STAFF REPORT

TOWN COUNCIL MEETING OF APRIL 10, 2012

PRESENTATION

To: Town Council

From: Town Manager

Subject: Pierre Beauchamp Presentation and Request Aquaponics Project

Date: March 26, 2012

RECOMMENDED ACTION:
Hear presentation, discuss request and approve financial support in the amount of $1,000.00 from the Town towards the project should Mr. Beauchamp still require it.

DISCUSSION:
Pierre Beauchamp, a Sophomore at Del Oro High School, has requested the assistance and financial support ($1,000.00) of the Town of Loomis for development of an Aquaponic operation at the Del Oro High School. Mr. Beauchamp will be showing a short 5-minute video regarding his proposed Aquaponic project. See attached for details of Mr. Beauchamp's proposal.

At the November Town Council meeting, the Council approved implementing a "Pay it Forward" policy for schools/students who request financial support from the Town. Based upon this policy, Mr. Beauchamp has proposed the following benefits from the program:

- To develop a school curriculum that focuses on efficient greenhouse production and harvesting of produce.
- Marketing and sale of produce through local farmers' markets, school cafeteria, and CSAs.
- Supply various greens and vegetables to school cafeteria.
- Provide agricultural science students with an opportunity to participate in an agricultural based business operation focusing on new technologies and applications.
- Introduce alternative and leading edge agricultural practices including hydroponic, aquaponic and traditional methods.
- The Project will provide ongoing opportunities for students at Del Oro High to participate in an

inclusionary program, providing work and educational opportunities. Students will be active in building the systems from start to finish.

- Students will learn how to create business plans and organize events and farmers' market days.

CEQA:

There are no CEQA issues at present.

FINANCIAL IMPLICATIONS:

The Town has $1,500.00 budgeted this year for miscellaneous donations and support. Staff is recommending supporting the request for $1,000.00, leaving a fund balance of $500.00 for the remainder of the fiscal year should Mr. Beauchamp demonstrate a continued need for the money.

March 26, 2012

Town of Loomis
3665 Taylor Road
Loomis, Ca 95650

Subject: Del Oro Aquaponics Project

Dear Mayor, Council members and Town Manager:

My name is Pierre Beauchamp. I am a Sophomore at Del Oro High School. I am a member of the Future Farmers of America (FFA). I have been developing a plan to construct an aquaponics operation utilizing the High Schools greenhouse. I personally have designed and built 8 working and producing aquaponic systems.

My goal is to construct an on campus system to provide the following:

- To develop a curriculum that focuses on efficient greenhouse production and harvesting of produce.
- Marketing and sale of produce through local farmers' markets, school cafeteria, culinary program and CSAs.
- Supply various greens and vegetables to school cafeteria.
- Provide agricultural science students with an opportunity to participate in an agricultural based business operation focusing on new technologies and applications.
- To provide a revenue source to cover the on-going cost of the project.
- Provide a source of income for the Del Oro FFA
- Introduce alternative and leading edge agricultural practices including hydroponic, vermiculture, aquaponic and traditional methods

I am requesting the Town's financial support for this project in the amount of $1,000.00.

Thank you for your consideration.

Pierre Beauchamp

Del Oro High School - Agricultural Science
Future Farmers of America
(California, Superior Region)
Collaborative Agriculture

Prepared by: Pierre Beauchamp
Dated: February 6, 2012

Project Objective:

- To develop a curriculum that focuses on efficient greenhouse production and harvesting of produce.
- Marketing and sale of produce through local farmers' markets, school cafeteria, and CSAs.
- Supply varies greens and vegetables to school cafeteria.
- Provide agricultural science students with an opportunity to participate in an agricultural based business operation focusing on new technologies and applications.
- To provide a revenue source to cover the cost of the project.
- Introduce alternative and leading edge agricultural practices including hydroponic, aquaponic and traditional methods.

Collaboration

Future Farmers of America - The FFA is an established national organization that has an active Student Chapter at Del Oro High School. The FFA would be the lead organization sponsoring this project.

- Leadership Support - the student body of the FFA will be engaged in helping facilitate events such as farmers markets and co-ops.
- Financial support – we will apply for grants and other scholarships, we will collect funds from community organizations such as the Rotary and Lions Club.
- Project competitions - the Project will be entered in the Regional, State and National competitions, as well as many FFA/school related competitions nationwide.
- Provide access to Del Oro High School greenhouse.
- Farmers market – the produce that is produced will be soled at farmers' markets in the Placer county region.
- The Project will be open to participation for students of all grade levels. We believe that this Project will provide students with Senior/SAE Project opportunities.
- The Agricultural Sciences Department at Del Oro High School will establish a full "real life" business model with related curriculum and entrepreneurial dynamics.

Del Oro High School – In cooperation with Regina Dvoraks' Agricultural Sciences Program.

- Del Oro High School administration will have an opportunity to lead an emerging agriculture technology program that will be sought after and will be a model for other school programs.
- This program will provide outreach to area high schools throughout the district and region.

