9 questions with eco architect William McDonough on the future of agriculture

7 hours ago under Agriculture, Architecture, biomimicry, Botanical, Interviews 0 Like 60

by Jill Fehrenbacher

VIEW SLIDESHOW

We're excited about **urban farming** here at Inhabitat, and we've been **following the work of green architect William McDonough for years** – from his groundbreaking **Cradle to Cradle manifesto and book**, to the inspiring **Ford Factory renovation** to the new **Method Factory with sprawling greenhouses on the roof** in Chicago. So imagine our delight when we learned that William McDonough was tapped to design the master plan for a new **"Silicon Valley of agriculture"** in Aarhus, Denmark. We recently had a chance to catch up with him to discuss this **new project** and his vision for the future of agriculture. He had a lot of fascinating ideas to share, from Thomas Jefferson's design ideas to poop recycling – read on for the full interview...

Inhabitat: Thank you for agreeing to chat with us today – we are very excited about your vision for this new "Silicon Valley of agriculture" in Denmark. Can you tell us about the Agro Food Park?

William McDonough: **The Agro Food Park** is a whole complex right now with 75 companies, about 1000 people. It's part of the Danish Agriculture and Food Council and was opened in 2009, about **460,000 square feet**. There's about half a million square feet already in place with 75 companies, and they're looking to expand and build an additional roughly three million square feet over the next 30 years. That's what we're doing here as the master plan and then conceiving how this sort of agricultural technology and food production thinking in Denmark can be expanded as commercial opportunities for people and their synergies. This is a place, literally, where people could be engaging in the business of feeding the world safe, healthy food. That, to us, is very exciting.

Inhabitat: Is it an office park that people commute to from towns nearby, or will it house a community of full-time residents?

William McDonough: **The Agro Food Park** is kind of a research and incubator hub, but not residential housing. The nice thing about the Danish landscape is that people get there easily on bicycles. They live around it, all around it. It's like like working in the Netherlands where it's relatively flat, and people ride their bikes. The key thing here, we typically prefer very dynamic mixed-use in basically everything that we can. It's one of the great discoveries of the obvious is that live-work is probably the most important element of transit, which is you don't need it in many cases, you know, when you look at history. This is meant to be a hub for the people who work in agriculture to rub elbows and share the same coffee and compare notes all the time. It's a giant watering hole.

RELATED: Denmark is building the "Silicon Valley of agriculture" in Aarhus, Denmark

Inhabitat: Does the Agro Food Park engage in actual commercial food production, or is it mainly research and development?

William McDonough: I'm going to invite **Alastair Reilly** who's sitting here with me to speak on this.

Alastair Reilly: Right now, this is really an R&D hub, so it's the confluence of the Danish agriculture lobbyist for the farm group. There's government entities there. Aarhus, the local university, is doing a new biotech lab there, and then it's commerce business. Some of the large Danish food exporters, Arla, who's building a new R&D center there. Then the agro-food park is really stitching all those entities together and also providing incubator startup space for small groups that are doing innovations around all kinds of food production.

Inhabitat: Can you tell me a bit about the role that the agro-food park currently plays in Aarhus and in Denmark in general, and then how you see this evolving over the next 30 years?

Alastair Reilly: Sure, I can start. As Bill mentioned, there's about 75 companies there. They're scattered around this campus. It's an old farm with some R&D buildings, labs, so our idea is to stitch those entities together, but currently it's a mystery what happens there. Everything is very inward-focused right now, so our idea is also to make it very open and transparent to the public and create a test lab. One of the main pieces of this new master plan is a lawn which would be a test lab. It would be open for the public for viewing but also allow the different R&D and users to see the other technologies that are being tested there. It's really designed to create some density so they can cluster all these different groups together, but with a central gathering space as well, so we can have overlaps of technologies between the different firms.

William McDonough: One of the things that I find really important at this point in my career is that I'm very focused on soil health. It's interesting to note that humus, human, and humility all come from the same Latin root, and to have humility means to be grounded. If we look at the whole earth as a system, as **Francis Crick** pointed out when he looked for what he called the "nature of vitalism," what does it mean to be a living thing? His conclusion was in order to be alive, you had to have growth, because otherwise you're dying. If you don't have cells growing, you're dying. You have to have income in order to grow, and that income on the planet is essentially from the sun. I like to note it's also from carbon dioxide and nitrogen from the atmosphere coming toward the earth.

