

"Everyone a vegetable garden "

Anton Boonstra, September 2019

Introduction

In the last decades, in our everlasting efficiency-drive, we have managed to organise the Food Supply Chain similar to any other sector, as for instance Automotive or Electronics. That was wrong!

We have burned down forests, to grow just one type of crop on too large plots. We have exhausted the soil, with monocultures we created diseases, which we had to fight with poison. We transport large volumes of commodities and food all over the world. Yes, let's admit it, we really messed up Mother Earth. I think the basic reason behind this, is the way we have organized our Food Supply Chain. We have created a monster!

The solution clearly tends towards less meat and fish, eating vegetables, eating more varieties of food closer to home, with less environmental impact. There have been already very good initiatives in this direction. But.... the real solution is to change the way our Food Supply Chain has been organized.

In this article I want to make clear that it was wrong to copy the way we have organized the Food Supply Chain from other sectors. I want to introduce a way of thinking, a model called: 'Everyone a vegetable garden'. Aim is to reorganize the Food Supply Chain dramatically. We are obliged to ourselves and our children to bring the environmental impact of our Food Supply Chain down, to make our planet a healthy planet again.

It's the way we have organized our Global Food Supply Chain which causes pollution of mother Earth.

Two years ago, I was temporarily in charge of a tea factory in the UK, part of a bigger company active on the organic market. Footprints of our factories were made and although the primary process of the factories were very different, the outcome per factory was very clear and similar: the biggest contributor to CO₂ production (approximately 85%) is caused by transportation (to supply raw materials and to distribute the produced finished products) and transport of commuting the personnel. That made me think! It isn't so much the factories themselves but the transport and distribution of the products and the travelling of the workers which causes the real pollution. Also, the spillage needed attention but wasn't that 'big' as I thought before. In the case of tea, most of the raw material is coming from China, and in minor instances from India and Africa, often supplied in containers by ship. We bought organic tea, so free of pesticides. The yield of organic tea per m² less than non-organic tea cultivation is less intensive. To get the tea to the UK goes into containers and heavy-diesel-consuming ships. Tea cultivation in UK itself is very limited because the combination of soil and climate isn't just good enough. Therefore, most of the tea is imported from the areas mentioned above. That applies to the entire tea industry. Somehow consumers think tea is coming from the UK, so it's important to be able to say, 'produced in the UK'. Ridiculous because like I have already said, tea is coming

from other regions in the world and transported to an island at the borders of the Europe. From UK to European countries it takes usually truck-transport to distribute tea inland to consumers via Retail-Dc's and supermarkets/stores. If I write down this story like that, it isn't really surprising that mainly the transportation of the material is causing the problem of producing too much CO2, is it?

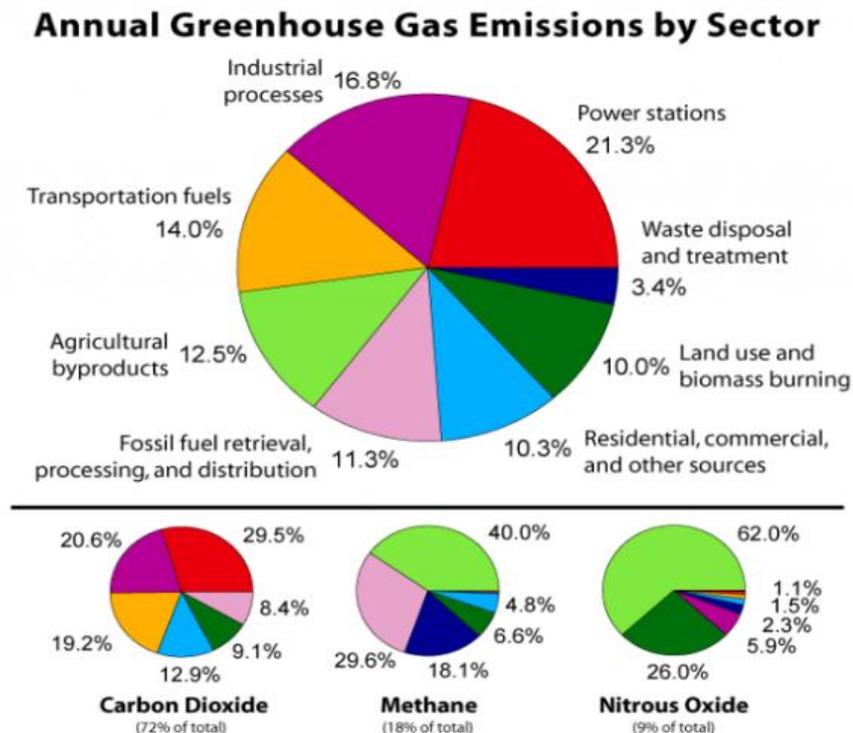
Also, this is about tea, but I would think the story of coffee, cacao is very similar. And unfortunately, if you think about meat and fish, I could draw down similar goods flows as well.

Environmental impact is more than CO2, the Food Supply Chains causes the biggest impact

If you look at charts of greenhouse gases, you can say they are starting to rise from the years 70/80. There is also this self-reinforcing mechanism: by increasing greenhouse gases, the temperature rises, and climate is changing, we get more storms, more wet and dry periods, green is reduced by drought, less greenhouse gases can be absorbed, which increases the CO2 even more.

Often agriculture is to be blamed, it is very often stated that agriculture contributes for 20 to 35% of total emissions of greenhouse gases. Can you say that?

I was triggered by the following picture: -



If you look at Agricultural by-products, land use and biomass burning, you're talking about 10 + 12.5% = 22.5%. So, in that way this graph is confirming that agriculture has indeed a heavy share in producing greenhouse-gasses. But there is also a 'food-share' in industrial processes and transport fuels for instance. If you count together:

'Industrial processes', 'Transportation fuels' and 'Power stations', you get $14 + 16.8 + 21.3 = 52.1\%$ of the emissions on their behalf. Assume Food is a third of those impacts than the total Food Chain would be responsible for production of: $22,5\% + 17,4\% = 39,9\%$! 40% !! Incredible 40% ! If you realize that, it's no discussion anymore: 'we need to change the way we work on our land, we treat our forests'. We need to reform the Food Supply Chain.

What this picture also shows, that there are more greenhouse gases than just CO₂. Certainly, CO₂ is 72% of the total greenhouse gas emissions, but don't underestimate the production of Methane (18%) and Natrium Oxide (9%). Did you know that the way we grow rice (in water) produces half of the Methane gas? Need I say more?

Apart from these 3 gasses, we don't touch all the other issues like spillage, waste,

Footprint

I think we need to change our consumer packages in such a way it's clear what the footprint is per consumer package you buy. At various universities and institutes this is worked on, for example on the Wageningen University in the Netherlands. We need to inform and participate our consumers in a way they are aware of the impact of greenhouse gases produced. Sometimes it sounds like Agriculture and Transport are to be blamed and it's something outside us. It's them, not us! But in the end, this is done for us as consumers, so it concerns us all!

A piece of history: we moved away from focusing on Production-efficiency to focusing on Logistics.

The Food Supply Chain isn't that old, just a couple of decades. Not long ago we took the wrong junction,



we went into a dead-end road.



It's not a matter of a diversion or so, the only thing we can do is going back to where we took the wrong junction and look from there for an alternative. We need to say goodbye to the 'old' Food Supply Chain, we need to really organize the Food Supply Chain differently.

Focus on production efficiency, scale, buying raw materials from East

Following Taylor, production-efficiency was the subject in the industry in the 70ties and 80ties. A stopwatch was used to measure the cycle time between products coming from the production lines. