

Polyculture Farming Must Serve As The Foundation

Last January I went on a road trip across California with my brother Adam in my Aunt and Uncle's VW Camper. I remember the awe we experienced as we gazed out the window at hundreds of acres of grapevines young and old. As we traveled along the countryside and outskirts of cities, we tactfully dodged mudslides in Big Sur, flooding, 80 mph winds in San Luis Obispo, where we hunkered down for the night at the El Chorro Regional Park next to the Botanical Garden, and a snow storm in Yosemite. Luckily the highway apps allowed us to safely maneuver our way between two beautiful National Parks in the winter. If you haven't visited Yosemite or Joshua Tree National Parks, they must be on your bucket list!

I never really thought to consider viticulture as a thriving monoculture movement until I was bombarded with rows of vineyards in my peripheral view. Just as the picture indicates, there's a succinct system in play within the viticulture industry and it's hard not to miss the lack of biodiversity in this industry alone. While there is a cover crop of grass in between the rows, there are other solutions that could be utilized to make viticulture production more sustainable. Encouraging organic viticulture is an ongoing debate but there are winerys all over the globe that work with nature to create a wine that is better for all living things.

In the twenty-first century the "tri-lemma; food, fuel, and the environment," are the driving forces that should propel biodiversity and agrobiodiversity. Power postulates that innovation is thwarted by decisions that farmers must make in response to policies and market trends, with landscape changes devised to meet these demands (2009). Power presents the dilemma that ecosystem services must support and detract between agricultural services and ecosystem services, and that they must be supported by biodiversity (2009). I believe that farming methods used to cultivate crops, like polyculture vs. monoculture, play an essential role in biodiversity and agrobiodiversity.

Ecosystem services must incorporate polycultural agricultural systems in order to build the foundation for more sustainable

food systems. Landis, Wratten, and Gurr (2000) previously discussed how monocultural cropping systems prevent the occurrences of beneficial insects to run their course due to the use of pesticides, and how polycultures provide a welcoming environment for multiple species to coexist and work with nature over time. Polycultural farming methods should serve as the foundation of policies and programs.

Agricultural systems are implemented as a result of agricultural practices driven by the demand in global markets (Power 2009). Agricultural systems must support alternative landscapes like permaculture in order to be effective at maintaining conservation, resource recycling, and water harvesting, while creating more biodiversity (Conrad 2013). Hesterman states that we are chipping away at transforming the food system through a systems change, emphasizing that we can't afford to wait, "we need to act more directly and forcefully now" (Oran B. Hesterman 2011, 43). Furthermore, policies should mandate that farms incorporate "adaptive landscaping" (Power 2009) on their farms in order to receive funding, and claim agricultural exemptions. Insisting that giant monoculture viticulture farms adhere to biodiverse systems would provide more sustainable solutions for dealing with drought.

Bibliography

Conrad, Abigail. "The benefits of alternative farming methods." *The Guardian*. April 23, 2013. <http://www.theguardian.com/global-development-professionals-network/2013/apr/23/farming-methods-agroecology-permaculture> (accessed October 10, 2014).

Douglas A. Landis, Stephen D. Wratten, Geoff M. Gurr. "Habitat Management to Conserve Natural Enemies of Anthropod Pests in Agriculture." *Annual Review Entomol* (Annual Reviews) 45 (2000): 175-201.

Oran B. Hesterman, PhD. *Fair Food*. Philadelphia: PublicAffairs, 2011.

Power, Alison G. "Agricultural Systems and Ecosystem Services: Trade-offs or Synergies?" *Twenty-First Century Ecosystems: Systemic Risk and the Public Good*. The National Academies of Sciences Engineering and Medicine, February 12, 2009.

How a Life Cycle Assessment (LCA) Measures Up With Energy Flows For Our Food System

Figure 1. Life Cycle Assessment (Anctil and Fthenakis 2012).

Understanding methodologies in calculating the energy flows of food systems is an essential part of making systems more sustainable and efficient. Is a good tool to measure the environmental impacts of a food product the life cycle assessment? The first LCA studies in the 1960s researched the impacts of beverage containers like Coca-Cola (Pray et al. 2012).

Within our food system, an LCA analyzes the various stages of the food cycle to prevent a shift to other life cycle stages (Pray et al. 2012). For a candy bar, this could include the impacts of manufacturing it through the production chain, including sourcing of ingredients, fuel to extract material, transportation for ingredients and candy, as well as the resources used in the “cradle-to-grave” life cycle (Pray et al. 2012).

The LCA can potentially measure emissions, water, waste, and help minimize costs but there are many

downsides of the LCA model (Pax 2013). A standard life cycle assessment (LCA) has three phases; goal and scope, inventory analysis, and impact assessment (Pray et al. 2012). A fourth element could be life cycle interpretation (Reap et al. 2007). A survey was conducted on problems with the LCA model and it identified 15 problems concerning this scientific system (Reap et al. 2007). One of the six problems of utmost importance in using the LSA model is that the impact (phase 3) only takes the environment into consideration and not the economic and social impacts of the good that are being manufactured (Reap et al. 2007). Ingredients like corn syrup and synthetic chemicals that are used to flavor and color the candy impact nutrition, and the health of those who manufacture the candy, and unfortunately were not measured.

