

SOUTHERN OREGON AQUAPONICS – a social venture –
Food Security Solutions in the Era of Agricultural Decline

Social Problem -

Worldwide there has been a steady decline of cropland area per capita since 1961. This trend is expected to continue over the next few decades, contributing to global food insecurity and spiraling food prices spurred by a deepening scarcity of supply. Climate change and the accelerated depletion of fertile soils by erosion are putting the food system at grave risk. The summer of 2012 has seen a severe drought in the USA (affecting 80% of the country's farms) that has pushed food futures to unprecedented levels with an estimated loss of over 100 million tons of corn (¼ of the total crop). Also of concern to global food security, the U.N. Food and Agriculture Organization (FAO) estimates that 75% of commercial fish stocks are overused or on the verge of collapse.

Local food security is threatened in many ways by the increasingly centralized production of foodstuffs that contributes dramatically to fossil fuel dependence and consequent climate change, ensuring extreme volatility in food supplies. The average distance food travels from farm to table in the USA is between 1,500 and 2,500 miles. The cost of 1 calorie of industrially produced food is calculated to be 10 calories of fossil fuel energy. In the event of continuing weather extremes and/or a disruption of petroleum supplies, the food system is the weak link in our fragile human ecosystem.

By 2050, there could be 9-billion people on this planet, which means global food production will have to increase by 70%. What kind of innovation, aside from Genetically Modified Organism's (GMO's) and chemically intensive industrial farming, can help us meet this challenge?

Solution Proposed -

A uniquely robust solution to the planetary food crisis exists in the high-yield horticultural practice known as *aquaponics*. The superior benefits of this marriage of aquaculture and hydroponics are well established. One of its numerous benefits is the capacity to achieve almost total climate control, as well as dramatically accelerated plant growth and high-density, year-round food production. Equally valuable in the era of worsening fresh-water crises is the extraordinary water conservation inherent to this method of farming. The protein production from an aquaponics dome with an area of 2700 square feet is equivalent to 5-8 tons per year. This 'closed-loop' system of agriculture is thus a solution to a multitude of environmental and social dilemmas.

The remarkable capacity of closed-loop aquaponics greenhouse systems to efficiently manage nutrient cycling and achieve complete run-off abatement is complemented by their power to generate surplus fertilizer (biosolids) to rebuild soil in areas like sub-Saharan Africa. When housed within relatively inexpensive geodesic domes, these sturdy structures act as water catchment systems in semi-arid countries where the bulk of annual rainfall occurs during one month out of the year. When properly designed, carbon sequestration within such systems can be near total. Immunity from environmental pollutants including genetic contamination from GMO pollen is a significant consideration. Decentralized food production is inherently more secure and economic in that it ensures ready local access & control, thus stabilizing the food economy (minimal volatility in price). Renewable energy systems and on-site biomass energy production can substantially reduce operating costs.

We propose to form a social venture to address local food security issues in the Rogue Valley of Southern Oregon where currently only 3% of our caloric intake is provided by local agriculture. Aquaponics figures centrally in the strategy to increase local food production, with a focus on meeting local market demand for value-added produce and basic nutritional needs.

Market Analysis-

There is a growing local food movement in the Southern Oregon bioregion that will be greatly empowered by a small-to-medium scale food production industry housed within self-contained 'grow domes' of inherently low operating cost. The declining availability of fertile cropland can be addressed by the biointensive horticulture of aquaponics, producing as much as 10 times the food per acre as conventional agriculture methods.

Feeding America rates food insecurity in this region at 18%, with an increasing percentage of children nationwide being affected by hunger and malnutrition. As part of our social mission, we would endeavor to provide discounted produce to support Farm-to-School programs in our area and hold educational events at our facility on a year-round basis. This approach would contribute to the growth of eco-tourism and encourage local economic self-sufficiency.

The Ashland restaurant market alone has a need for >\$500,000 worth of fresh produce annually to serve both local clientele and the burgeoning tourist trade drawn by the Oregon Shakespeare Festival (250,000+ visitors annually). Once our operation has begun to produce mature fish of various species (after Year One), revenues will increase markedly.

Launch Strategy and Requirements –

We envision our initial launch targeting consumers through educational activities and the general appeal of local produce to restaurateurs. This strategy will allow us to build a market for our product, while helping to promote food security in low-income communities that would benefit most from aquaponics installations. As we are well networked with local NGOs, one of our core aims is to employ social outreach to broaden the local food sustainability, ethic, and educate aspiring farmers in the art of sustainable agriculture. An expanding market share will hinge upon both this mainstay and a community supported agriculture (CSA) model pursued concurrently. Commercial installation of greenhouses in individual communities and within established farming operations would follow in subsequent years as we demonstrate the success of this high-efficiency method of food production. Partnering with businesses dedicated to a sustainable local economy, the early stage development of our venture will be highly collaborative and successfully reach the target markets we have identified.

We will be seeking a seed investment of \$500,000 from *Slow Money Institute*, a pioneer in the financing of local food entrepreneurship, that will allow us to build a medium-scale aquaponics greenhouse complex in the Rogue Valley. We have already secured a commitment from their Chairman, Woody Tasch, to visit Ashland in 2013 to discuss these and related local food initiatives.

We aim to meet the local restaurant demand for several key produce items (basil, mixed salad greens, strawberries, fish). Several local restaurants have already expressed interest in purchasing the output of the initial greenhouse. We will have access to the SOU campus greenhouse to incubate our plant-starts. Among our strategic partners are the following entities:

Pacific Domes, a local manufacturer of geodesic dome structures, is committed to launching a local food resiliency initiative in cooperation with our firm by providing greenhouse dome structures 'at-cost'. Their technical teams, currently developing aquaponics prototypes, are prepared to assist with the launch of our aquaponics dome systems.

EarthTeach, is a 1680 acre wildlife preserve in Ashland that fosters ecological, sensibility, and sustainability thinking. Their commitment to our project is the provision of land where our first greenhouse will be established, free of charge to the business. They also have dedicated support staff who will participate in educational programs and community outreach.

Financial Plan (Income Statement) – For the Years Ending Dec. 31, 2014 and Dec. 31, 2013

Revenue	2014	2013
Total Revenues	525,000	315,000
Expenses		
Advertising	15,000	15,000
Initial Costs		50,000
Cost of goods sold	35,000	95,000
Furniture and equipment	5,000	175,000
Insurance	10,000	10,000
Maintenance and repairs	5,000	5,000
Salaries and wages	70,000	70,000
Total Expenses	152,460	420,000
Net Income Before Taxes	372,540	(105,000)
Income tax expense	14,936	9,920
Net Income	357,604	(114,920)

Our annual overhead costs will be generally fixed until distribution and product offerings dramatically expand. Educational events and consulting fees on the design & installation of aquaponics systems for third-parties will be an ongoing source of revenue. After early-stage investment is repaid, it is intended the ownership of this venture will be kept largely in the hands of a core clientele subscribing to the food output. The bulk of profits shall be reinvested in the expansion of the business model to include, in Year 3 and beyond, a commercial partnership with Pacific Domes to offer proprietary kits for the emerging global market in aquaponics products & services.

Impact Summary-

The local food sustainability movement in the Rogue Valley is an example that can be duplicated throughout the country and worldwide. Our venture is set to bolster this movement with advanced growing systems that will significantly increase both access and availability of foods needed to keep the region buffered against a global food system in stark decline.

Team Members: Andrew Mount, Environmental Studies Major, Sustainability Leadership Certificate Candidate
Sean Lowry, Business Management and Field Biology Major, Sustainability Leadership Certificate Candidate
Jeff Jensen, Business Management Major