Student Involvement

- The Project will provide ongoing opportunities for students at Del Oro High to participate in an inclusionary program. Providing work and educational opportunities.
- Labor - students will be active in building the systems from start to finish.
- Strategic planning and support – students will learn how to create business plans and organize events and farmers' market days.
- It is envisioned that students will be able to accept accountability for particular "positions" and "functions" as if this were a private business endeavor.
- Students will be held accountable for completion of specific strategic and tactical functions that reflect business situations.
- It is contemplated that once the project is implemented, school courses will be established in the Project scope that would provide course credits.

Community Support

- The Project will reach out to the local and regional business and services community in an effort to further link the Del Oro High School programs to the public.
- The Project will seek community support in the form of monetary and in-kind contributions. This will provide students an excellent opportunity to integrate into community activities that will nurture exposure to the adult community.

- Local and regional participants may include area social service organizations (Rotary, Lions, Chamber of Commerce, etc.)
- The Project will be presented to the City of Loomis, Placer County and State representatives in an effort to gain their support and recognition of the program.

Proposed Systems:

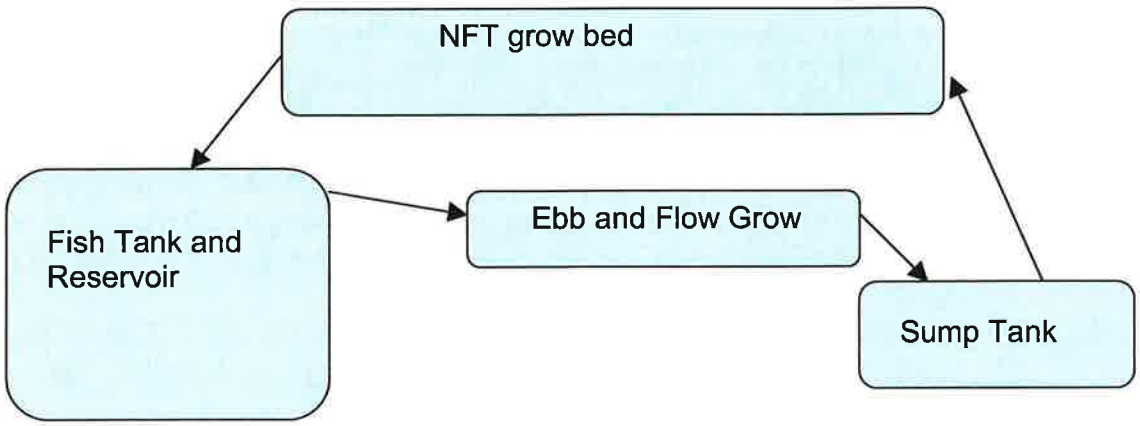
System #1: Ebb and flow pebble bed/deep water culture

- 300-gallon reservoir to supply water to the system and contain 100 – 200 fish (figure 1)
- The fish that will primarily be grown are catfish and koi depending on demand.
- The water from the reservoir is then gravity fed into a 1' deep by 2' wide by ? long, flood-and-drain bed.
- This grow bed will be mad of 1/2" welded polyethylene sheets (figure 2)
- The vegetables that will primarily be produced in this phase are as follows: parsley, cilantro and chives. These may vary depending on demand.
- The water from this stage is then gravity fed into a sump tank (the lowest point in the system) from here the water is pumped into a 4' wide by 6" deep by 8' long grow bed (figure 3)
- The system may accommodate several sections of these beds depending on the length of the system.
- Styrofoam rafts will float on the surface of the water suspending the crop allowing the root system to dangle into the underlying water.
- The water from these beds is then gravity fed back into the starting reservoir thus completing the circulation.

Figure 1

Figure 2

Figure 3


NFT grow bed
Fish Tank and Reservoir
Ebb and Flow Grow
Sump Tank

Overview:

Aquaponics is not a new-aged idea. These systems have been built and operated for centuries. The Chinese were some of the first to develop and implement the concepts. Aquaponics is a combination of aquaculture (the raising of aquatic species in large tanks or ponds) and hydroponics (the growing of plants in a non-soil based system using liquid nutrients and chemicals to feed the plant by delivery of water. When these two systems are merged, the need for synthetically generated nutrients is eliminated from the hydroponic component, which is replaced by the byproducts of the fish (ammonia and solid waste). The constant need for fresh, clean water is also eliminated from the aquaculture component because the plant roots provide a constant filtering system for the water. Thus creating a more sustainable system by conserving water and eliminating the need to purchase nutrient concentrate. The system is operable in the fallowing fashion.