Then you have to have an open metabolism with chemicals operating for the benefit of the organisms and their reproduction. That organism, essentially for us as terrestrial creatures, comes from soil. Soil is the basis. I find it very interesting to look at all the agricultural systems in the world and ask as a first question, "Is the soil improving in health?" That is the first question because, over the eons, you've got natural systems building soil. Otherwise, it's a dead rock in space. Are we healing the soils? Are the soils growing? Are they healthy? That takes us to the fungi, the bacteria, the microbes, and then on to us. These projects that start with that fundamental question is very exciting for me. We're doing quite a few projects around this issue of how do humans inhabit soil, and how do we feed ourselves from it?

Inhabitat: This makes sense. So how does that view impact your master plan for this design of the Agro Food Park? What is the general design premise for this master plan?

William McDonough: Having been the dean at the **University of Virginia in the School of Architecture** and living on Thomas Jefferson's **lawn**, the power of that space as a gathering place relies on its very specific dimensions.

The Great Lawn at University of Virginia – designed by Thomas Jefferson as an academical village

Thomas Jefferson was very precise. The length of the lawn was the amount of distance at which you could still recognize another person, in his mind. He wrote specifically about it. In the Agro Food Park, there is a lawn in the center of the design, which is where these experiments are going on. It would be the place to come and wander around and see what everybody's doing around it and be present as an organizing space. This is what **Jefferson would have characterized as academical village**, here might be characterized as essentially commerce and culture radiating around it. It's really a research village around a **great lawn** that isn't a lawn. It's food.

Inhabitat: Can you elaborate on how or whether you were able to integrate Cradle to Cradle thinking into this design?

William McDonough: Well, the whole idea of agro-urbanism is **Cradle to Cradle** at its roots. The idea that we connect our food and our buildings into daily lives is how **Cradle to Cradle** translates into buildings. Also, one of the reasons we're here and working with GXN and the other partners on the team, including the Danish architects and landscape designers, is that I helped our partner, Kasper, here. We wrote the **Cradle to Cradle** for the social environment guidelines for the Danish design industry together. He and I have been working very closely on the idea of bringing Cradle to Cradle at all levels into Danish design.

Inhabitat: I'd like tie this into what you see as the future of global agriculture. Here at Inhabitat we've done a lot of coverage of urban farms, particularly the idea of the indoor vertical farms, and trying to

bring large-scale agriculture closer to dense urban areas. I'm wondering what you think of those ideas versus the large, flat, terrestrial farm that's out in the countryside. How do you think we're going to feed the world globally in the future?

William McDonough: It's a great question and it deserves its length. I was born in Tokyo in 1951 and every night was awoken by the farmers coming with the ox carts over the cobblestones and these giant oak wheels and coming to collect our sewage. My mother would sing a song as we woke up as little babies, and the songs were really funny, actually, in retrospect. They were stuff in American tunes from my mother who was from Alabama, and they were sung in Japanese with a southern accent and kind of cute. Anyway, for a little kid, this is heaven because she would make up songs about poop. You're 3 years old, you're lying on a futon in a paper house in Tokyo, all made of joinery, and your mother, who the farmer is waking up with the ox cart, collecting the sewage to take it to the farms. You're lying on your back giggling because this is so great.

I always thought the city and the farms were one organism, and the farmers came back with their ox carts laden with food during the day for the market. Paris was the same. It had a system of market gardeners that would come into Paris with their fresh peaches and the vegetables. They would go to the markets, and they would go to the very streets where there were people in the streets who essentially captured the horse manure of that street. That was their world. They would collect the horse manure in that street that belonged to them, and they would pile it up in the corners. The farmers and the gardeners would bring the food, and they'd deposit quickly. Then they would go to the corner and collect horse manure and straw and take it back to their gardens. The cities and the gardens are one thing, and for me, they still are.

The idea that we would grow close by fresh, healthy food and use our own nutrients as part of the cycle is the part that interests me. I've been very involved in studying vertical gardening and articulating the issues around it. I'm quite involved in the Netherlands where artificial agriculture is predominant from an industrial perspective. A lot of this agriculture is growing in greenhouses. The things that I get a little concerned about are what happens to our sewage because it's not necessarily incorporated in the formula. Part of that is because a lot of it has been contaminated by industrial systems that combine storms and sewer and industrial waste and things like that that are of a concern to people.

