

Dear Students, Colleagues and Friends,

We had a fire in early Spring, which is why you haven't heard from me. All organisms (humans, quadrupeds, tri-peds [We have a 3-legged cat]) survived and we're busy rebuilding all but the outer shell. At the risk of "telling" you how to feel, I'd like to just say please, don't worry. We are living a delightful life in a camper in the driveway of the farm; and the whole thing has served as a grounding recalibration. We're also enjoying the songs of dickcissels, field sparrows, meadowlarks, barred owls and coyotes with an unimpeded ear.

Nevertheless, it drew my attention away from you, fellow sustainabilists, until I was provoked into the following . . .

Aha!

We love that feeling, don't we? A strong personally held belief intersects with evidence and culminates in action. Ahaa!

It's what I felt this morning as I opened Twitter, still bleary-eyed and gulping coffee, to see the headline: "IKEA's Space10 is creating on-site aquaponic farms for restaurant supply". Interest piqued, I scrolled down reading the attendant bold print – "**indoor farming to 20 new locations**", "**60,000-square-foot vertical indoor farms in Louisville, Kentucky**" and "**world's largest indoor farm produces 10,000 heads of lettuce a day in Japan**".

For those of you who I taught *Water, Energy and Land Management* back at Lipscomb U., this probably sounds very familiar – particularly the last article which describes [AECOM's design for a conceptual cityscape](#) featuring a public plaza with green pillars of flowers and food rooted in pools hosting fish for fertilizer first and the dinner plate later. Beauty. Food. And further function. Without saying it, these businesses are engaging in systems thinking and applying it for the good of the community and economic goals as well.

If one looks at LinkedIn forums, systems thinking is awash with mathematical derivations, complex science, and lofty language. It puts so many people off. Makes us think we can't partake. We don't know enough. It's for the designers. For the mega-wealthy corporations. All those people who attend all those conferences.

Bull hockey.

Systems thinking is fun – yes fun – and here you see many people are making a business of it. So what are its secrets? How can we inject ourselves onto this cutting edge of sustainability and get in on it? Well, since the articles all involve food, let's start with plants.

Of course plants are not the root (Sorry!) of systems thinking, but since we see them every day they're relatable and we can use them for our base of discussion. Of course, both they and the ecosystems they are part of are subject to the way the earth works, so we'll start there. After all, if we didn't have our Earthly system, where would we be? We live on a big rock ball with crusty, outer layers formed of all those rocky materials along with additional components of the life forms up above – after they've lived life and returned to ground to be recycled. Ashes to ashes. Dust to dust. There's the start of a system right there – a group of items all with their own individual functions and yet all in relationships with each other, operating in their own cycles and yet in concert with one another. (Hold up there – not necessarily in concert, right? Let's be intentional here and just say, in relationship with one another. OK, continue.)

Now, all that dust would float up into the atmosphere if we didn't have gravity. You all know gravity. (I'm getting to know it more intimately every year.) It's fairly critical to our existence for many reasons; but let's isolate that dust-and-dead-critter-blend element of the surface we trample. It hangs around because of gravity and creates a substrate in which plants can grow and derive nutrition. It also makes a convenient walking surface. Add to that the sun, atmosphere and water which make this big blue ball the color it is and you have a pretty amazing interactive system which has functioned over eons to support life on this planet.

Now that we've established the key components of this system, let's look at why this new way companies are interacting with plants is so exciting. In the old days (and by that I mean pre-sustainability thinking/acting) we tended to use plants for a single purpose. First, we used them for food. Over time and still primitively, we began using them for shelter. About 2800 B.C., we began using them for their beauty. Let's refer to each of these specific uses as a "stocks". Over time plants as a food stock would sometimes be abundant and other times scarce, creating a flow. So it is with stocks; partially because of all those relationships and cycles we were talking about earlier.

