CITY OF TAFT PLANNING COMMISSION
SPECIAL MEETING AGENDA
WEDNESDAY, APRIL 6, 2016
CITY HALL COUNCIL CHAMBERS
209 E. KERN ST., TAFT, CA 93268

AS A COURTESY TO ALL - PLEASE TURN OFF CELL PHONES

Any writings or documents provided to a majority of the Planning Commission regarding any item on this agenda are made available for public inspection in the lobby at Taft City Hall, 209 E. Kern Street, Taft, CA during normal business hours (SB 343).

SPECIAL MEETING **6:00 P.M.**

Pledge of Allegiance
Invocation

Roll Call: Chairman Orrin
Vice Chair Jones
Commissioner Leikam
Commissioner Livingston
Commissioner Thompson

1. CITIZEN REQUESTS/PUBLIC COMMENTS

THIS IS THE TIME AND PLACE FOR THE GENERAL PUBLIC TO ADDRESS THE COMMISSION ON MATTERS WITHIN ITS JURISDICTION. STATE LAW PROHIBITS THE COMMISSION FROM ADDRESSING ANY ISSUE NOT PREVIOUSLY INCLUDED ON THE AGENDA. COMMISSION MAY RECEIVE COMMENT AND SET THE MATTER FOR A SUBSEQUENT MEETING. PLEASE LIMIT COMMENTS TO FIVE MINUTES.

2. CONTINUED PUBLIC HEARING – CONDITIONAL USE PERMIT NO. 2016-04

Recommendation – Motion to adopt a Resolution approving Conditional Use Permit 2016-04 to establish a mixed-use development by constructing a 309 square foot commercial addition on the front of an existing 675 square foot single family residence, for the aquaponics growth of and retail sales of organic produce; on a 0.11 acre lot, within the Downtown Commercial (DC) Zone District located at 610 Kern Street (APN 031-170-17)

3. COMMISSIONER COMMENTS

ADJOURNMENT

AMERICANS WITH DISABILITIES ACT
(Government Code Section 54943.2)

The City of Taft City Council Chamber is accessible to persons with disabilities. Disabled individuals who need special assistance (including transportation) to attend or participate in a meeting of the Taft City Planning Commission may request assistance at the Office of the City Clerk, City of Taft, 209 E. Kern Street, Taft, California or by calling (661) 763-1222. Every effort will be made to reasonably accommodate individuals with disabilities by making meeting material available in alternative formats. Requests for assistance should be made five (5) working days in advance of a meeting whenever possible.

AFFIDAVIT OF POSTING

I, Brenda Johns, declare as follows:

That I am the Recording Secretary for the City of Taft; that an agenda was posted on a public information bulletin board located near the door of the Civic Center Council Chamber on April 1, 2016, pursuant to 1987 Brown Act Requirements.

I declare under penalty of perjury that the foregoing is true and correct.
Executed April 1, 2016, at Taft, California.

Date/Time_____Signature_____

City of Taft
Planning Commission
Staff Report

Agenda Item: #2

DATE: April 6, 2016

TO: Chairman Orrin and Members of the Planning Commission

FROM: Mark Staples, Director
Planning and Development Services

SUBJECT: **CONTINUED PUBLIC HEARING** - Conditional Use Permit No. 2016-04 – Up Cycle Aquaponics, 610 Kern Street

RECOMMENDATION: Adopt a Resolution approving Conditional Use Permit No. 2016-04 to establish a mixed-use development by constructing a 309 square foot commercial addition on the front of an existing 675 square foot single family residence, for the aquaponics growth of and retail sales of organic produce; on a 0.11 acre lot, within the Downtown Commercial (DC) Zone District located at 610 Kern Street

LOCATION: 610 Kern Street (APN 031-170-17)

PROPERTY OWNER/ APPLICANT: Shari Rightmer
610 Kern Street
Taft, CA 93268

PROJECT DATA:
1. General Plan: Mixed Use
2. Zoning: Downtown Commercial (DC)
3. Access/Circulation: Kern Street/Highway 33

PROJECT ANALYSIS:
At the March 16, 2016, Planning Commission meeting, the project Conditional Use Permit No. 2016-04 was presented by the Planning Director, discussed during a public hearing between the Commissioners and the applicant, and was subsequently continued to a special meeting. Commissioners requested additional information on aquaponics operations, where other aquaponics facilities are located, and if any are located within Kern County. The March 16 staff report is attached for reference.

Aquaponics Facilities
At the March 16, 2016, Planning Commission meeting Shari Rightmer had Kimberly Jackson, of EcoCentric Farms in Bakersfield, detailed how an aquaponics operation works. Ms. Jackson provided some details of EcoCentric's operation and production output. EcoCentric does not sell their produce to individual customers, but does sell wholesale to Bakersfield area restaurants. Attached is a copy of Ms. Jackson's profile on the networking website LinkedIn.

Other aquaponics facilities are mostly education and research based. Bakersfield College has just begun a research and education aquaponics farm that was featured at their April 2015 Garden Fest that the college holds every April. The UC Davis College of Agricultural and Environmental Sciences produced a paper in 2012 (see attached) discussing California Aquaculture. The College has agriculture and other food research programs that range from plants, vegetables, olives, and honey. UC San Diego has partnerd with a non-profit

group called Solutions for Change, which has an aquaponics operation called Solutions Farms. Solutions for Change is a family homeless shelter (similar to ALPHA House) that utilizes Solutions Farms as a workplace training site for preparing people to re-enter the workforce. Solutions Farms sells their produce at local farmers markets and supplies fresh produce to local school districts.

Other national public entities that have aquaponics operations or have compiled research on aquaponics include Marquette University, Auburn University, Alabama A&M, MIT, Colby College, and the Southern Regional Aquaculture Center. Private aquaponics education operations include Walt Disney World's Living with the Land exhibit at Epcot. Disney's Future of Food Production exhibit provides a functioning demonstration of aquaponics, which includes the resulting produce being served in nearby restaurants.

Aquaponics/Hydroponics

The terms aquaponics and hydroponics seem to be interchangeable, but there are significant differences between the two growing operations. Aquaponics utilizes fish and their nutrient waste to grow their plants, whereas hydroponics uses a nutrient additive to their water system without fish. Due to the nutrient additive, hydroponic operations need to dump and replace their water, whereas aquaponics just need to top off their water as its absorbed by the plants. Due to the symbiotic nature of the fish and plants, Aquaponic grown produce is considered a more organic process. Hydroponics requires a sterile environment and may utilize pesticides or other chemicals that would harm the fish. Hydroponics is not an improper way of growing plants and produce, but it is inappropriate to use the term when referencing aquaponics operations as they do not involve the same key elements for growth.

Cannabis/Marijuana

The applicant has agreed to a condition of approval that the aquaponics operation is prohibited from growing and harvesting cannabis, marijuana, or other similar plants. Although some websites may claim that they can grow cannabis with an aquaponics system, there would need to be significant filtration systems of the water leaving the plants and returning to the fish. As explained above, certain chemicals and pesticides are needed for many plants to grow and those applied on cannabis plants most likely negatively affect the fish, which then disrupts the purpose of the aquaponics operation. As detailed in the attached article claiming the use of aquaponics for growing cannabis, they run into the issue of the aquaponics and fish not producing enough for the cannabis to grow. The example given introduces soil and chemical nutrient additives of hydroponics or other growing methods. At that point, the system is no longer an aquaponics operation and is not effectively utilizing the fish in the growth process.

CEQA:

The project is exempt from the requirements of the California Environmental Quality Act (CEQA) as set forth in Section 15303 of the CEQA Guidelines (New Construction or Conversion of Small Structures).

ATTACHMENTS:

1. Resolution
2. Kimberly Jackson, EcoCentric – LinkedIn Profile
3. Bakersfield College Garden Fest 2015
4. UC Davis – California Aquaculture
5. Solutions for Change – Making a Difference 2016
6. Solutions Farms – About
7. UC San Diego – Solutions Farms Aquaponics
8. Aquaponics vs Hydroponics
9. High Times Grow Hack – February 10, 2015
10. Conditional Use Permit No. 2016-04 Staff Report – March 16, 2016

RESOLUTION NO. _____

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF TAFT APPROVING CONDITIONAL USE PERMIT NO. 2016-04 TO ESTABLISH A MIXED-USE DEVELOPMENT BY CONSTRUCTING A 309 SQUARE FOOT COMMERCIAL ADDITION ON THE FRONT OF AN EXISTING 675 SQUARE FOOT SINGLE FAMILY RESIDENCE, FOR THE AQUAPONICS GROWTH OF AND RETAIL SALES OF ORGANIC PRODUCE; ON A 0.11 ACRE LOT, WITHIN THE DOWNTOWN COMMERCIAL (DC) ZONE DISTRICT LOCATED AT 610 KERN STREET

WHEREAS, the applicant, Shari Rightmer, has proposed a Conditional Use Permit for a mixed-use development by constructing a 309 square foot addition on the front of an existing 675 square foot single family residence, for the aquaponics growth of and retail sales of organic produce on a 0.11 acre lot, within the Downtown Commercial (DC) Zone District located at 610 Kern Street (APN 031-170-17) in the City of Taft, County of Kern; and

WHEREAS, notice of a public hearing was published, posted, and mailed to surrounding property owners to consider the proposed project in accordance with City's Zoning Ordinance and applicable laws; and

WHEREAS, the Planning Commission studied and considered the written findings for approval of Conditional Use Permit No. 2016-04, City Staff's written and oral reports, and all public testimony before making a decision on this request, and

WHEREAS, the laws and regulations relating to the preparation and adoption of environmental documents, as set forth in the State Guidelines Implementing the California Environmental Quality Act have been adhered to; and

WHEREAS, the Planning Commission has fully considered this request and the potential environmental effects.

NOW, THEREFORE, THE PLANNING COMMISSION DOES HEREBY FIND, DETERMINE, RESOLVE, AND RECOMMEND AS FOLLOWS:

SECTION 1. The Planning Commission hereby makes the following findings:

1. The proposed use is conditionally permitted within the Downtown Commercial (DC) zone district pursuant to the provisions of this section, complies with all applicable provisions of the Zoning Ordinance, is consistent with the goals, policies, and objectives of the General Plan, and is consistent with the applicable development policies and standards of the City; and

2. The proposed use would not impair the integrity and character of the Downtown Commercial (DC) zone district; and

3. The site is suitable for the type and intensity of the proposed use; and

4. There are adequate provisions for water, sanitation, public utilities and services to ensure the public health and safety; and

5. The proposed use will not be detrimental to the public health, safety, or welfare, or materially injurious to the properties and improvements in the vicinity; and

6. The proposed amendment is exempt from the California Environmental Quality Act pursuant to Section 15303 of the CEQA Guidelines (New Construction or Conversion of Small Structures).

SECTION 2. The Planning Commission hereby approves Conditional Use Permit No. 2016-04 with the conditions of approval set forth in this resolution as follows:

General Conditions

1. The applicant and property owner ("Applicant"), solely at its cost and expense, shall defend, indemnify and hold harmless the City of Taft (hereinafter referred to as "City"), its agents, legislative bodies, officers and employees regarding any legal or administrative action, claim or proceeding concerning approval of Conditional Use Permit No. 2016-04, and/or related actions including, without limitation, actions taken or not taken with respect to the California Environmental Quality Act (hereinafter referred to as "CEQA"); or, at its election and in the alternative, shall relinquish such approval. Applicant shall assume the defense of the City in any such legal or administrative action, claim or proceeding with legal counsel paid for in the entirety by the applicant, but subject to the City's reasonable approvals. The Applicant shall also reimburse the City, its agents, legislative bodies, officers and employees for any judgments, amounts paid in settlements, court costs and attorneys' fees which the City, its agents, legislative bodies, officers and employees may be required to pay or otherwise pay as a result of such action, claim, or proceeding. The City may, at its sole discretion, participate at its own expense in the defense of any such action, claim or proceeding, but such participation shall not relieve the applicant's obligations under these conditions of approval.

2. The applicant, or general contractor, shall submit a list of all contractors and/or subcontractors performing work on this project to the City's Finance Department and such contractors and subcontractors shall obtain valid business licenses to do business and/or work in the City prior to the commencement of work.

3. The safety and security of the site shall satisfy and be in compliance with all applicable Local, County, State, Special District, and Federal regulations, California Building Code, and California Occupational Safety and Health Association (CAL/OSHA).

