rock media. The nutrient rich water is part of our fish tank(s) that will introduce the water into the bottom of the adjacent tubs (Rock Tubs) with fish water discharges the Rock Tub at the top of lava rock where it will then return to the fish tank. This cycle is continuously repeated. This design mimics what we see in nature as riparian areas, those regions adjacent to flowing streams, which are usually lush and plush with plant growth because the water flowing over rocks oxygenates that water and the rock media will be demineralized, allowing those minerals to be taken up by the plants. As such we like to compare our 151 Rock Farms design to what happens in nature as we [“Bring a River to Your Roots”](#).
- 3) The southwestern United States is currently experiencing [historic drought conditions](#) with [California being particularly hard hit](#). The benefits to converting to Rock Farms for our food supplies is that the food then becomes locally sourced, from a modular designed and infinitely expandable system. The roughly 95% of water savings in a Rock Farm versus traditional soils cultivation is that, in a Rock Farm, the water is consumed only by plant uptake and small amounts of evaporative loss. Any water loss is greatly reduced by the top of the Rock Tub water line being about 1” below the rocks exposed surface to the sun. Plant water uptake is reduced to the roots that make their way through this top 1” dry rock zone and then will grow unobstructed into the oxygenated water regions, taking up only the water they require for that particular stage of their growth.
- 4) Since fish act as the “canary in the coal mine” in our systems, no nutrients, pesticides, fungicides or aerocides can be added to the plants that would in turn harm the fish. Also consuming fresh food and

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medications is infinitely healthier than consuming processed food. This is another important consideration to our inner-city food supplies where increased health risks from processed food can directly correlate to obesity, high blood pressure and diabetes to name a few.

- 5) The most important ingredients created in any aquaponics system are nitrogen, phosphorus, potassium, calcium sulfur, and magnesium. However, there are plants, particularly flowering plants, which may also need trace amounts of boron, copper, chloride, zinc, molybdenum, iron and manganese added to the system which if accumulated, can be harmful to the fish. In that case, to meet both the plants and fish needs, we developed a Dual Root Zone that treats the plants in the lower root zone with the recirculated fish water but add another root zone with a soil or combination media of your choice allowing the plants to be treated as they would in a hydroponic garden. That is away from the fish water environment. In a Dual Root Zone the second (top) root zone is a 10 gal pot that has a [coco coir barrier](#) between the zones and [3 large 6" holes made into the bottom of the zone two pot](#). Zone two roots can be treated with any of the trace minerals without leaching those nutrients into the zone one or fish system media. As the plants outgrow the zone two container the roots will work through the coco coir and fill in the zone one region beneath them.
- 6) The systems are modular and expandable. They are sold as fully functional systems that have established plants, fish and have been inoculated with the beneficial bacterial necessary for the nitrification cycle to occur.
- 7) The social equity aspects of our mission would fall under our 151 Hand Up program. We believe that to help people, when they are in a time of need, is the main purpose for why we are put here on this earth. As humans we are subject to war, political and religious manipulation and disease that will affect all our quality of life. The one thing that crosses all these boundaries and that we share in life is that we eat. At 151 Farms we refer to this as Food Parity with our only requirement to participate in our farms is that **"If You Eat, You're In"**. Once in, we simply ask that you open your mind and leave any previously held bias at the gate while you reinvent yourself and the world we live in.
- 8) In addition, we created our Hand Up program to assist those who are looking for a new chance in life. If the candidate is willing to participate in our Hand Up program, he/she must agree to a strict policy of not using illegal drugs. We operate under zero tolerance for that. Further, any threats or acts of physical violence will get one expelled from our program.
- 9) We created our Hand Up program to assist those qualified enrollees with an alternative to traditional convalescent or hospice type care. The appropriate candidate for this program would be one who is not completely bed bound and is willing to perform, on a daily basis, with light to medium duties that consist of feeding the fish and simply engaging with others here at the farm. As people get older their daily care options tend to be reduced. We believe that we, as a society, need to find better ways to keep our guests engaged so they can [experience a sense of purpose](#) and a higher quality of life.
- 10) We have developed our 151 Rock Farms to operate on either metered or unmetered water and power systems. For example, in rainwater capture designs each Rock Tub captures rainwater that would fall from