In very recent times, we began recognizing the stock of plants and their inherent usefulness in creating green infrastructure to cool buildings, block wind and even more recently, absorb or detain water. Fewer people (but a growing count) have even started using them purposefully for their health benefits of oxygen production and proximity benefits for mental health. In a system though, and in nature, the most efficient systems use multi-functional thinking and design. Cycles are leveraged. Actions which recognize and integrate interdependence and interconnectedness of multiple stocks enhance healthy flows. So, instead of just landscaping or growing a crop out on a farm, why not do both or create some other utility or beauty? The requirements, cycles and feedback loops all entail the same amount of energy, but instead of serving one goal we can serve many. If we direct the stock of human labor toward this end we increase the stock of possibilities. Wow.

Let's take a look at one of those possibilities. I won't have to write very long or press pen to paper very hard for those of you reading to underscore the challenges of over-population. In addition to the deeper challenges of currently, 7.4 billion people on our

planet, a first consideration is always feeding all these two-leggeds. By thinking in systems we can increase our stocks in all the things we've pressed plants into service for: food, shelter, infrastructure, health and well-being (as well as income). By using plants in a multi-functional way within cities we are also able to protect habitat stocks outside cities since we needn't plough more ground in ever-widening circles, then truck plant stocks to where we live.

Importantly, as [with IKEA and Space10's](#) collaborative work in Denmark, [Chicago's FarmedHere projects across North America](#) and [Japan's lettuce production](#) facility; food can be local. That alone is huge. But if we could interface with plants and animals as AECOM is suggesting with a new conceptual cityscape literally "rooted" in aquaponic ponds, we could supply fish for human consumption and nutrients for vertically-supported floral and food crops while providing shade and healthier air in a public square for all to see and enjoy. In addition, the projects already operating take pressure off utility grids by shrinking water consumption to as little as 1% of conventional farming, cut food waste up to 40% and increase production on a breathtaking scale. In Maryland, the [Enviro-Center](#) is even integrating plants into their leasing framework where occupants of offices receive some food in addition to space for their monthly rent. Urban farmers using rooftop farming are mitigating upward spiraling urban heat cycles by reducing roof temperatures by up to [90°F](#) in summer months. And of course, these new enterprises also provide jobs.

What we haven't accounted for is the fact that nothing in a system of any size – not a plant in its ecosystem, nor us in our food/beauty/shelter/infrastructure/well-being framework – is static. Flow indicates that by definition. Life flows. It shifts. First one thing is in higher supply; then another. And the flows of all our interacting stocks create feedback loops governed by the relationships of those stocks to each other and their attendant flows. Here's where we often foul up. Humans, in our more-is-better mindset, tend to think that reinforcing flows are what we need to achieve. More widgets from our widget factory. More money. More buildings. More infrastructure. More. More. More. The problem – and I think you already know where I'm going – is that we forget that all those elements are stocks tied to a larger system. So, more two-leggeds mean more food requirements, shelter and infrastructure – exponentially at times. And the other stocks within that system become strained to provide for those reinforcing feedback loops.

If, however, we utilize systems thinking – while considering the health and flow of each of the component stocks – and we can move toward a healthier system of balanced flows. That's where companies like AECOM are getting it right. Don't just provide food. Provide food and the nutrition base for that food along with beauty, shade to counter urban heat island effects, healthier air and infrastructure at the same time. Multi-use. Multi-service. Interconnected. Interdependent. This is where the sustainability we believe in meets the evidence we require. Now all we need to do is act – and support those who are already acting in this manner. This means educating those in our communities and those with whom we work. This means deploying systems thinking in our own lives.

Aha!

<https://www.linkedin.com/pulse/plant-systems-thinking-your-work-margo-farnsworth?published=t>

Pura vida!

Margo Farnsworth

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Give good people good information and they'll do good things.

(If you've just received this single newsletter, it may be because I thought you'd be interested in this particular subject. You may or may not get others. If you want on my list regularly, e-mail me. If you want off my list, e-mail me. Thanks!)