4. The applicant shall comply with all provisions of the City's Zoning Ordinance, Construction Standard Details, the latest adopted Building Code, Mechanical Code,

Plumbing Code, Electrical Code, Fire Code, and all other applicable codes, ordinances, regulations, and development standards in effect at the time of issuance of relative permits. Identification of specific sections of any of the aforementioned City documents does not negate the applicant's responsibility to conform to unmentioned sections of the City's Zoning Ordinance, Subdivision & Engineering Design Manual, California Building Code, and all other applicable ordinances, resolutions, standards, and requirements of the City.

5. The Applicant shall pay all applicable development and processing fees adopted by the City in effect at the time of issuance of any permits.

Public Works Department/City Engineer

1. The Applicant acknowledges that the City of Taft may incur engineering expenses by its City Engineer for the review of on-site and off-site improvement plans for Conditional Use Permit No. 2016-04 and agrees to reimburse the City within thirty (30) days of receiving an invoice from the City of Taft associated with these engineering expenses.

2. Prior to issuance of a Certificate of Occupancy of any building proposed for Conditional Use Permit No. 2016-04, the Applicant shall submit a business license application to the Finance Department, which includes new sewer service for the aquaponics business.

California Department of Transportation (Caltrans)

1. The Applicant shall obtain an encroachment permit from Caltrans for any construction work within the right-of-way of Kern Street, including projecting signage. All inquiries shall be directed to Kevin Lum, District 6 Planning and Local Assistance, 1352 W. Olive Avenue, P.O. 12616, Fresno, CA 93728, (559)444-2583, Email: Kevin.Lum@dot.ca.gov

Building Department

1. The Applicant shall submit three sets of plans along with applicable calculations and reports that comply with the current California Building Code, Green Code, Mechanical Code, Plumbing Code, Electrical Code, Fire Code, and all other applicable codes, ordinances, regulations and development standards in effect at the time of issuance of relative permits.

2. All improvements shall comply with American with Disabilities Act standards and regulations (ADA).

3. Contractors and subcontractors shall obtain a business license from the City's Finance Department prior to beginning any work.

4. Building addresses shall be permanently displayed in a manner easily visible and legible from the street, consistent with Building and Fire Department requirements.

Kern County Fire Department (KCFD)

1. The applicant shall submit an application and site plan review fee along with engineered plans to KCFD to be reviewed for fire and life safety compliance. Submittals shall be delivered to Fire Department Headquarters located at 5642 Victor Street, Bakersfield, CA 93308, (661) 391-7080.

2. A Certificate of Approval shall be obtained by the Applicant from the Kern County Fire Department prior to the issuance of a Certificate of Occupancy.

Planning Department

1. The Applicant shall develop the property, with (1) a 250 square foot solarium to house a 1,000 gallon fish tank and aquaponics equipment growing plants and produce, (2) a 59 square foot restroom for business customers, and (3) and convert the 87 square foot existing porch to a sales area for the business operation, consistent with the approved plans on file with the Planning Department.

2. Conditional Use Permit No. 2016-04 is approved solely for the aquaponics operation only. Any other conditional use listed under the DC zone district in Table 5.A, of Chapter 5 in Title 6, requires a separate application, fees, review, and approval by the Planning Commission.

3. The approved Conditional Use Permit and aquaponics operation is prohibited from being used to propagate, grow, harvest, distribute and sell cannabis, marijuana, or other similar plant products that are considered an illegal narcotic.

4. The Applicant shall provide a minimum of two (2) parking spaces per the Zoning Ordinance; however, as the business is located within the DC zone district available street parking can be used to meet this requirement. The applicant shall notify its customers that public parking for the business is available along Kern Street. However, the business shall not and is not permitted to stripe, block off, or otherwise designate specific street parking areas for the business operation.

5. Prior to building permit issuance, the building permit plans submitted for the exterior elevations for the solarium shall be in substantial conformance with the approved elevations on file with the Planning Department.

6. The solarium structure shall include an air circulation system that filters potential odor nuisances that may emanate from the fish pond and aquaponics operations.

7. The Applicant shall be responsible for avoiding and minimizing potential nuisances from the proper disposal of the deceased fish that support the aquaponics operation.

8. The Applicant shall maintain the entire project site, including the undeveloped portions,

in graffiti-free, weed-free, safe, clean, and orderly manner at all times.

9. At such time the Applicant and aquaponics operation requires permits from the Kern County Department of Agriculture or Kern County Environmental Health, an operation of such increased size will be required to be located on a property within the Industrial (I) zone district.

10. The Applicant shall submit a Sign Plan Review application, with three (3) copies of site plans, structural, and electrical plans to the Planning Department for review and approval prior to issuance of a business license or erecting any signage on site.

11. This approval for Conditional Use Permit No. 2016-04 shall expire twelve (12) months after the date of approval, per the Taft Zoning Ordinance.

12. Conditional Use Permit No. 2016-04 shall be reviewed by the Planning Commission approximately twelve (12) months after commencement of operations. The purpose of the review by the Commission is to determine how the aquaponics use relates with other adjacent commercial and residential properties and review any potential nuisances that may have occurred during the first year of operations.

13. A revision or modification to this approved Conditional Use Permit may be requested by the Applicant. The Applicant shall submit an Amended Conditional Use Permit application to the Planning Director indicating the reasons for the change and supporting information. The revision or modification shall be subject to review and approval by the Planning Commission.

PASSED AND ADOPTED on this 6th day of April, 2016.

ATTEST

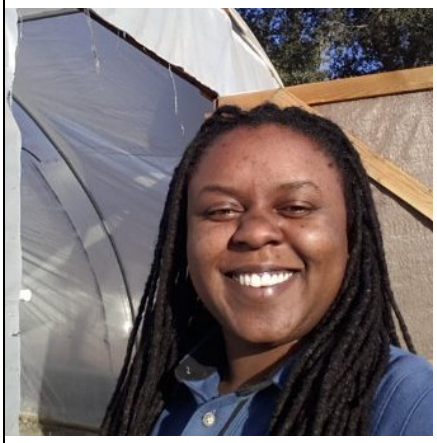
_____ _____
Brenda Johns, Deputy City Clerk Ron Orrin, Chairman

CERTIFICATION

I, Brenda Johns, hereby certify that the foregoing resolution was passed and adopted by the Planning Commission of the City of Taft at a regularly scheduled meeting held on the 6th day of April, 2016, by the following vote:

AYES:
NOES:
ABSENT:
ABSTENTIONS:

_____
Brenda Johns, Deputy City Clerk



Kimberly E. Jackson

3rd

Operations Manager at EcoCentric Farms

Bakersfield, California | Farming

Education CSU Bakersfield

Send Kimberly E. InMail

19 connections

https://www.linkedin.com/in/kimberly-e-jackson-58043098

Contact Info

Background

Summary

At EcoCentric Farms we believe everyone should have access to fresh nutritions food. We design, construct, and operate innovative aquaponic and hydroponic grow systems.

We employ and have expertise in several methods including:
Nutrient Film Technique
Deep Water Culture
Kratky Method

The most productive is the 4,000 plant/ 4,000 gallon vertical aquaponic grow system designed and constructed by EcoCentric. It only uses 10% of the water used by farms of the same scale, is 10 times more productive per square foot than traditional NFT, generates its own organic fish feed and plant fertilizer.

We are raising Tilapia using a self-formulated fish feed, using low stocking densities, and superior water quality standards. These standards yield a higher quality Tilapia than what we typically find in our local grocery store. Clean taste, flaky texture, and nutritional superiority set our Tilapia apart from most (higher ratio of Omega-3s to Omega-6 fatty acids).

Enclosed in a 1,500 square foot greenhouse we produce food year round and distribute locally.

Experience

Operations Manager

EcoCentric Farms

March 2012 – Present (4 years 1 month)

Skills

- 2 Organic Farming
- 2 Sustainable Agriculture
- 2 Sustainable Business
- 2 Aquaponics
- 2 Hydroponics
- 1 Sustainable Design
- 1 Operations Management
- 1 Leadership

Education

CSU Bakersfield
Bachelor of Arts (B.A.), Anthropology
2007 – 2012

CSU Bakersfield
Bachelor of Arts (B.A.), Philosophy and Religious Studies
2007 – 2012

BAKERSFIELD COLLEGE (/)

Home (/) » Events (/events)

Garden Fest

Date & Time: Sat, 04/18/2015 -
9:00am to 4:00pm

Location: Bakersfield College Panorama Campus

10th Anniversary Garden Fest banner

Visit the Garden Fest website for more! (http://891418088421670332.weebly.com/)

Garden Fest at Bakersfield College beginning its 10th year, has become Bakersfield's premiere springtime garden event. Garden Fest is an open house featuring the Environmental Horticulture and Agriculture programs that draws thousands of visitors to the Bakersfield College campus for a day of family fun.

For our 10th anniversary we will hold a cooking competition with BC Culinary Arts Students like "Chopped" on Food Network. It will be sponsored by IKEA and they will supply everything needed in the 4 finalists cooking stations. The students get to keeptheir stations. The winner will get a scholarship from Culinary Arts.

We will also be demonstrating a new Aquaponic system that will be installed on our greenhouse, which grows fish and food in the same system.

With over 150 vendor booths featuring gardening, pets, farmer's market, cooking, outdoor leisure, arts & crafts, and environmentally friendly home improvement ideas, there is something for everyone.

About BC (/about)

Achieving the Dream (/about/achieving-the-dream)

Renegade Scorecard (/scorecard)

Accreditation (/accreditation)

BC Foundation (/foundation)

Business Services (/about/business-services)

AQUAPONICS

California Aquaculture

UNIVERSITY OF CALIFORNIA, DAVIS

Introduction: Aquaponics can be defined as the symbiotic cultivation of plants and aquatic animals in a balanced recirculating environment. The symbiotic relationship is that the fish provides nitrogenous waste, which serves as a nutrient for the plants, and the plants remove the nitrogenous compounds thereby cleaning the water for the fish. Although the term aquaponics is relatively new, the concept was made very popular in the 1970's through efforts of the New Alchemy Institute, whose legacy can be visited at http://www.thegreencenter.net/. A popular book written for backyard aquaculturists based on the New Alchemy approach is, *"The Freshwater Aquaculture Book: A Handbook for Small Scale Fish Culture in North America"* by William McLarney. Over the past 35 years, the number of books, videos, and websites providing information on aquaponics has grown tremendously. Some useful web sites can be found at the end of this article under Aquaponic Resources.

Aquaponic vegetables
(Photo courtesy of Nelson and Pade, Inc., www.aquaponics.com)

By any definition, aquaponics is one of the fastest growing segments of aquaculture, and is extremely popular in California. Aquaponics' current popularity stems from people's interest in participating in sustainable and urban applications of agriculture and the concept of "grow your own organic food." Organic vegetables are already commanding a large segment of California's food market and have well established regulations relative to the definition of organic. This information can be found at the California Department of Food and Agriculture web site at http://www.cdfa.ca.gov/is/i_&_c/organic.html. Currently, there is no legal definition for organic fish in California. California is waiting for the USDA's National Organic Standards Board (NOSB) to establish national organic standards for fish before it establishes its own state standards. Until then, it is illegal to produce and market fish as organic in the state. Information of the NOSB can be found on the USDA web site at http://www.ams.usda.gov/AMSv1.0/NOSB

AQUAPONICS

Scale of Operation: California's aquaponic growers range from small garage and backyard operations to commercial endeavors employing large tank systems for culturing fish, combined with greenhouse and open-environment systems for plant production. Most of the inquiries we receive at the University of California, Davis concerning aquaponics are from potential growers who want to begin a pilot aquaponics project for home consumption, then scale up to a commercial venture. Small-scale aquaponics for home consumption is easily manageable. If successful, the returns on investment most frequently range from break-even to slightly ahead of the game to even being able to provide the extras for a few friends and relatives. The greatest rewards come from growing and controlling your own food source. However, the leap from small-scale home consumption to a commercial venture involving profits capable of supporting living wages and supporting a family unit entirely from the sale of fish products and plants is immense. Most aquaponic operations not only market food and ornamental products, but also market aquaponic systems, system designs, consulting services, short courses, books, information media, and an array of other products. Without a doubt, aquaponics will make a valuable and major contribution to food production.

Plants: Popular aquaponic plant crops include Asian vegetables, lettuce, tomatoes, cucumbers, and herbs. Actually, most any edible or ornamental plant can be grown in aquaponic systems. The list of edible aquaponic plants include any crop that the grower feels will provide a return on investment, or that might suit their table and palate. Table 1 provides a partial list of edible plants that are commonly grown in aquaponic systems. A link to Asian vegetable seeds can be found at the website Asian Vegetable Seeds-Evergreen Seeds at *http://www.evergreenseeds.com/asveglis.html*.