I am really interested in cities being able to create fertilizer factories instead of sewage plants where it is possible. If we can capture the phosphates, the nitrogen, carbon, we can use it as fertilizer. I'm working on projects like that to see where we can do that – this is very exciting to me.

Urban farming with artificial light is very dynamic because we see that tomato plants, for example, only care about five wavelengths of light; 3 blues and 2 reds. With LEDs, you can actually articulate the growing light that the plants actually desire. At the same time, Grow Lights use an incredible amount of energy. Unless we have renewably-powered energy that's actually of a different kind that I'm working on on another scale, it's of concern because if we replace one problem with another we have to be careful.

The energy balances of these things are important. That's why we put all of these **greenhouses on the roof on top of the Method Factory** in Chicago. ***[It's the world's biggest rooftop greenhouse]***.

RELATED: World's largest rooftop farm sprouts 10 million pesticide-free crops each year

It's pretty exciting being able to do this. In India, we've got greenhouses on factories. The jobs and their people are right there, and these are areas that are in the sunshine that weren't previously occupied, so we now grow food there. We make water there. We make solar energy there. We use the carbon for growing. We use the cooling system to take water out of the air in the deserts because we have condensates. We can do many things at once up there, so we do that. Part of it's providing food for people right there to take home to your families. It's pretty exciting.

As far as large-scale agriculture; I'm very concerned about monocultures and the exploitation of the soil in the conventional American situation, because it doesn't yield soil health. We now see soil depletion. Soil health is so important and that's another reason I think the working with the Danes is so exciting, because it's such a big part of the focus. The Italians are doing incredible work on this, too, by the way, at **University of Trento**. They're realizing that the viruses that are attacking the hazelnuts and the olive trees, are coming from Costa Rica and Africa via Rotterdam on the seeds being used in the Global Agro seed business. This is really devastating for our local, regional food crops. Olives and hazelnuts? Can you imagine Italy without olive oil?

What they're realizing is that it's the soil that is the first line of defense for the plant. They're developing new compost optimizations for those plants so that the plants are feeding vigorously from composts that are natural to them and allows the right micro eco system: the bacteria, the microbes, to fully engage the plant with its health, so the viruses have a tough time getting it. That's the first line of defense for the organism, so soil, soil, soil.

The thing I see in the future is beautiful fields of solar collectors. They would be Cradle to Cradle, obviously, which we now have, deployed high above the ground so that you can move around underneath them. This would utilize the shade to encourage the perennials to come back, which they do immediately – it is quite amazing. We can get 15 foot deep roots. We can get agriculture going under there, water comes back, soil health comes back, they're carbon-positive, in my language. You get food, you get jobs, you get fiber, you get water, you get soil health, and carbon retention. You get kilowatt hours like sugar on an apple. You don't just go out and put solar reflectors out there, baking the earth, without considering the entire ecosystem. Instead we can actually use raised photovoltaics as if they were trees and shade the ground and have cool places underneath for all the organisms that need that for the soil and the water making it grow.

That's the part that's really got me excited because then we can build large-scale agriculture with revenue streams and jobs galore. Everything from basic agricultural labor to high-tech all at once in the same place adjacent to cities. Then allow the cities to provide fertilizer through their internal metabolisms, so people can start to feed themselves when we recapture the nutrients. Otherwise, we're all going to end up trying to go to Morocco for phosphate, and that's going to be a problem. It is a problem already.

Inhabitat: What do you see as the relationship between soil health and climate change? What do you think is necessary for the kind of global paradigm shift that we so desperately need to slow the pace of climate change? How is this project related to that?

William McDonough: Well, just think about Denmark and the conversations that we get to have with people there when we do our work. If you say in Denmark, "We could renewably power this without fossil fuel " they don't look at you funny. They nod their heads because guess what? That is what they're already doing, so that seems natural to them. That's an unusual culture to be working in on that front. You also look at a country with 5 million people growing enough food for 30 million people. That's interesting. Then you look at the kind of research that will go on here on how do you accrue carbon in soil because if you are going to have a growth economy, you will be wanting to grow your soil health so that you can be perpetual. This is agriculture, and this is living soil, so you support the life of your soil.
This project and this culture, Danish culture, are really a key place for us to be working, so that we can bring this model to other places. We're already in discussion about bringing many of our ideas to China at scale. This is an important place for us to stand humbly in the soil while we play in the dirt so to speak, as children. It's playful, but it's a tool.