The functional unit for measuring food is unclear as caloric values, nutrition, and emotional value also play a role (Pray et al. 2012). Others argue that LCAs on food systems measure food systems differently like by mass or volume which makes it challenging to compare different food items (Pray et al. 2012).

We should create policies that provide solutions for methodologies that are more sustainable. In regards to sustainable development, the LCA model doesn't necessarily promote sustainable decision making as sustainable production and consumption are lacking (Reap et al. 2007). These are a few

reasons why we should question methodologies behind energy flows in our food systems so that we can create a smaller footprint for our planet. After I conducted three LCA assessments on an organic vegetable and fruit farm, an organic dairy cow farm, and a goat meat farm, I came to the conclusion that each farm is unique and presents its own challenges when analyzing data and computing formulas.

Multiple considerations must be taken into consideration when conducting an LCA. Which includes incorporating the availability and access to resources, waste management streams, value added value chains, regional location, marketing channels, the farming operation and management system, and energy measured as consumed by humans and machinery from a cradle-to-grave perspective. Ultimately a farmer, small business, non governmental organization (NGO), corporation, and so forth, must determine if the LCA will add value and improve a company's triple bottom line. Otherwise it can be extremely inefficient due to the lack of accurate data, thus taking an extensive amount of time to conduct an analysis, while it is extremely expensive to conduct a thorough assessment. Therefore conducting a SWOT analysis on a quarterly basis will allow you to measure your targeted areas of opportunity and weaknesses , perhaps in a more efficient manner so that your business enterprise can address alternative solutions for a more sustainable

future head on.

Bibliography

Anctil, Annick and Vasilis Fthenakis. "Chapter 4 Life Cycle Assessment of Organic Photovoltaics." In *Third Generation Photovoltaics*, by Annick and Vasilis Fthenakis Anctil. Creative Commons, 2012.

Reap, John, Felipe Roman, Scott Duncan, Bert Bras. "A survey of unresolved problems in life cycle assessment: Part 1: goal and scope and inventory analysis." *International Journey of Life Cycle Assessment*, June 28, 2007.

Pray, Leslie, Laura Pillsbury, Maria Oria. *Exploring Health and Environmental Costs of Food: Workshop Summary*. 2012.

Pax, Sara. "Food LCA: The Elusive Quest to Go Beyond Carbon." *Environmental Leader: Environmental & Energy Management News*. June 4, 2013.

<http://www.environmentalleader.com/2013/06/04/food-lca-the-elusive-quest-to-go-beyond-carbon/> (accessed November 15, 2015).

Mid Summer Garden

Well I don't think I can ever get caught up in the backyard these days! My gardens have become so large that I'm constantly cultivating the soil! It seems as if just as I've finished one thing, another bed needs redone!

It has been a very successful tomato season for us even though many farmers have said the complete opposite due to all of the rain! Plenty of heirloom tomatoes here! At this time I have planted about 102 in my small space. The reason for that is a greenhouse lesson learned. In the years prior I seed started in the house where the environment wasn't ideal for sprouting. Davin was able to finish the greenhouse coop last fall and I was able to start my favorite varieties successfully for the first time. I put 3 seeds in each pod, and guess what, they all came up! So, I was able to sell a few at the farmer's market, and donated about 40 to a few local families. Lesson learned! We will be expanding our greenhouse coop into a full greenhouse with aquaponics in one section and a chicken care station below, in addition to our seed starting stations. That will be our next big project after Davin remodels the new coop again. I swear, how many times can you rebuild something until you are satisfied with the end result?

Our chickens are 20 weeks old on Wednesday! One of our Campines has been laying for almost 2 weeks straight now but none of the other ladies have begun yet. The campine eggs are tiny, a little smaller than a guinea egg actually. The new flock is having a hard time adjusting to the heat I think because we had so much

rain in the spring that it was actually pretty cool for much longer than it usually is. Since it's dried up for the past month or so it's been pretty hot and they are struggling, even though it hasn't reached 100 degrees yet. Luckily we have multiple fans in both the new coop and the old coop so all of our hens are getting some relief. It does help them to lay in the summer if they have places to cool off. We have multiple locations for water and I like to give them refreshing frozen or chilled afternoon fruit treats.

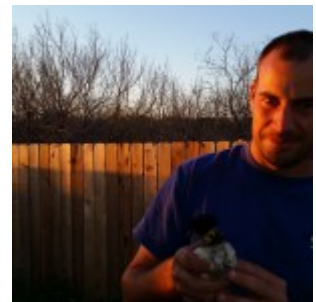
We also have ten different breeds, within the 20 birds we own. Four of them are 16 months old and three of them are consistently laying. The Ameraucana hasn't been laying eggs but has a deformed dorsal, which I've read is how some of the original Arcaunas were shaped. She did have some very soft shelled eggs and I'm not sure if she will lay again or not. So right now she's helping to control the bad bug population, and fertilization. She is one of the original ten pullets that we bought 8-10 weeks old and lost 60% for different reasons. Davin calls her Corky. For anyone considering raising chickens, get them as chicks, not as older pullets. They'll have a much better chance of survival and be much healthier if they grow up in the same environment.