tarps that extend around the tub(s) and direct this water back to the fish tank. Once the fish tank starts overflowing, the water is captured in overflow pipe(s) that direct the water to adjacent storage tanks for year-round crop cultivation. The basic systems operate on a single 1/2hp water pump which service the farthest rock tub in the system. Each Rock Tub is then filled to the spill pipe and sent to the next Rock Tub as water courses between the furthest Rock Tub and the fish tank. To illustrate this function, [we have built a working farm on a trailer](#) that we use as a mobile platform to bring our farm to groups of people that may not be familiar with the concept. In large farming applications the rainwater capture system can be monitored by a satellite and when rain is predicted the tarps can be rolled out by a motorized trolley that would then return them once the rain had ceased. Water capture laws vary but since the water would essentially be coming off a roof, these projects would not be subject to ground water capture laws.

- 11) We partner with non-profit 501(C)(3) organizations to allow [sales and marketing opportunities](#) to be developed with the use of our systems.
- 12) We develop regional licensing by zip code of our 151 Farms that control the licensing of individual projects within their region. [Please review our websites Questions and Answers section for more information.](#)
- 13) We incentivize [151 Ambassador](#) relations which provides ongoing economic opportunities for anyone introducing our products, systems, and techniques to the market.

FORWARD LOOKING SUMMARY

I would like to continue developing a larger, model project here in San Diego that would allow for the expanded use of the facility to include more area being devoted to:

- Rock Tub farming
- 24/7 Security and controlled access
- Modular Pod Housing constructed of 53' shipping containers, stacked 2 high, converted to 5 ea., private quarters with single bunk beds, heat/AC, TV and closets with dresser drawers. This gives people a sense of permanency while they stay on the farm. We refer to every 4 containers grouped together as a POD. Each POD could house up to 40 people. Every POD would have 2 common baths/showers and a kitchen area.
- Adult Education
- Community Center
- Recreational Center
- 12 ea., Interim Recovery Beds for our aging guests engaged in our Hand Up program
- 2 ea., inhouse staff quarters to assist 24/7 with our Interim Recovery guest needs.
- 12 ea., RV parking and shore power connections which would allow friends and relatives to stay on the farm for up to 2 weeks as they visit with loved ones who are in our Hand Up Interim Recovery program.
- Job's placement coordinator and career counseling.
- Farm products sales and distribution.
- On site peer to peer counseling sessions and therapy.

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- A band shell to promote regular on-site music and art festivals.
- A permanent art gallery where resident work can be shown and sold,
- Media outreach and our [151 Ambassador interviews](#).
- Public, private and religious sector partnering which would include contracts to grow traditional food crops, hops for micro-breweries, and [hemp for clothing, fuel and to replace graphene as a super conductor in batteries](#).
- [Bioremediation projects](#) that clean and purify aquifers of heavy metals and toxins.
- [Restoration of Native American water rights](#), through Rock Farming compacts that would recover land use opportunities which were lost when those rights were sold away. Water would be “borrowed” for the use of Rock Farm cultivation and returned to the aqueduct waterways with the only losses coming from small evaporative losses and plant uptake. By doing this, the Native American land and water rights could rebuild their communities with an acrocentric industry necessary to maintain and prosper with a restored quality of life.

For additional information visit our website and the following links @

151Farmers.org

[The Art of Urban Farming as an Inalienable Right by Darryl Cotton](#)

[Why Growing Your Own Food Can Repair a Broken Political System](#)

[An Introduction to Rock Farming by Darryl Cotton](#)

[Moringa: The Tree of Life](#)

[151Farmers Facebook Page](#)