One of the terrifying things about tools sometimes is when they're used for what we might consider negative purposes. The value of a tool is placed there for the intention of the human who's using it. If you look at soil or a hammer. For a child, hammer immediately becomes a toy. For a carpenter, it becomes a house. For a maniac, it becomes a weapon. The tool doesn't know. The people and
their use and their intention for the tool give it the value that either builds or destroys. When I was a baby, poop stories were entrancing for all children. Then children get connected to the soil.

When we moved to Hong Kong after Japan, my mother, who was an American, would always say to us that we were no longer allowed to go barefoot. As little kids, this was so difficult for us. She said, you cannot go barefoot because we have ringworm, scarlet fever, cholera, typhoid, typhus, et cetera, so you're just not allowed to go barefoot.

All we wanted to do was play in the dirt, so she used to tell us, “When you get to the states,” because every summer we spent in the Puget Sound, my dad was from, and my grandparents lived in the forest of the Olympic Peninsula. She said, “When you get to the states, you can play in the dirt, because we have clean dirt there.” First thing we did coming off the airplanes, we took off our shoes. Then she said, “You’re not supposed to go through the airport barefoot.” We would always say, “Mom, you said we could go barefoot when we got to the United States, so now we’re going barefoot.” I think that notion is really important when you think about what has happened to the soil because of various kinds of agricultures. It’s as if we wanted to kill the soil.

If we wanted to kill our soils, we couldn’t be doing much better. Look at what is our intention in the Great Plains, and you watch the erosion. You watch the inability of soils to take up nutrients. You look at the chemical fertilizing and so on and so forth. I mean, it’s really, it’s almost like it’s a weapon instead of a playful place for a tool. Agriculture is using nature as a tool. Children use nature as a toy. Farmers use nature as food production.

Inhabitat: What do you see as a solution to making the soil better?

William McDonough: It’s astonishing what the addition of a small amount of compost will do to rev up the engine of bacteria, fungus and microbes in soil. It’s unbelievable how things start to kick in and start to heal. I would say we should review all sewage treatment plants and see where we can extract essential agricultural nutrition in various forms that’s safe and treat them as businesses. For example, phosphate literally can be recovered from sewage treatment even if it’s from mixed sources as a mineral. You get away from all the yuck factors of various things because you’re dealing with a mineral and that kind of thing. We should look quickly at an inventory as well as the phosphate, nitrogen, and so on, and see how we’re going to optimize those for our national security, for resilience, for local production, and economic benefit. It’s going to be important. That’d be one thing.

Good soil is valuable. We have to use the economy to drive these things. When we look at some of the agricultural systems, the ones that are healing the soil are incredibly productive. They may have higher costs and inputs because of the higher quality for the soils, but the soils then can accrue more materials from the atmosphere and previous uses. It becomes a virtuous cycle of growth instead of a vicious cycle of amendments that require more amendments. It’s amendments that allow the soil to extract its own amendments. That’s a very important basic shift in the agriculture is feed the soil – but not with Twinkies. That’s the kind of thing with this project that is so interesting because this is the kinds of research that will be done at the Agro Food Park.

Inhabitat: Just a last question on turning sewage into soil – do you know of any high-tech examples of towns or municipalities using sewage and extracting fertilizer? Finding a better way to deal with sewage than just the typical treatment plants that we have in most cities? Have you seen anything where they’re actually able to use some of that and take it back into agriculture to amend the soil?

William McDonough: Yes. There are more and more chances every day. They're just getting going because a lot of technologies they're in their adolescence. The ones that you'd want to look at for simple technology would be **Vancouver for example**. They have a company there. I haven't checked with them lately to see how they're doing but called **Ostara**, that makes a

actually created laws that are asking municipalities to recover phosphates, so it's coming. Once you start seeing laws or requests by the government to do things like this, you all of a sudden start to see the innovation. That means something is going on that stimulated both the concern but also the interest in the business community.

+ Agro Food Park

William McDonough + Partners

Denmark is building the "Silicon Valley of agriculture" near Aarhus

09/15/2016

VIEW SLIDESHOW

Denmark is making huge investments in urban agriculture, with some of the world's leading architects and designers steering the way to a whole-systems, **ecological approach to growing food**. **William McDonough + Partners** and GXN, along with 3XN Architects, BCVA and Urland, have collaborated to develop a new master plan for the Agro Food Park (AFP), an existing hub of agricultural innovation near Aarhus. The project is designed to enhance cooperation between researchers and businesses and their ability to boost agricultural pe ıce in a dense urban environment, ensuring long-term food security without en ental degradation.