Water is fed from the fish reservoir to a filter/grow bed. The water at this initial stage is rich in ammonia, and solid waste, which is produced from the fish living in the reservoir. The ammonia in the water is broken down into nitrates by bacteria in the grow bed. The nitrates are then further broken down into nitrites, which is the standard food for plants. Red worms, which are initially added to the media in the grow bed, break down the solid waist for further consumption by bacteria. This phase of the system is designed to constantly be flooding and draining to ensure that only aerobic bacteria are present. This constant flooding and draining also delivers oxygen to the roots of the plants, which is crucial to a healthy crop. The water is then gravity fed in to the lowest point of the system, the sump tank. The water undergoes further filtering threw mesh screens and other material to ensure that no solid material enter the next and final phase of the system. In this tank lies the only water pump in the system that pumps water to the DWC/NFT (Deep Water Culture/Nutrient Film Technique) phase. In this final phase, water is pumped into a 6" deep grow table (figure 3). The left over nitrites (nutrients) that were produced in phase 1 are transported to this section of the system for further consumption by the vegetative crop. The water is delivered at the far end of the grow tables and proceeds to flow down the length. As the nutrient rich water trickles past the roots of the crop the excess nutrients are absorbed. As the water reaches the end of the cycle it is free of all fish byproducts and is ready to reenter the reservoir and begin the cycle again.

Presentation Materials

- Project Proposal
- Project Photographs
- Project Videos

- System Diagrams

List of Supporters:

Del Oro High school

Regina Dvorak – Dept. Chair, Agricultural Science Faculty, FFA Advisor
Mike Pahl – Ag Shop Faculty, FFA Advisor
Dan Gayaldo – Principal
Justin Cutts - Dean
David Horsey – Superintendent
Scott Strawhecker – District Electrical
Colby Davis – System Maintenance and construction (SAE Project)

Local Community Support

Fuzzy Jarnigan – Loomis Lions Club, Member of American Legion
Russ Kelley – Town Council, Loomis Lions Club, Member of American Legion
Michael Kane – Associate Dean of Science & Mathematics Department, Sierra College
Gary Haywoth – VP of Business Development at Granite Bay Energy

City of Loomis

Placer County Administration

Christine Turner - Placer county agricultural commissioner (retired)
Josh Huntsinger - Placer county agricultural commissioner.

Placer County Farm Community

Joanne Neft - Placer Grown, Farmers market coordinator
Carole Arnold - Foothill Farmers Market - Administrator
Brian Kaminski-Natural Trading Company - 2010 Placer County farmer of the year.

Business Community

Marco Krapels - Rabobank
Kieth Sutter – Sutter Photography (Auburn)
Steve Demink – Demink DeSign (Auburn)

System Specialists and Aquaponics Experts

Chris Newman – Santa Cruz Aquaponics
Pete Bridson - Aquaculture Research Manager at Monterey Bay Aquarium (SeaFood Watch)
Peter Shaw – Director of Horticulture at Cabrillo College
Kristen Manrivers – Permaculture Consultant, Executive Director – Zone Zero-Collaboration for Green Schools
Josh Gulliver – Systems Designer, Farmer
Blare Rice – Sustainable Greenhouse owner (Polyethylene grow beds and tanks)
Max Myers - Fish, Technology NorCal Aquaponics
Chris Thompson - Alchemy Aquaponics
Robert Fudge – Systems Consultant

Bud Neville – Quail Mountain Ranch Hydroponic Supply Co.

Del Oro High School Greenhouse
Project Cost Estimate
January 27, 2012

Item #	Item Name	# of Units	Price/unit	cost
	Reservoir (for fish)	2	$200	$400
	3/4" PVC 12' length	2	$3	$6
	male 1 1/2" threaded to female non threaded	1	$3	$3
	3/4" PVC "elbows"	7	$2	$11
	3/4" PVC "T"	1	$2	$2
	3/4" PVC valve	1	$3	$3
	1" male threaded - 1 1/4" non threaded	1	$3	$3
	1 1/4" PVC "elbow"	3	$3	$9
	NFT grow beds	4	$120	$480
	polyethylene grow bed	4	$180	$720
	grow bed assembly labor	1	$200	$200
	bell siphon system	3	$5	$15
	3/4" rubber sealed drain fitting	4	$7	$28
	sump tank	1	$100	$100
	sump drain - pump fittings	1	$10	$10
	floating rafts	12	$5	$60
	hydroton	30	$35	$1,050
	water pump	1	$350	$350
	solids filter screen	2	$5	$10
	tall tables, 4"W by 8"L, 3.5"H	4	$140	$560
	short tables 3'W by 8'L 1.25' H	4	$150	$600
	aerator	1	$300	$300
	water heater	1	$200	$200
	thermostat for water heater	1	$50	$50
	koi fish	200	$5	$1,000
	initial seed purchase	25	$3	$75
	initial fish food purchase	2	$30	$60
	initial rock whool purchase	15	$10	$150
	net pots	4	$10	$40
	air hoses	1	$100	$100
	propagation trays	5	$5	$25
	quarantine tank	1	$100	$100
	cinderblocks	5	$6	$30
	filter for quarantine system	1	$125	$125
	cover for all fish tanks	3	$75	$225
	transportation and assembly	1	$500	$500
	Total Material Costs			$7,600
	contigency-10% total cost			$760
	total cost of complete system			$8,359