Here are a few pictures to show you what's new at our market garden-backyard homestead and some of the things we've done this spring and summer!



A few plants that
we got from
Sunshine
Community Gardens
annual spring
plant sale, 2015

Seed starts in
the greenhouse



Davin's favorite.



Adjusting the new
system.



Drip system runs
off of rainwater
and is very
efficient.



Drinking
harvested
rainwater, packed
full of
electrolytes!

Another compost
pile located in
Sustainable
Garden Bed



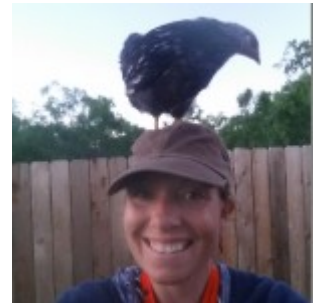
New grape bed and
added garage sale
decor to the gate



French Heirloom
Creme de l'ite
Carrot



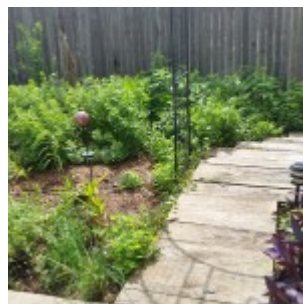
Walking onion



Yes, early
bonding. They
like to jump on
my head!



Table grapes from
Stark bro's.



Herb garden in
the spring 2015



Citrus and
succulents



New coop



Just a little wet
from the rain



Grew buckwheat to
build the soil
with nitrogen, as
a beneficial
insect promoter,
and for chicken
scratch



Compost for the
chickens to
scratch in

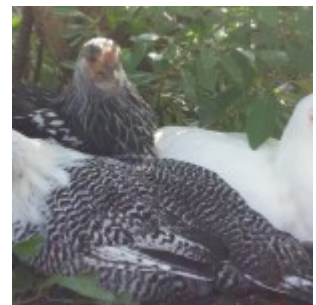




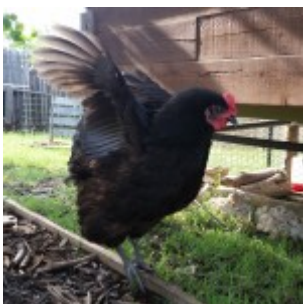
Everbearing
raspberries



1015, Red, White,
Texas Sweet
Onions, were
harvested early
because of all of
the rain and
flooding.



Silver Campine,
Leghorn, Heritage
Breed Hens



This was our
broody Australorp
hen this spring!
We got her back
on track after a
couple of weeks!



Buff Orpington,
Ameraucana, J

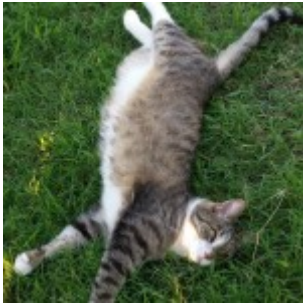




Brabanter
Heritage Breed
Hen



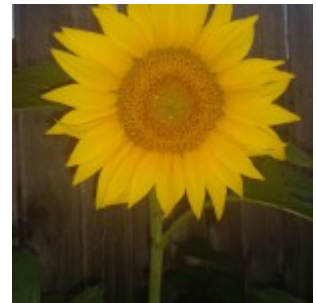
Norwegian
Jaerhons,
Heritage Breed
Hens



Mic relaxing



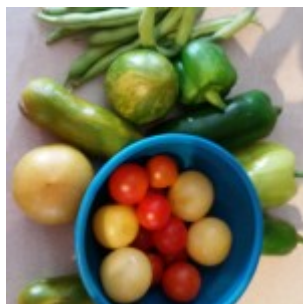
rattlesnake that
I went face to
face in while
cultivating the
corn bed



sunflower



late spring/early
summer harvest



Some of the first
harvests in the
spring.



Heirloom Garlic



Giant Zinnia



A peek in the new coop



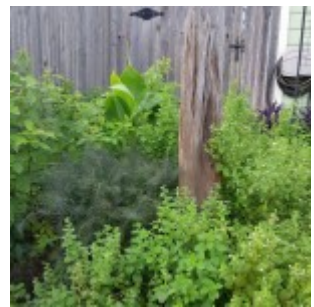
Garden in June



crimson
watermelon that
came up on its
own free will



For some reason
we have two
banana spiders
hanging above our
nesting boxes on
both coops. I'm
ok with that too!
They are well
fed!



Melissa, fennel,
raspberries,
roses, cana, and
an old log that
we turned into
garden art in the
herb garden



Cinnamon basil



Pink lemonade
blueberries