Table 1. Partial list of edible plants commonly grown in aquaponic systems (Courtesy of Backyard Aquaponics, LLC).

Watercress	Bok Choy	Butter beans	Onion
Chives	Broccoli	Sage	Tomatoes
Chilies	Cabbage	Lemongrass	Cucumber
Celery	Cucumber	Yarrow	Lettuce
Snow peas	Mizuna	Comfrey	Basil
Egg plant	Coriander	Rockmelon	Chard
Watercress	Garlic	Spinach	Parsley

Fish: The most popular fish grown in aquaponic systems are tilapia. Tilapias are a robust fish that do extremely well in recirculating systems. Many states have restrictions on the culture of tilapia as they are non-native fish and resource agencies do not want the fish established in natural waters if they were to escape aquaculture systems. California, for example, has restrictions on where tilapia may be cultured in the state, and most tilapia culture is restricted to southern California in counties located south of the Tehachapi mountain range that separates southern California from the Great Central Valley. The State's resource agency originally stocked tilapia in southern California as they once believed that the fish could not reproduce, or even survive the cool winter temperatures. Tilapia not only survived, but successfully reproduced, even in the high salinity inland Salton Sea. The restrictions are in place now to prevent tilapia from being introduced in the watersheds north of the Tehachapi mountain range.

AQUAPONICS

Currently, *Oreochromis hornorum*, *Oreochromis mossambica* and *Tilapia zilli* are the only three tilapia species that are allowed by California Department of Fish and Game (DFG-Lead Agency) to be raised in specific counties of southern California. The specific counties are Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Imperial counties. *Tilapia zilli* is allowed only with a Restricted Species Permit obtained from the CDFG. If you live in one of these six counties and plan to raise tilapia in an aquaculture or aquaponics system, you must register as an aquaculturist with the CDFG. If you plan to import tilapia into California, you will need an importation permit from CDFG. You can obtain more information on aquaculture in California on the CDFG Aquaculture webpage at: http://www.dfg.ca.gov/Aquaculture/, or call CDFG at (916) 445-0826.

Tilapia in an aquaponic system
(Photo courtesy of Nelson and Pade, Inc., www.aquaponics.com)

Aquaponic operations north and south of the Tehachapi mountain range use other fish species besides tilapia in their culture systems. Table 2 is a partial list of common fish used in aquaponic systems. All fish should be purchased from a licensed fish breeder and, if imported, the buyer by law must obtain an importation permit from the CDFG.

Table 2. Partial list of fish and crustacean species commonly grown in aquaponic systems.

Tilapia sp.	*Oreochromis hornorum*, *Oreochromis mossambica* and *Tilapia zilli* (Allowed in specific counties in southern California)
Channel Catfish	*Ictalurus punctatus*
Common Carp	*Cyprinus carpio*
Hybrid Carp	*Cyprinus carpio x Carassius auratus* (cross)
Goldfish	*Carassius auratus*
Ornamental Koi	*Cyprinus carpio*
Minnows	*Gambusia affinis, Notropis lutrensis, Notemigonus crysoleucas*
Largemouth Bass	*Micropterus salmoide*
Bluegill	*Lepomis macrochirus*
Red Swamp Crayfish	*Procambarus clarki*
Freshwater Shrimp	*Macrobrachium rosenbergii*

At present, the CDFG requires an aquaculture license to raise any fish species that is raised for human consumption in California. This license requirement can be relatively expensive for a small aquaponics operation. Recent communications from the Department indicate that they are considering the development of a different license for small non-commercial aquaponic operations, and possibly allowing one or two species of tilapia to be used if they are purchased from a certified fish vendor. For this to occur, the proposal would have to be reviewed and approved by the Fish and Game Commission. However, if the fish are part of the aquaponic system, are not raised for human consumption, but only used as a source of nutrients for the plants, the license is not required.

Primary Steps: All prospective aquaponic growers should become familiar with the regulations and necessary permits required to operate a legal aquaponic operation in California, or their resident state. A second step is to carefully consider the scale of their operation; either home consumption or commercial venture. If the target is a commercial operation, planning should include ancillary products and services that might provide cash flow until food and ornamental products sold can support your income needs. A quick review of the companies listed at the end of this article will show that these companies market a large variety of support products and client services as income to support their operations.

Define your markets for your fish products. The vast majority of California's traditional aquaculture industry does not have a processing industry, and with the exception of sturgeon flesh and caviar), abalone and other shellfish products, aquaculture products are primarily sold to the recreational fishing markets or in live-haul sales to live fish markets in metropolitan areas. Some small sales are through local farmers' markets, local retail outlets and local restaurants. The vast majority of the fish and shellfish products consumed in California are imported from other states or from other countries.

Define and understand your plant markets. Aquaponics is building a reputation for safe wholesome food products. If you are producing edible plant products, establish conversations early with potential buyers so that you will be able to meet their expectations. Some commercial buyers are concerned about their liability related to marketing vegetables grown in "fish water". Although there have been no reported incidences of contamination, be prepared to address food safety issues with potential buyers, and be prepared to initiate monitoring or testing protocols for *E. coli* or *Salmonella* if these concerns arise.

Obtaining Assistance and Aquaponics Information: Currently, the University of California does not have an aquaponics program, nor is the University researching aquaponics technology. However, we do work with aquaponic producers, providing basic aquaculture information on animal biology and culture technology, basics of recycle systems, and troubleshooting when problems arise. Specialists do work directly or indirectly through consultants, with some large commercial producers, and also provide contact information to clientele for people and institutions that have more experience with aquaponic systems. University personnel do not endorse any particular aquaponic systems. Most aquaponic producers either have adopted their own system designs, or have purchased aquaponic designs or systems from other established producers that market these products. However, we do provide basic recommendations, such as being able to reduce the risk from contaminating the system in event of a fish disease, or treating fish without impacting the integrity of the plants.

As in many developing aquaculture industries, many large commercial aquaponic companies are proprietary. When University personnel work with these companies, they have to respect the proprietary nature of the information exchanged, and cannot transfer proprietary information to another entity. We often receive requests to arrange tours of aquaponic operations, but can only suggest that requests be re-directed to companies that promote educational activities and information exchange.

Whether you are looking for a source of fish, a system design, aquaponics information, short courses, tours, or aquaponic supplies, one of the greatest sources of aquaponic information is the Internet. The resource list provided at the end of this publication will provide you with contacts that provide these services. The list is made up of companies that have either captured our attention, or whom we have worked with over the years. It is by no means all-inclusive, and additional resources will be added over time. I encourage you to examine what each company has to offer, and I also encourage you to provide feedback based on your experience with their services.

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03/10/2012

AQUAPONICS RESOURCES

Professional Aquaculture Services
559 Cimarron Drive
Chico, CA 95926

PAS is operated by Tony Vaught, who has over 30 years' experience in production aquaculture. PAS offers a ***source of fish*** in their Aquaponics System Starter Package for those establishing a new aquaponics system, consulting services and trouble-shooting consultation for system design, feeding and fish health.

Phone: (530) 343-0405
tvaught@proaqua.com
http://www.proaqua.com/
http://www.aquaculturedirect.com/

AQUAPONICS

The Aquaponic Source
3980 Broadway, Suite 103-142
Boulder, CO 80304

The Aquaponic Source is operated by Sylvia and Alan Bernstein. The Aquaponic Source sells aquaponic supplies, small and large aquaponic systems, and is a resource for everything the home or backyard aquaponics gardener needs.

Phone: 303-720-6604
http://theaquaponicsource.com/

Nelson and Pade, Inc.
PO Box 761
Montello, WI 53949

The company is operated by Rebecca Nelson and John Pade, who have been involved in soilless culture and controlled environment agriculture since the mid 1980s and aquaponics since the early 1990s. They offer training workshops, consulting, complete aquaponic system packages for all applications, tech support and growing supplies. They also operate a 5,000 sq. ft. demonstration greenhouse and have continuously published the Aquaponics Journal since 1997. In partnership with the University of Wisconsin-Stevens Point, they are offering the first full semester, 3-credit hybrid aquaponics course, beginning Spring, 2012.

Phone: 608-297-8708
Email: info@aquaponics.com
Journal: http://aquaponicsjournal.com
Blog: http://www.aquaponics.com/blog/
http://www.aquaponics.com

Friendly Aquaponics
PO Box 1196
Honoka'a, HI 96727

The company is operated by Susanne Friend and Tim Mann. They offer training courses, internships, a wonderful aquaponics e-newsletter, aquaponics information. They also sell designs and plans for aquaponic systems. The farm is located on the highway from Hilo to Waimea on the Big Island of Hawaii.

http://www.friendlyaquaponics.com

Backyard Aquaponics, LLC
Chino Valley, Arizona

The company is operated by Cindy Stanley and Jerry English. They provide basic aquaponic information and sell aquaponic designs for potential growers.

Phone: 866-536-1408
http://www.tilapiaaquaponics.com/index.html

NorCal Aquaponics
The company is operated by Max Meyers.

NorCal Aquaponics offers commercial aquaponics training, system designs and consultation. NorCal Aquaponics is currently working with the agriculture department at Ukiah High School to construct an aquaponics system on campus that will serve as an educational model, working farm, student run business and revenue source for the UHS Agriculture Department.

Phone: 707-841-7087
info@norcalaquaponics.com
http://norcalaquaponics.com/

AQUAPONICS

Portable Farms Ltd. Aquaponics Systems
The company is operated by Colle Davis, CEO and Phyllis Davis, President; and the operation is located in Escondido, California.

Portable Farms Ltd sells systems, system designs, and offers aquaponic training. The operators have 40 years experience with aquaponic systems.
Phone: 760-208-2663.
http://portablefarm.com/farm/

Colorado Aquaponics

Colorado Aquaponics offers online aquaponics courses.
Other services include trainings, workshops, custom home aquaponic systems, and aquaponic consulting for small scale to commercial sized projects.
JD Sawyer at JD@coloradoaquaponics.com
Tawnya@coloradoaquaponics.com
http://www.coloradoaquaponics.com/

Farming with Fish
Farming with fish is an information source operated by Richard Fox of Oceanside, California

A place where you can read, watch, and learn about aquaponics.
Phone: 760-802-5947
http://farmingwithfish.com/

Aquaculture in the Classroom

The University of Arizona has extensive experience in hydroponics. They are an excellent source of hydroponic information and are expanding their interest in aquaponics.
http://ag.arizona.edu/azaqua/extension/Classroom/home.htm
http://ag.arizona.edu/azaqua/extension/Classroom/Aquaponics.htm

The Aquaponic Gardening Community: A Community and Forum for Aquaponic Gardeners. Operated by Sylvia Bernstein of "*The Aquaponic Source*"
http://aquaponicscommunity.com/

Aquaponics Library
http://aquaponicslibrary.20megsfree.com/aquaphon.htm

Aquaponics Related Links
http://www.i55mall.com/aquaponics/links.shtml

Asian Vegetable Seeds-Evergreen Seeds
http://www.evergreenseeds.com/asveglis.html

Acknowledgment: The graphic design of *Aquarius* in the header is by **Sheila Waters**, who granted permission for our use on the *California Aquaculture* website and our digital material. Visit her website at *http://www.calligraphersguild.org/SheilaWaters.html*

Solutions For Change

OUR MISSION STATEMENT

To solve family homelessness—one family, one community at a time.

OUR 2016 GOALS

Expand housing, educational, health and workforce development operations to serve more than 200 homeless families with the resources needed to permanently solve their homelessness.
Construct three new Solutions housing communities approved in Oceanside, Carlsbad and Escondido.
Lead, as the non-profit managing general partner, and open Parkview Apartments in San Marcos, housing an additional 40 once homeless children in affordable homes.
Utilize our $1 million social purpose grant to scale our world-class aquaponics farm, Solutions Farms, and quadruple our certified organic food harvest and distribution.
Lead a five-city Unified School District innovation project to distribute our certified organic produce, feeding over 10,000 school children our top 1%, locally grown greens and vegetables.