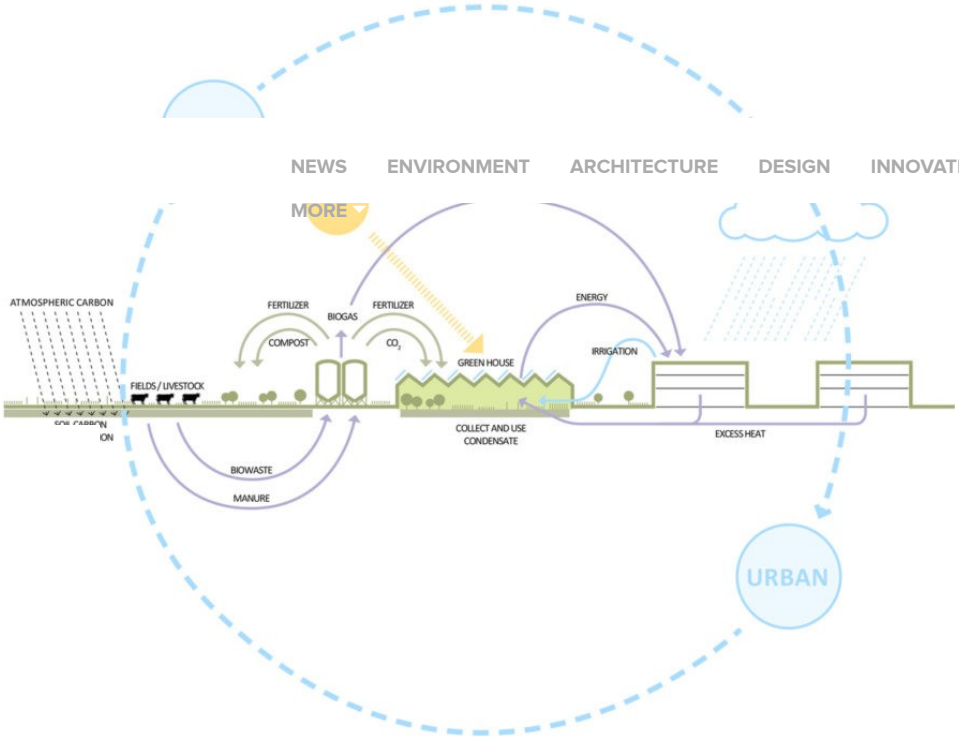
According to **William McDonough + Partners**, the agricultural food park first opened in 2009. It is owned by The Danish Agriculture & Food Council and currently hosts 75 companies and 1,000 employees. Now spanning 44,000m2, the park will grow an additional 280,000m2 in multiple phases over the next 30 years. William McDonough + Partners said it is expected to

McDonough later told Inhabitat, "This is a place, literally, where people could be engaging in the business of feeding the world safe, healthy food. That, to us, is very exciting."

Wil cDonough + Partners and GXN are specifically focusing on five particular areas that wil e the AFP (and potentially future, similar developments) and creative an inspiring space that gives rise to innovation; they include healthy materials, **clean energy**, increased biodiversity, healthy air, and clean water.

Related: Interview with William McDonough, green architect and Cradle to Cradle founder

"Embracing Agro-Urban Ecosystem Design, the AFP treats urban and agricultural development together as a unified, productive and restorative ecosystem," said William McDonough + Partners. "By integrating the carbon cycle and other ecological processes into large scale urban systems and their surroundings – buildings and energy flows, water cycles and wastewater treatment, land use and food production – the AFP creates economic value within the urban and agricultural infrastructure."



The er plan comprises three main sections – the Lawn, a central communal **green space** tha ecome a "showroom" for experimental food production, the Strip, the main street with "ac round floor facades to ensure a lively atmosphere throughout the day, and five Plazas tha d" clusters of buildings together, creating individual neighborhoods with distinct ide.

"Innovation occurs best when knowledge is concentrated in clusters and cross-pollinated," said Kasper Guldager Jensen, Director of GXN. "By linking food production to urban life, we have tried to create an environment where people, knowledge and ideas meet. The dream is to create the framework for agriculture's answer to Silicon Valley."

+ William McDonough + Partners

VIEW COMMENTS (1)

ions with eco
t William McD...

TAT INTERVIEW:
Architect & Cra...

Green Design Predictions For 2011!