THE AREA(S) WE SERVE

San Diego North County

FUNDRAISING EVENTS

Each September, Solutions for Change hosts its annual "An Evening to Remember" charity gala. Over the past 5 years, Solutions for Change has raised over $5.8 million to solve family homelessness. This black-tie event features dinner, a charity auction and world-class keynote speakers.
Learn more at www.solutionsforchange.org/gala

CALLING ALL VOLUNTEERS

There are many ways to get involved at Solutions for Change. Volunteer at our innovative aquaponics farm, assist with childcare, prepare meals, or contribute your own unique talents to help us build awareness. Contact (760) 941-6545 ext. 319 for volunteer opportunities.

DONATION OPPORTUNITIES

Solutions for Change works with individuals, corporations and foundations, aligning gifts with goals. Our sustainable approach to solving family homelessness offers unique giving opportunities.

Want to make a difference through organic agriculture? Or how about impacting the future by enriching the lives of children? It's all here at Solutions for Change, and it all works together to solve family homelessness.

Solving Family Homelessness as a Team:
Want to make a direct impact on a family or child? Become a matching partner. Your gift is multiplied by our underwriters and families, turning every $7,500 into a $22,500 investment in families. Through our social enterprise model, parents get jobs and pay tuitions back into Solutions University. Those tuitions are match by our underwriters and by your generous investment to solve family homelessness.

Want to learn more?
Visit us online at solutionsforchange.org, or in person at Solutions University or Solutions Farms. Want to speak with a giving specialist? Call us direct at 760.941.6545 Ext. 325 to find a giving strategy that works for you.

Solutions for Change, Solutions University and Solutions Farms incorporates a wide range of programs to solve family homelessness:

- Community Redevelopment
- Real Estate Development
- Teen Outreach
- Child Outreach
- Domestic Violence
- Mental Health
- Substance Abuse
- Education
- Workforce Development
- Organic Farming & Aquaponics
- Environmental Sustainability
- Social Enterprise
- Servant Leadership

Solutions for Change

Established 1999

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Vista, CA 92083
760-941-6545
Fax: 760-941-1715
info@solutionsforchange.org
solutionsforchange.org

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Aquaponics operation gets $1M grant

(/staff/teri-figueroa/)

By Teri Figueroa (/staff/teri-figueroa/) | 6:38 p.m. July 29, 2014

In this April 2014 file photo, Solutions for Change client Jeremy Webber, right, and volunteer Morrie Callaghan carry encore lettuce at the Vista aquaponics farm known as Solutions Farms. — *Jamie Scott Lytle*

6 — A small Vista aquaponics farm run by a nonprofit group that works with homeless families has been tapped for a $1 million grant, allowing the farm to expand to quadruple its growing capacity.

North County Solutions for Change, which runs Solutions Farms, announced Tuesday that Alliance Healthcare Foundation had selected its aquaponics farm as the winner of its 2014 Innovative Initiative grant.

“We are thrilled for the opportunity and honored that Alliance would select our idea,” Solutions Director Chris Megison said.

The nonprofit Alliance Healthcare Foundation provides grants to nonprofit groups that address health care matters among the poor in San Diego and Imperial Counties.

“Alliance Healthcare Foundation was really excited about the innovative ideas that brought in social enterprise to expand not only the farm, but also the workforce development, the environmental impacts and its help to the target population of the homeless,” Alliance’s executive director Nancy Sasaki said.

The aquaponics farm puts once-homeless people to work, and also provides fresh produce for the Vista Unified School District and other clients.

The larger Solutions for Change program provides housing and support services about 135 families, including about 300 children. Some of the parents receiving Solutions services work at the farm, as part of the program’s emphasis on moving toward self-sufficiency.

Solutions Farms started in summer 2012 as a nearly 7,000-square-foot greenhouse operation. The $1 million grant will allow for a planned expansion to triple its size by early 2015. Efficiency improvements will mean the output will increase fourfold, Megison said.

By next year, Solutions Farms will provide more than 1.6 million servings of organic greens annually. Most of the food will go to local schools.

Aquaponics combines aquaculture — in this case, raising tilapia, a freshwater fish — with hydroponics — growing without soil.

The gist is that the fish water — with its nutrient-rich fish excrement — is pumped out of the fish tanks and supplied to the plants. The plants take what they need from the water, and in doing so, cleanse it. Then it's pumped back into the fish tanks. The cycle repeats again and again.

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Solutions for Change
Solutions Farms

Solutions Farms

Produce that tastes good...and does good!

Subscribe to the Solutions for Change eNewsletter to learn about our families, Farm and all that is happening!

First Name

Last Name

Email Address

About Solutions Farms

After acquiring a former two-acre nursery property, Solutions undertook a major renovation that was facilitated by more than 3000 hours of volunteer support and more than $100,000 of in-kind donations. Old structures were removed, plumbing, electrical, and other essential infrastructure was installed, and in 10 weeks of remarkably intensive effort Solutions Farms was built. The farm opened with about 7,000 square feet of greenhouse space outfitted with fish tanks, grow beds, pumps and lights.

If that doesn't sound like the equipment of a conventional farm, it's because Solutions Farms is a bit different.

Solutions Farms is unique in many ways. It is a soilless, or aquaponics farm, where nutrient-rich water from fish culture is used to nourish produce, which in turn purifies the water so it can be returned to the fish. Everything is done within the controlled environment of a greenhouse. We are currently one of the largest aquaponics facilities in the West.

The farm is also a laboratory for teaching important work values and preparing people for re-entry into the workforce. This is the social enterprise function; accomplishing a worthwhile social purpose while also being a functioning business. Solutions Farms raises hope, as well as produce.

While doing all this, the farm provides a source of locally-raised, certified organic produce that is being used by North County restaurants, juice bars and eager farmers market buyers.

We're green and we're good.

Support Us

Produce Selection

Solutions for Change

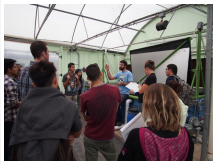
Solutions Farms Aquaponics

Helping a successful aquaponics farm increase efficiency for their upcoming expansion

Aquaponics

Aquaponics is a form of farming that combines aquaculture and hydroponics. Aquaculture is the farming of fish and hydroponics is a technique for growing plants in a soil-less media. When combined, aquaculture and hydroponics form a natural balance. Fish are raised in large tanks; the water from the tanks is pumped to the soil-less "grow beds"; the plants use the fish waste as nutrients, cleaning the water in the process; lastly, the water is sent back to the fish tanks. Aquaponics systems become a self regulating ecosystem. This form of farming uses just a fraction of the water compared to traditional farming.

Solutions Farms

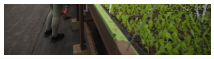
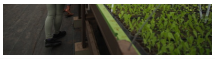


Solutions Farms, a branch off its parent company, Solutions For Change, is a commercial size aquaponics farm located in Vista, California. The farm is operated by Kevin Gorham, who has been the main point of contact and compass for our ESW team. Solutions For Change is a non-profit with an amazing goal of solving family homelessness. The aquaponics farm plays a part in their plan by being a work training facility for homeless parents. As far as the aquaponics system goes, the farm uses tilapia as their fish and sells all of its vegetable crops to the Vista Unified School District. Soon the farm will be tripling in size and that is where our ESW team comes in to play.

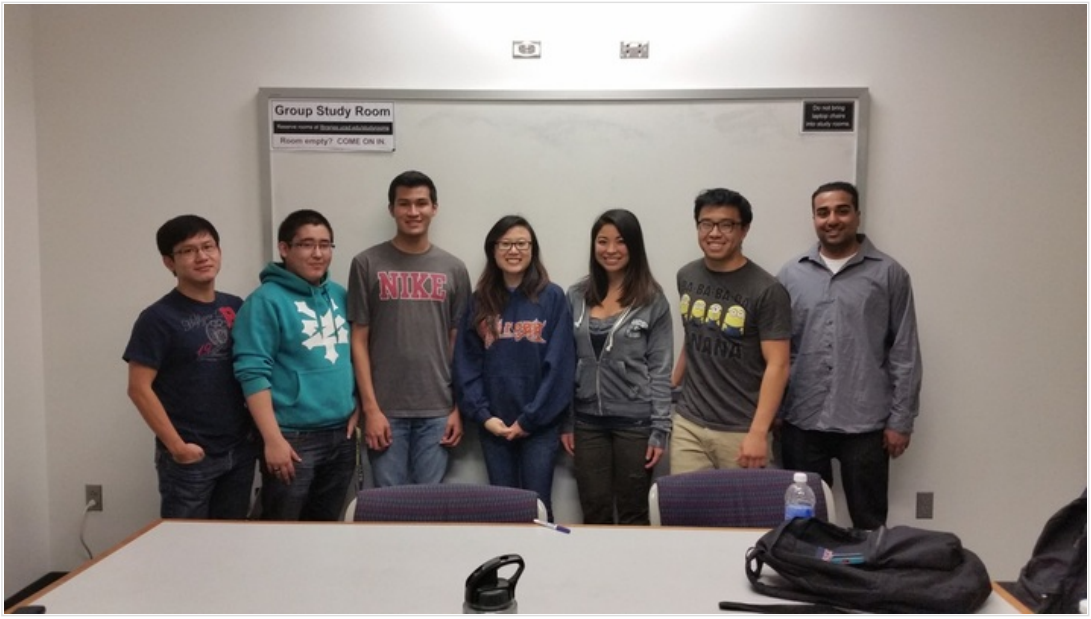
ESW Contribution

The beginning of every crops life at Solutions Farms starts in the nursery. When the whole farm triples in size in the upcoming expansion, the nursery needs to triple as well. Our

team has taken on the challenge of designing a multilevel nursery; going vertical is the most efficient use of the the farm's floor space. A multilevel nursery will require a new plumbing strategy (so water can reach each level), artificial lighting (for plants not on the top level receiving natural light), and a lifting/lowering system (for workers to easily access each level). Our team has been hard at work and is approaching a final design.

Current team (from left): Phong Tran, Jonathan Tran (Leader), Donald Alvarez, Crystal Lam, Jackie Iiyama, Bryce Oishi, Monal Parmar
Not pictured: Edward Gunawan



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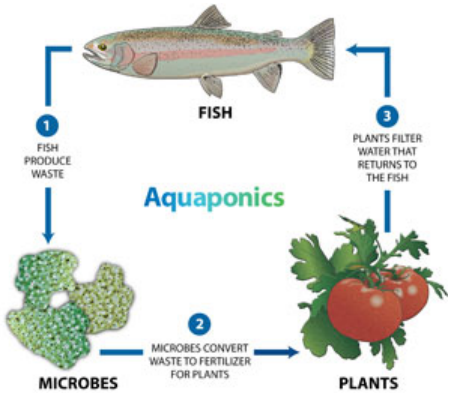
Aquaponics vs Hydroponics – 5 Ways Aquaponics is an Improvement over Hydroponics



1) Expensive nutrients are replaced by less expensive fish feed.

You know how much you spend on nutrient solution every year. Now consider this scenario. In our AquaBundance SpaceSaver aquaponics system you use a 60 gallon tank to grow in 7.5 sq ft of space. For this example, in that space you can grow 6 – 7 indeterminate tomato plants and about 10 tilapia. The only inputs to the system are about 15 watts of power for the pump (let's say that is equivalent to hydroponics), water to top off the tank (less than in hydroponics because you never discharge and replace the nutrient solution) and fish food.

- Tilapia grow from fingerling stage to plate sized (1.5 lbs) within a year
- Tilapia convert feed to body weight at an efficient 1.2 – 1.5 lb of fillets for every 1 lb of feed.
- The means that you will need (10 * 1.5 * 1.5) 22.5 lbs of fish feed per year to raise your 10 tilapia
- Fish feed costs about $1/lb depending on feed quality, shipping costs, bulk pricing, etc.

So this means you're running a 7.5 square foot grow bed for about $22.50 a year…AND YOU GET 10 FRESH, DELICIOUS FISH AT THE END OF THAT YEAR!

2) You never dump out your nutrient solution!

Popular Posts

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Posted by Kari-Lise Boyer

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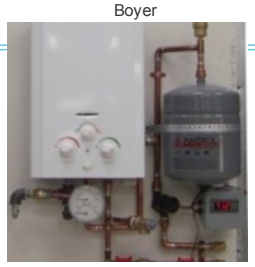


AQUAHEAT GAS-FIRED HEATING SYSTEM
$1,395.00

Water in hydroponic systems needs to be discharged periodically, as the salts and chemicals build up in the water which becomes toxic to the plants. This is both inconvenient and problematic as the disposal location of this waste water needs to be carefully considered. Rather than having these problems with chemical imbalance, in an aquaponic system you are achieving a natural nitrogen balance that is the hallmark of an established eco-system. The water in your system as a critical component that you nurture as part of that balance.

In aquaponics you NEVER replace your water; you only top it off as it evaporates.

---

3) Aquaponics (vs Hydroponics) is more productive!

A university study has now shown that after the aquaponic bio-filter is fully established a grower will see faster and better growing results with aquaponics vs hydroponics. (Click here for a study by Dr. Nick Savidov, of the Crop Diversification Center South, Alberta Agriculture Food and Rural Development at Brooks, Alberta, Canada report in the Aquaponics Journal, 2nd Quarter, 2005.)

Aquaponics is actually more productive than hydroponics!

---

4) Aquaponics is completely organic

Hydroponics is all about growing in a sterile, man-made environment. Traditional hydroponic systems rely on the careful application of expensive nutrients made from mixing together a concoction of chemicals, salts and trace elements. In aquaponics you are creating a natural ecosystem where you rely on bacteria and composting red worms to convert the ammonia and solid waste from the fish into a complete plant food. It is a necessarily organic process. If pesticides are applied to the plants, the fish will suffer. If growth hormones or antibiotics are given to the fish, the plants will suffer.

Aquaponics relies on nature, and is rewarded through better growth, less maintenance, and lower disease rates. If you can't beat Mother Nature, you might want to join forces with her.

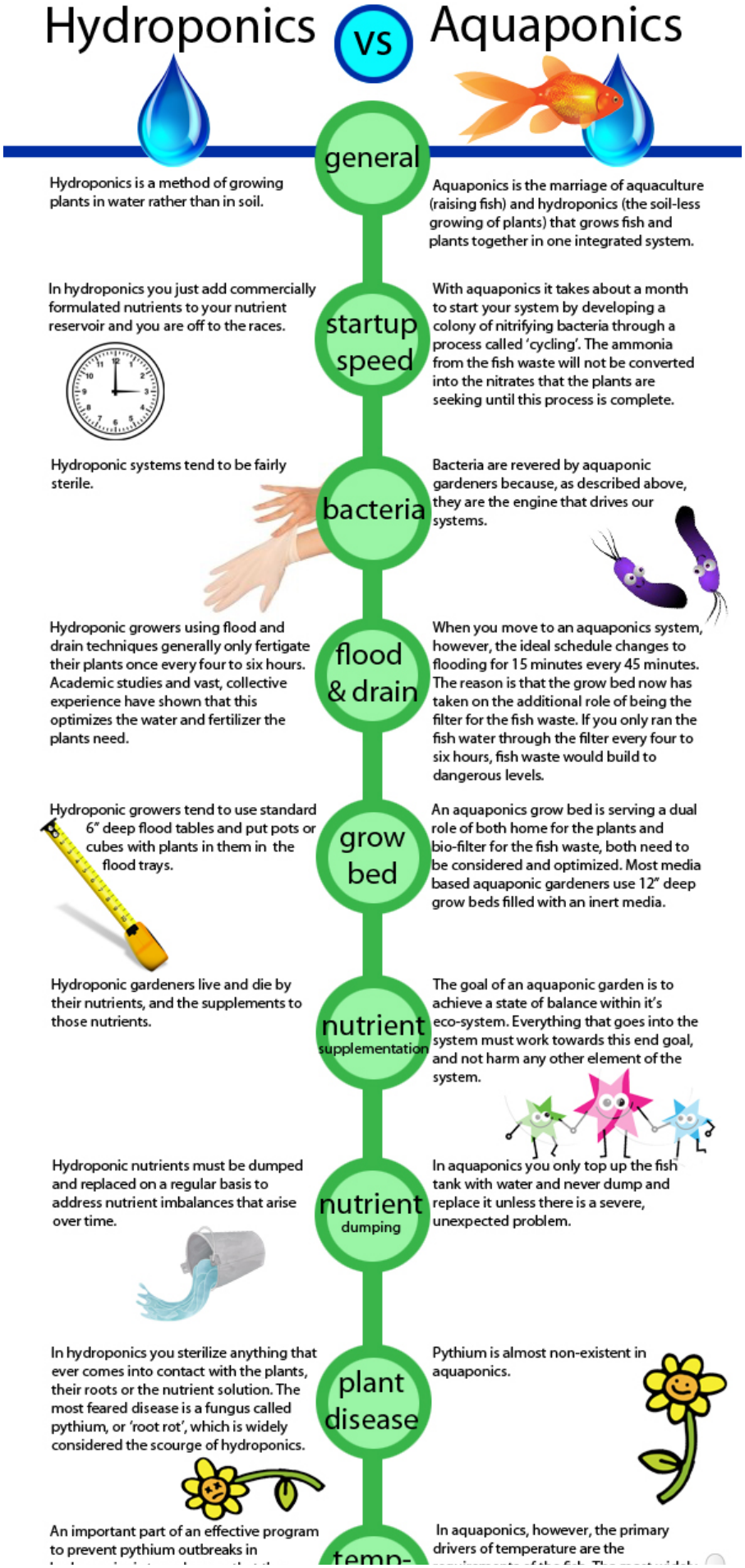
---

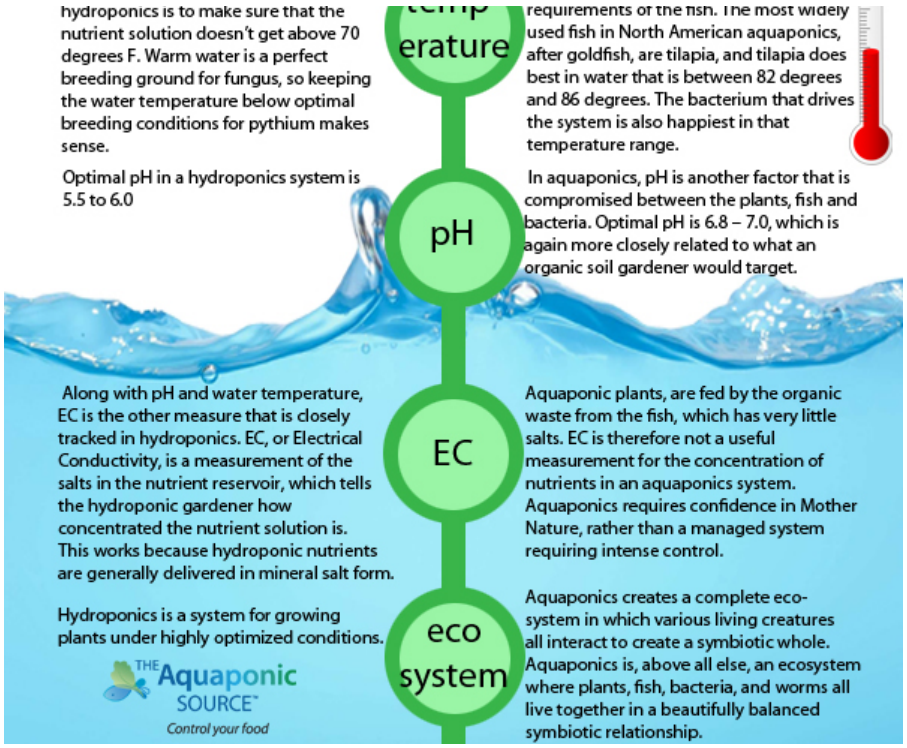
5) Best of all, you can say goodbye to pythium ("root rot") forever. It is almost non-existent in aquaponics.

Pythim is everywhere – in the water, in the air – and in a sterile hydroponic environment it can run wild. Despite the fact that aquaponic systems tend to run with warmer water and more frequently timed irrigations the occurence of the scourge of hydroponics (pythim) is rare.

Hydroponics creates a sterile "boy in the bubble" environment where disease can run rampant because nothing is fighting it. A natural aquaponics eco-system provides an immune system against disease.

Want to go deeper? Check out this blog post on Hydroponics vs Aquaponics for 12 more ways they differ…


Hydroponics
vs
Aquaponics
general
Hydroponics is a method of growing plants in water rather than in soil.
Aquaponics is the marriage of aquaculture (raising fish) and hydroponics (the soil-less growing of plants) that grows fish and plants together in one integrated system.
startup speed
In hydroponics you just add commercially formulated nutrients to your nutrient reservoir and you are off to the races.
With aquaponics it takes about a month to start your system by developing a colony of nitrifying bacteria through a process called 'cycling'. The ammonia from the fish waste will not be converted into the nitrates that the plants are seeking until this process is complete.
bacteria
Hydroponic systems tend to be fairly sterile.
Bacteria are revered by aquaponic gardeners because, as described above, they are the engine that drives our systems.
flood & drain
Hydroponic growers using flood and drain techniques generally only fertigate their plants once every four to six hours. Academic studies and vast, collective experience have shown that this optimizes the water and fertilizer the plants need.
When you move to an aquaponics system, however, the ideal schedule changes to flooding for 15 minutes every 45 minutes. The reason is that the grow bed now has taken on the additional role of being the filter for the fish waste. If you only ran the fish water through the filter every four to six hours, fish waste would build to dangerous levels.
grow bed
Hydroponic growers tend to use standard 6" deep flood tables and put pots or cubes with plants in them in the flood trays.
An aquaponics grow bed is serving a dual role of both home for the plants and bio-filter for the fish waste, both need to be considered and optimized. Most media based aquaponic gardeners use 12" deep grow beds filled with an inert media.
nutrient supplementation
Hydroponic gardeners live and die by their nutrients, and the supplements to those nutrients.
The goal of an aquaponic garden is to achieve a state of balance within it's eco-system. Everything that goes into the system must work towards this end goal, and not harm any other element of the system.
nutrient dumping
Hydroponic nutrients must be dumped and replaced on a regular basis to address nutrient imbalances that arise over time.
In aquaponics you only top up the fish tank with water and never dump and replace it unless there is a severe, unexpected problem.
plant disease
In hydroponics you sterilize anything that ever comes into contact with the plants, their roots or the nutrient solution. The most feared disease is a fungus called pythium, or 'root rot', which is widely considered the scourge of hydroponics.
Pythium is almost non-existent in aquaponics.
An important part of an effective program to prevent pythium outbreaks in
In aquaponics, however, the primary drivers of temperature are the



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Grow Hack: How to Build an Aquaponics System

By Stephen Raisner · Tue Feb 10, 2015

Hello, growers! Consider this your bare bones guide to understanding and building a simple Aquaponics system. There is much more to cover than this brief overview, but it should help you better understand how cannabis grows in Aquaponics. Using this technique, we've been able to grow some great, high-yielding plants. The one pictured above we grew using Aquaponics and measures almost nine feet across.

The Build

You can purchase a turn-key aquaponics system kit or build one from scratch. To properly grow cannabis, we are going to set up our system to function by flood and drain. To do that, your water pump will need to function on a timer.

First, drill two holes in the grow bed that will fit two bulkheads, one for the fill and one for the drain. Next, place your fill and drain into the bulkheads and connect the pump. Plug the pump into the timer and set it on for 15 minutes and off for 45 minutes. This is a far more frequent flood cycle than in hydroponics but remember the water needs to be regularly filtered for the fishes' sake.

Place your now-plumbed grow bed over your fish tank and fill it with the grow medium of choice. At AquaponicsSource, we really like round, expanded clay media because it's easier on your hands and

lasts a long time. We like to see at least 12” of depth on the grow bed so it adequately filters the water for the fish.

Next you will cycle your system before adding fish. Cycling is the process of establishing a colony of bacteria that can carry out the nitrogen cycle in your system. The bacteria start with the ammonia in fish waste in covert it step-wise into nitrate fertilizer, which can get taken up by the plants once you put them in.

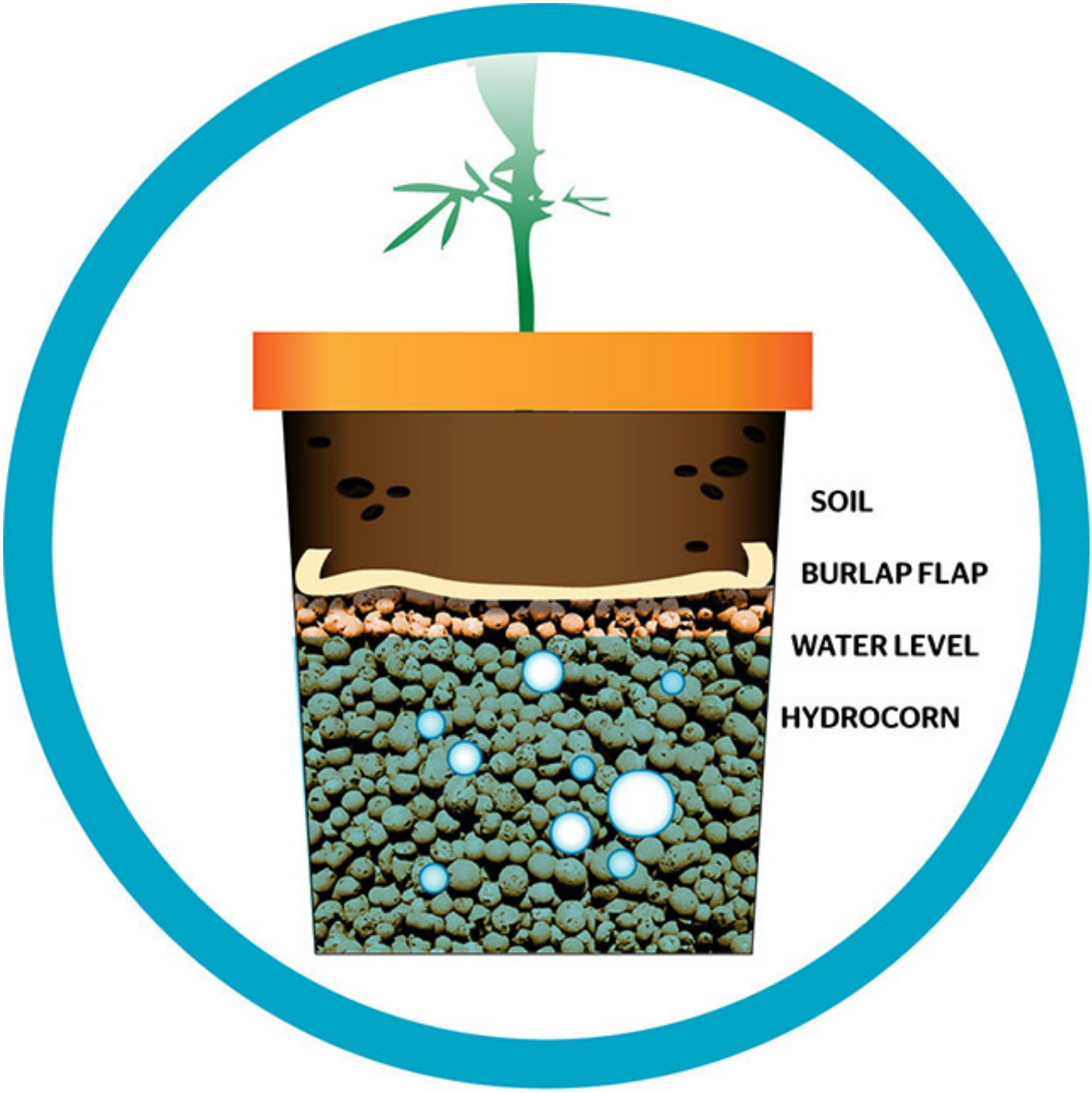
It is important to cycle your system before planting. Without cycling you will not have enough beneficial bacteria to provide your plants with the nutrients they need. To tell if your system is cycled you need to test your nitrogen levels starting with ammonia. You want to use pure ammonia, or an AquaCycle fish-less cycling kit, and bring your ammonia to 4 ppm. Anything much above a 4 ppm will start to kill bacteria, but start with at least 2 ppm.

The next spike in the nitrogen cycle you will see is nitrite. This will spike as bacteria convert ammonia into nitrite. Finally the nitrite is consumed and turned into nitrate. This is the form of nitrogen most available to the plants in your system. You know your system is cycled when your ammonia and nitrite read 0 ppm, or close to it, and your nitrogen is all converted into nitrates. Read here for more information about cycling.

Once your system is fully cycled, you can now put your fish and plants into your grow. It’s useful to continue to monitor your system until you’re sure a good balance is reached between the plants, bacteria and fish.

The Dual Root Zone

With a traditional Aquaponic setup, you will still have issues getting nutrient levels high enough just with what is provided by the fish and microbes. They provide a lot of what’s necessary—but not 100% of what we need. With just the nutrients from the fish, we are still a little short on potassium and phosphate. So to get around, this we use something called the dual root zone planting method. This is the key to growing cannabis successfully in Aquaponics.



In a dual root zone you separate a layer of traditional expanded clay media with a layer of burlap, or other root permeable material, and add a soil layer on top. This dual root zone allows you to house your terrestrial microbes in an upper soil layer, which can be amended however you'd like, and aquatic layer to house your aquatic microbes. This allows you to have some longer-term nutrient retention in the upper root zone while allowing great gas exchange and water to your plants at the same time. It also enables you to gain the benefits of both biomes of microbes and maximize natural nutrient input going into your plants.

Once you know the amount of water the soil layer can hold, you can water this layer separately with phosphate and potassium rich organic fertilizer without fear that it will contaminate the fish water. Too much phosphate and potassium is unhealthy for the fish and microbes, but is necessary for flourishing plant growth.

Additional benefits of the dual root zoning method have been seen in our testing. We haven't had an issue with cannabis plants yet, and lab tests done in other parts of our company have noticed that dual root zone grown tomatoes have higher resistance to powdery mildew than tomatoes grown in regular clay media. The other big benefit to you and your wallet is that you only need to supplement the water and soil in small amounts meaning much less fertilizer gets used overall. The plants also barely need to get flushed before flowering. In a dual root zone your plants are getting supplemented in the soil layer but their main source of water is always the nutrient rich water the fish live in. When you are about three or four weeks out simply stop supplementing and let your plants flush with the water from your Aquaponic system. This leaves you with an amazing, clean, rich, smooth flavor with no harshness to speak of.

With Aquaponics we have five knobs we can turn to adjust our available nutrients. You can supplement using fish safe additives directly into your sump tank or fish tank. You can supplement by changing the diet of your fish, or the frequency or amount of feeding, to increase output of desired nutrients. You can add soil amendments of your choice to the soil you use for your upper half of the root zone pot. You can use any liquid supplement you desire in the upper root zone at any time during growing. And lastly, you can foliar spray if you also choose. This gives you a wide range of options when you want to supplement your plants. We have done a lot of work towards figuring out what works best in each application. You can learn all about it over at PotentPonics.com. We have everything from classes and education into so-called turn-key systems.

Thanks for taking the time to learn about Aquaponic growing, and we hope you give it a chance. We know you won't be disappointed!

For more information on Aquaponic cannabis growing check out PotentPonics.com and TheAquaponicSource.com.

City of Taft
Planning Commission
Staff Report

Agenda Item: #5

DATE: March 16, 2016

TO: Chairman Orrin and Members of the Planning Commission

FROM: Mark Staples, Director
Planning and Development Services

SUBJECT: Conditional Use Permit 2016-04 – Up Cycle Aquaponics, 610 Kern Street

RECOMMENDATION: Adopt a Resolution approving Conditional Use Permit 2016-04 to establish a mixed-use development by constructing a 309 square foot commercial addition on the front of an existing 675 square foot single family residence, for the aquaponics growth of and retail sales of organic produce; on a 0.11 acre lot, within the Downtown Commercial (DC) Zone District located at 610 Kern Street

LOCATION: 610 Kern Street (APN 031-170-17)

PROPERTY OWNER/ APPLICANT: Shari Rightmer
610 Kern Street
Taft, CA 93268

PROJECT DATA:
1. General Plan: Mixed Use
2. Zoning: Downtown Commercial (DC)
3. Access/Circulation: Kern Street/Highway 33

PROJECT ANALYSIS:
The applicant, Shari Rightmer, is proposing to establish a mixed-use development by constructing a 309 square foot commercial addition on an existing 675 square foot single family residence on approximately 0.11 acres within the Downtown Commercial (DC) Zone District located at 610 Kern Street/Highway 33. The commercial addition will be used for the aquaponics growth and retail sales of organic produce, to be known as Up Cycle Aquaponics. The establishment of a mixed-use development, residence and commercial use on the same property, requires the review and approval a Conditional Use Permit by the Planning Commission. The aquaponics growth of and retail sales of organic produce, which is not defined in the Zoning Ordinance requires a Conditional Use Permit.

The project site is currently developed with an existing 675 square foot single-family residence and a 216 square foot shed at the rear of the property. The site and properties to the east, west and south across Kern Street are all within the Downtown Commercial (DC) zone district, with properties to the north within the Medium Density Residential (R-2) zone district. The property is surrounded by a mix of single-family residential, automotive commercial uses, and a church to the south across Kern Street; an open lawn area, parking lot and a church to the west; single family residential and retail commercial to the east; and single family residential uses to the north across the alley.

The proposed 309 square foot addition includes a 250 square foot solarium and 59 square foot restroom for customers. An existing covered patio for the single family residence will be reconfigured as the sales area for

the Up Cycle Aquaponics business. The solarium structure will house a 1,000 gallon tank/pond to house fish that are the key to the aquaponics process. The aquaponics process does not require a planting bed to grow produce. Aquaponics uses a constant flow of water from the fish tank to the vertical tubes that house the produce. The plants filter the water for the fish and the fish fertilize the plants, and the cycle is repeated. Aquaponics can be used for growth of plants and produce, but also for farming the fish. However, fish farms are not permitted in the DC zone. The aquaponics operation will utilize longer living Koi fish that are not typically used for food, which will minimize waste and disposal. The project is conditioned to provide proper ventilation for nuisance odors that may come from the aquaponics process, and that deceased fish are to be disposed of properly. Furthermore, the property owner is the resident of the home and will be the operator of the Up Cycle Aquaponics business.

The General Retail use parking standard of 1 space per 250 square feet of gross floor area will be applied to the project, which will require 2 parking spaces. The project proposes no on-site parking spaces. However, as the project site is located within the Downtown Commercial (DC) zoning district, Zoning Ordinance Section 14.50 – Adjustments to Off-Street Parking Requirements allows uses to credit on-street parking and public City parking lots toward the required parking amount. Therefore, the customers of Up Cycle Aquaponics will be able to park along the front of the business along Kern Street.

The proposed project was reviewed at the February 25, 2016, Project Assistance Team meeting. As such, all City departments that make up the Project Assistance Team reviewed the project and after receiving additional information regarding the aquaponics operation recommended the project move on to the Planning Commission for review and approval. Below is a table that details how the proposed project complies with the Downtown Commercial (DC) Zone District.

Downtown Commercial (DC) Zone Development Standard Compliance

Development Standard		Required	Provided
Minimum Parcel Size		5,000 s.f. (0.115 acres)	4,687 s.f. (0.108 acres)*
Minimum Site Width		50 feet	37.5 feet*
Minimum Site Depth		100 feet	125 feet
Minimum Setback:	Front	0 feet	Approx. 1.5 feet
	Side	0 feet	0 and 5 feet
	Rear	0 feet	78’-6”
Maximum Building Height		50 feet	12 feet
Maximum Floor Area Ratio		0.85 (3,750 s.f./0.086 acres)	1,287 s.f./0.030 acres – 0.27
Parking: Restaurant		1 space per 250 s.f. of retail area	396 s.f,/250 = 1.584
Total		2 spaces	2 street spaces^

*As the property is a legal parcel it is not required to merge additional land to meet minimum parcel size, width and depth
^Per Zoning Ordinance Section 14.50 – Adjustment to Off-Street Parking Requirements

CEQA:

The project is exempt from the requirements of the California Environmental Quality Act (CEQA) as set forth in Section 15303 of the CEQA Guidelines (New Construction or Conversion of Small Structures).

ATTACHMENTS:

1. Resolution
2. Kern County Fire Department Conditions Memo, dated March 1, 2016
3. Vicinity Map
4. Project Description Letter from Applicant, including Q&A Specifics on Project
5. Site Plan, Floor Plan, Elevations
6. Photo of Existing Site
7. Image of Typical Solarium Structure
8. Email Correspondence to Applicant from Kern County Dept. of Agriculture and Environmental Health
9. USDA Blog Aquaponics and Benefits of Aquaponics

Benny Wofford
Fire Marshal
Fire Prevention Unit

Fire Department Headquarters
5642 Victor Street • Bakersfield, CA 93308 • www.kerncountyfire.org
Telephone 661-391-7080 • FAX 661-391-7077 • TTY Relay 800-735-2929

3/1/2016

Permit No. Taft City

Job Address	610 Kern St., Taft (Hydroponic attached to an R-1)		
Business Name	Shar-On	Type of Construction	
Owner		Floor Area	
Occupancy	B	Occupant Load	

Plans have been checked in accordance with:
☒CFC 2013 ☐CBC 2013 ☐Title 19 ☐Title 24
☒Hold for Compliance
☐Okay to Release-Hold for Final

MEET ALL OF THE FOLLOWING REQUIREMENTS. PERMIT WILL NOT BE ISSUED UNTIL THE FOLLOWING ITEMS HAVE BEEN ADDRESSED.

COMPLIANCE LIST:

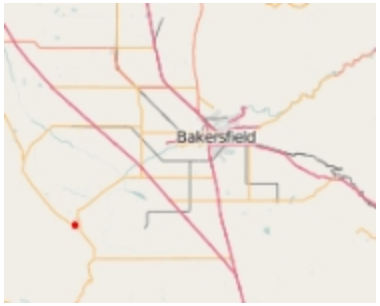
1. Submit application and site plan review fee along with engineered plans to KCFD to be reviewed for fire and life safety compliance.

If you should have any questions or comments, please contact this office.

Respectfully,

Cary Wright

Conditional Use Permit 2016-04 - 610 Kern St



Legend

Roads

- Freeway
- Highway
- Major
- Minor
- Local
- Ramp
- Unpaved

Restrictions

- DIAG PARK
- HANDICAP
- NO PARKING
- NO STOPPING

- Functional_Classification
- Parcels
- Lakes & Ponds
- Water Course
- Canals
- County Parks
- Bakersfield Parks
- Golf Courses

1: 1,128

0.0 0 0.02 0.0 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

© Latitude Geographics Group Ltd.

This map is a user generated static output from an Internet mapping site and is for general reference only. The County of Kern assumes no liability for damages, incurred by the user of this information, which occur directly or indirectly as a result of errors, omissions or discrepancies in the information.

Notes

APN 031-170-17

February 4, 2016

City of Taft Conditional Permit for Shari Rightmer d/b/a **Up Cycle Aquaponics**

Up Cycle Aquaponics will be physically located at 610 Kern Street, Taft CA 93268. This property is owned by and is currently the residence of Shari Rightmer, however, I plan to add on to the front of my home, creating a solarium to house an aquaponic urban farm. The dimensions are 10' depth x 23' width, with a height at the peak of the gable of 12'. This addition would be for commercial use only, and my residence would be for residential use only. An ADA-compliant restroom will be located on the east side of the residence at the side of the porch area. The commercial space will provide pure organic foods available for purchase by community members, local restaurants and stores within Kern County. It is intended to serve as a prototype for future aquaponic expansion and will provide an opportunity for education about this new trend of urban farming.

Aquaponics is a sustainable organic system in which fish produce nutrient-rich water, microbes convert the water to fertilizer for plants, the plants grow and filter the water that returns to the fish. The result is a perfectly balanced system which will be able to produce up to 1800 non-modified, non-GMO plants per month at this site. (See attachment for more detailed information on the fish.)

The benefits of aquaponic urban farming:

1. It uses 90-95% LESS WATER than conventional, in-ground agriculture. Definitely a plus, with California's drought issues.

2. Up Cycle Aquaponics will grow produce vertically, thus allowing the ability to grow more food in a small space.

3. Out-of-season produce can be grown year round.

4. Up Cycle Aquaponics is a NO WASTE program. Produce that is not sold live will be dehydrated, re-purposed and packaged for soup mixes, spices, snacks, etc.

5. Roots from plants will be used for composting, which will benefit our drought resistant landscaping.

6. Any water removed from the system will be put to good use on our landscaping, again providing for no waste.

The solarium will feature a solar-powered, ductless filtered air conditioner/heater, a Vertex water heater using 96% less energy, and non-breakable, heat resistant, self-cleaning glass that is fire resistant. Drought-resistant White Iceberg Roses will frame the exterior front of the solarium, with drought-resistant Texas Redbud slow-growing white flowered trees adorning the east and west exteriors.

Up Cycle Aquaponics is compliant with all city, county, state and federal laws. Letters from both the U.S. Agriculture Department (USDA) and the Kern County Environmental Health Department have been submitted to the City of Taft exempting me from licensing because I will be both growing and selling produce on site. USDA will ***register*** the produce as Organic, however, until there is a profit of $4,999.99 or more, we cannot be ***certified*** by law.

Up Cycle Aquaponics will pay the city for sewer, refuse and street sweeping. West Kern Water District has changed my usage code to commercial and added the business name to my account. One electrical panel will supply energy along with the 8 permitted solar panels on the roof. Power consumption for the water pump will be 200-250 watts, and the water will flow continuously.

Produce sales will depend on the crop, the time of year, and local market pricing. Heads of organic lettuce retail for $2.00-$5.00, depending on the variety. Kale is at the higher end of that range. For example, in a 5 or 6 week cycle, I could harvest 300-350 plants per week and earn $600-$1,500 per week. Sales could come from restaurants, farmers market, retail customers and grocers.

A poll was posted on Taft Treasures with the following question: Would you purchase live organic produce if it were available in a new Taft retail store? One day poll results were 100 – YES, 5 - NO. Also, 75% of Soroptimists at the March 1 meeting said YES, they would purchase live organic produce locally in Taft. Ron, the Manager at Albertson's, stated that they were expanding their organic produce and were accepting local foods also. He provided a contact at Albertson's HQ and there is interest in setting up a meeting in Fullerton in April. Tumbleweed Restaurant is open to purchasing fresh produce, as was Chef Jeff at Taft College. So it seems that the demand is there, as long as the price is right.

As the owner, I will be the only worker for Up Cycle Aquaponics at this time. However, should the opportunity arise, I would like to be able to hire up to 4 employees in the future.

To my knowledge, this will be a first-of-its-kind retail commercial business involving aquaponics, and, if successful will stand as a prototype for future development.

For any questions, I am local and available at 661-205-6575.

Sincerely,

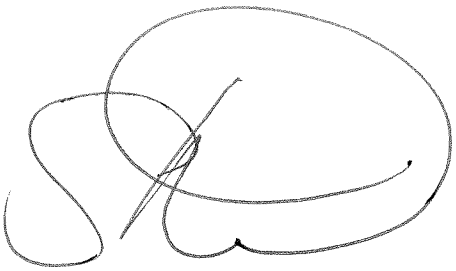
Shari Rightmer
Up Cycle Aquaponics

Up Cycle Aquaponics

Question and Answer Info on Aquaponic Fish

1. How large will the tank/pond be?
   2,000 gallons
2. How many Koi will be in the pond to feed the produce?
   1" of fish per 10 gallons of water, so 50 - 4" fish or 25 - 8" fish.
3. How long do Koi live?
   20 – 30 years
4. How small are they to start, and how large do they get?
   Koi fingerlings start off very small (1 – 2 "). Domestic Koi usually grow to 12 – 15 inches long. Japanese Koi grow 22 to 26 inches long. Jumbo sized Koi grow up to 34 – 36 inches long.
5. Will Up Cycle Aquaponics be selling fish?
   No.
6. How do you keep multiplying under control?
   By keeping the water at a constant temperature. Usually water gets cold in the winter, then warms in the spring, which triggers spawning.
7. How are dead fish disposed of?
   We will bury them on site. The EPA deems this an acceptable form of disposal as long as we follow the parameters outlined.
   file:///C:/Users/Seiryu/Downloads/477888_guide_mortalities.pdf
8. Will UCA smell like fish? What will it smell like?
   No, it will smell like the crops we are growing. If you have ever visited a well maintained pond or aquarium, you probably did not observe any odor.
9. How loud are the pumps? Will it be noisy?
   You will hear the soothing trickles of a small waterfall. The tubes containing the young plants will give off a trickling sound, but as the roots become established, the trickling sound stops because the water runs from root to root.
10. How much water to start? How much water thereafter?
    We will start with 1,000 gallons and slowly add in the remaining 1,000 gallons as we stock and cycle the pond. We top off the pond once every 2 months. This is the water that the plants have absorbed.
11. How and where do you dispose of water from tank so it doesn't go to the sewer system?
    It will be used in gardens around the property, as plants would thrive on the nutrients. (Fish water is actually sold commercially as a hydroponic fertilizer.)
12. How many times per year do you have to change the water?
    We do not "change" the water, we only top it off. Changing the water would kill beneficial bacteria and throw off the nitrate cycle.

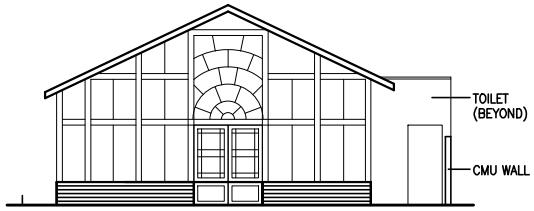
13. What kind of fish food would be used?
    AquaOrganic Aquaponics fish feed.
    USDA Certified Organic Fish Feed
    No GMO's, no fish meal, and no soy,
    formulated for omnivorous fish such as Koi.
14. Why Koi?
    They like warm water 65 – 75 degrees. Beneficial bacteria also like warm water above 64 degrees. (**Worth noting** : Harmful bacteria which cause food poisoning cannot grow in the aquaponic environment because the fish are cold-blooded.)
15. How are the fish processed?
    We are not stocking edible fish, so there will be no processing necessary.



SHAR-ON

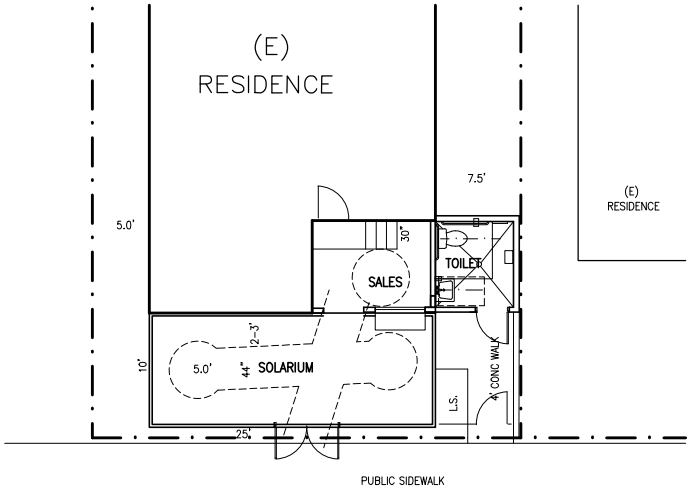
Up Cycle Aquaponic

610 Kern Street



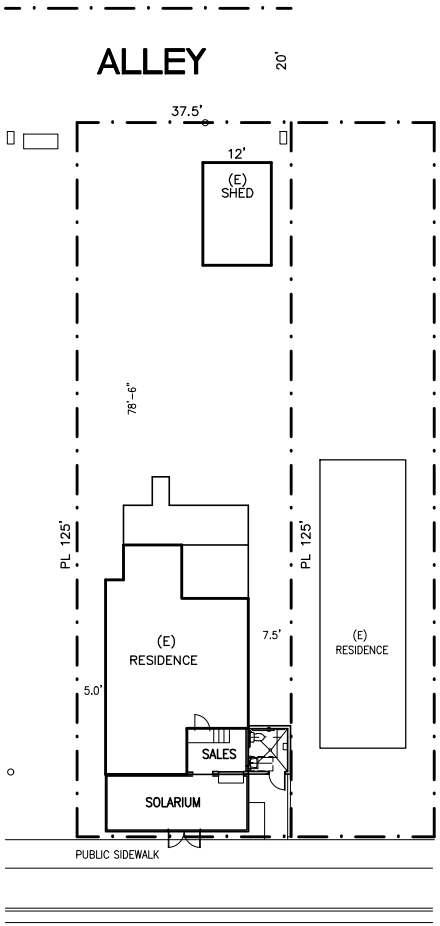
SOUTH ELEVATION

1" = 20'-0"



ENLARGED PLAN

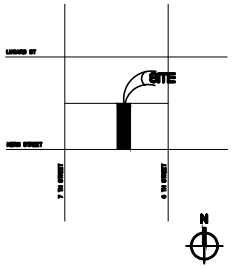
1" = 20'-0"



KERN STREET

SITE PLAN

1" = 10'-0"



VICINITY MAP

APN: 031-170-17

610 KERN STREET, TAFT, CA

ZONING: DOWNTOWN COMMERCIAL (DC)
(E) SINGLE FAMILY RESIDENCE

PROPOSED USE: CONDITIONAL USE PERMIT
COMMERCIAL – PRODUCE SALES

SOLARIUM, SALES AND TOILET ADDITION SHALL BE ADA ACCESSIBLE

LOT SIZE: 4687 S.F.

(E) RESIDENCE: 675 S.F.
(E) SHED: 216 S.F.

SALES (PORCH): 87 S.F.
SOLARIUM: 250 S.F.
TOILET: 59 S.F.

OCCUPANCY: 337 S.F./100 = 4

Project:

Shar-On

Up Cycle Aquaponic

610 Kern Street
Taft, CA 93268

GILMAR Construction Inc
Design–Construction Services

Gilbert M. Wong
Architect
C 12967

808 DAVIES CT
BAKERSFIELD, CA
93309-1416
(661) 631 2254
Fax (661) 631 2254
gmwarchitect@yahoo.com

LICENSED ARCHITECT
GILBERT M. WONG
C-12967
8-31-2017
STATE OF CALIFORNIA

SITE PLAN
ENLARGED PLAN
EXTERIOR (SOUTH) ELEVATION

DATE	ISSUED
.	PLAN CHECK
.	BUILDING PERMIT
.	.
.	.

MARK	DATE	REVISION
1	2.24.16	SALES AREA INCLUDED
2	.	.
3	.	.
4	.	
5	.	
6	.	

DATE 11.4.15
SHEET A1.0
JOB NO.
DRAWN BY
CHECKED BY
OF 1 SHEETS

GILMAR – DESIGN / CONSTRUCTION SERVICES – 808 DAVIES COURT – BAKERSFIELD, CA. 93309 – (661) 631 2254

610

Brenda Johns

From: Shari Rightmer <shari@sharirightmer.com>
Sent: Monday, February 01, 2016 1:48 PM
To: Brenda Johns
Cc: Shari Rightmer; Catherine Edgecomb
Subject: Fwd: Agriculture licence Exempt for Up Cycle Aquaponics

Hi Brenda,

Here is the info from Ag Dept Mark requested regarding my licensing and Registered Organic produce sold from 610 Kern St., Taft, CA 93268 doing business as Up Cycle Aquaponics.

Thank you for all you do for community,
Shari Rightmer

---------- Forwarded message ----------
From: "Jennifer Stilwill" <stilwillj@co.kern.ca.us>
Date: Feb 1, 2016 1:37 PM
Subject:
To: <shari@sharirightmer.com>
Cc:

Hi Shari! Here is the pertinent code section that allows the production and sale of produce at point of production. I bolded the most applicable text.

3 California Code of Regulations § 1392.1

§ 1392.1. Direct Marketing Authorized.

(a) Notwithstanding other provisions of this Group, this article authorizes producers or certified producers of certified or noncertifiable agricultural products to sell their products, as defined in this article, directly to consumers or to individuals, organizations, or entities that subsequently sell or distribute the products directly to end users, subject to the provisions of this article.
(b) A certified producer may sell agricultural products, which he/she has produced, at a certified farmers' market.
(c) ***A producer may only sell*** *noncertifiable agricultural products which he/she has produced, at a certified farmers' market, or* ***agricultural products which he/she has produced, at or near the point of production.***
(d) ***Fresh fruits, nuts, and vegetables may be sold directly to consumers or to individuals, organizations, or entities that subsequently sell or distribute the products directly to end users, exempt from size, standard pack, container, and labeling requirements only by:***
(1) The certified producer of the agricultural products at a stand at a certified farmers' market; or
(2) ***The producer of the agricultural products at a field retail stand or farm stand located at or near the point of production.***
(e) Fresh fruits, nuts, and vegetables may be sold for commercial resale only when such products comply with all applicable size, standard pack, standard container, and labeling requirements, except as provided in subsection 1392.4(k).

(f) All fresh fruits, nuts, and vegetables sold pursuant to this article shall comply with the regulations of the California Code of Regulations, title 3, subchapter 4, beginning with section 1359, governing maturity and quality.
(g) Excluding fresh fruits, nuts, and vegetables, agricultural products, as defined in this article, which are sold or offered for sale at a certified farmers' market, a field retail stand, or a farm stand at or near the point of production, must comply with all applicable laws and regulations pertaining to quality and labeling.
(h) This article does not supersede the provisions of federal marketing orders, state marketing orders, state laws and regulations enforced by any state agency, or any other local health and safety laws, regulations, or ordinances.
Note: Authority cited: Sections 407, 42681, 42682, 42684, 47000, 47001 and 47003, Food and Agricultural Code. Reference: Sections 42941, 47002 and 47003, Food and Agricultural Code.

Also the link to the CDFA Organic page is: https://organic.cdfa.ca.gov/OrganicReg/

Let me know if there is any thing else I can help you with.

~Jennifer Stilwill
Kern Co. Dept of Ag & Meas Stds
1001 So Mt Vernon Ave
Bakersfield, CA 93307
(661) 868-6300 phone
(661) 868-6301 fax

Brenda Johns

From: Diana Wilson <dianaw@co.kern.ca.us>
Sent: Thursday, February 04, 2016 2:37 PM
To: Brenda Johns
Cc: shari@sharirightmer.com
Subject: Up Cycle Aquaponics

Brenda

This e-mail is to confirm that Up Cycle Aquaponics does not require a permit from the Kern County Environmental Health Division to sell produce, herbs and fruit grown on property owned by Shari Rightmer.

The California Retail Food Code does not identify the activity of growing produce and selling that produce from property under the control of the producer as a food facility.

Should the project change to include other foods, food preparation or selling produce not grown by the producer, then a health permit from our Division will be required. Also, depending on the activities, the operator may have to install additional equipment such as sinks.

Ms. Rightmer may take items from Up Cycle Aquaponics to her house and dehydrate the items and then sell them at Up Cycle Aquaponics after she obtains a Class B Cottage Food Permit from our Division.

If you have any questions, please contact me.

Diana Wilson, REHS
Kern County Department of Public Health Services,
Environmental Health Division
2700 M Street, Suite 300
Bakersfield, CA 93301
(661) 862-8734
(661) 862-8701 fax

USDA Blog » Hooked on Aquaponics

This fish tank is located in Honolulu, HI at the President William McKinley High School, and illustrates the cleanliness of water in an aquaponics/aquaculture system. For aquaponics, when the system is properly balanced, the water can be maintained at maximum clarity. Photo courtesy of the Hawaii Department of Agriculture.

If you're wondering what aquaponics is, you're not alone. Tracing its roots back to the Aztecs and rice cultivation in South China, aquaponics is a combination of aquaculture and hydroponics – growing fish and plants together in a symbiotic system. Basically, the plants keep the water clean for the fish to grow, and the fish fertilize the plants. Both help the other to survive and thrive.

A wide variety of foods—lettuce, beans, broccoli, cucumbers, peas, herbs, strawberries, melons, and tomatoes, for example—all flourish through aquaponics farming.

The Hawaii Department of Agriculture, in cooperation with the Aquaculture Program of the University of Hawaii, is surveying grocery retailers and restaurants in Hawaii to explore the viability of aquaponic farming in the market place. They are looking at several factors, such as market acceptance, demand level, preferred product form, packaging and price points for produce and fish produced by aquaponics farms. Their research will help farmers better understand the benefits and viability of aquaponics as a method for raising fish and specialty crops simultaneously.

This project is the first aquaponics project ever awarded a grant through USDA's Federal-State Marketing Improvement Program (FSMIP). The grants are designed to support a wide range of projects, fostering work between the States, academia, farmers, and many other stakeholders.

Aquaponics farming is one example of the research-based, innovative projects USDA supports, with the goal of improving the long-term efficiency and sustainability of American agriculture.

Administered by USDA's Agricultural Marketing Service (AMS), FSMIP provides matching funds on a competitive basis to state agencies and universities to assist in exploring new market opportunities for U.S. food and agricultural products. To find out more about other FSMIP projects, visit www.ams.usda.gov/FSMIP.

This growbed is located in Apopka, FL, at the Pentair Aquatic Ecosystems Demonstration Farm, and is a great example of the diversity of plants that can thrive in close proximity to each other. The floating rafts are visible which hold the root structures of the plants. Many vegetables, herbs, fruits, and flowers flourish in an aquaponics environment. Photo courtesy of the Hawaii Department of Agriculture.

- **Sign up for Email Updates**
- **Calendar**

November 2013

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

« Oct Dec »

Benefits of aquaponics and why Aquaponics is better than organic

Benefits of Aquaponics

Problems with Organic certification:

- Once you are certified, the inspector rarely stops by to check if you are truly practicing organic methods.
- There is currently more organic produce being sold, than actually is being grown. Which means some produce labeled as organic is not. The only way to combat this is to know the farm you are buying from.

Why Aquaponics is Better than Organic

1. **Bottom Line:** There is no cheating on this with aquaponics, because we can't use chemical pesticides of any kind or our fish would die, period.
2. Even most approved organic pesticides would kill our fish. The fish act as the "canary in the coal mine", and force the aquaponics farmer to be honest. Even our tap water in Bend contains chloramine, which is an additive much like chlorine that would kill our fish.
3. Aquaponics mimics the natural symbiotic relationship between fish & plants.
4. Even traditional organic farms need to supplement their soil with fertilizers. These fertilizers can be bad for the over health of the soil and watershed.
5. We are located right next to downtown Bend. You can come visit us and see how we grow and treat our plants and fish, to be sure that what your eating is 100% chemical free!
6. No G.M.O. We do not grow any G.M.O. plants.
7. Another advantage of growing indoors is that we don't have to worry about sprays from farms next door blowing in the wind over on to our crops. Or mysterious G.M.O. plants appearing in our crops like what happened in Eastern Oregon.

OTHER BENEFITS OF AQUAPONICS

Farming Technique

1. Our proprietary system grows six times more per square foot than traditional farming.
2. Aquaponics uses 90% less water than traditional farming.
3. With our system, we can grow any time of year, in any weather, anywhere on the planet.
4. Because aquaponics recycles the water in the system, we can grow in droughts and areas with little water.
5. Less pests to deal with since we are growing indoors.
6. There's no weeding!
7. Plants Grows Twice As Fast! Due to the naturally fortified water from the fish.
8. For the commercial farmer, aquaponics produces two streams of income, fish and veggies, rather than just one.
9. Our aquaponics farm does NOT require farmland with fertile soil, or even land with soil; aquaponics can be done just as successfully on sand, gravel, or rocky surfaces, which could never be used as conventional farmland.

7. Because we hang our grow lights vertically, and use both sides of the light (no reflector), our lights are twice as efficient, as they are growing two areas of plants versus the standard one area.

Environmental

1. **Water Conservation:** Aquaponics uses 90% less water than traditional farming. Water and nutrients are recycled in a closed-loop fashion which conserves water.
2. **Aquaponics Protects Our Rivers & Lakes:** No harmful fertilizer run off into the water shed. In efforts to maintain nutrient rich soil, farms have to use a lot of fertilizers, those excess fertilizers eventually make it the rivers, where there are countless harmful side effects.
3. **Gas Conservation:** "Food Miles" are greatly reduced. Our produce only travels less than five miles from farm to consumer. Only serving the local community reduces harmful gas emissions.
4. **Energy Conservation:** Even with grow lights, we use less energy than conventional commercial farming! All energy used in aquaponics is electrical, so alternate energy systems such as solar, wind, and hydroelectric can be used to power our farm.
5. **Land Conservation:** Our system grows six times more per square foot than traditional farming.
6. Also, by growing in abandoned warehouses, we are using structures that already exist, saving money, energy and other valuable resources.

Health & Nutrition

1. Our fertilizer is from cold blooded fish which do not carry the E. coli or Salmonella, unlike fertilizers from warm blooded animals. Read More Here.
2. Fish are the fastest converter of plant protein to animal protein.
3. Fish have no growth hormones, no mercury, no antibiotics, No P.C.B.s (What are PCBS?)
4. Our Plants have no antibiotics.
5. Produce tastes better than that purchased at the grocery store (because it is not shipped and stored for extended periods of time).

Compared to Hydroponics

1. With Hydro you have to continuously change out your water supply, because the nutrient solution builds up salts and chemicals in the water. Not only is this wasting more water than aquaponics, it is also polluting the watershed.
2. Nutrient solutions for hydro are super expensive, where the fish in aquaponics can be fed worms, bugs and scraps from the plants.
3. Hydro revolves around a sterile environment, where Aquaponics embraces all micro-organism as they each play an important part in the growing process. As such aquaponics tends to have less diseases and pest problems.
4. In hydroponics, you don't get to raise and harvest fish.
5. Hydroponic growers can use toxic chemicals to control pests.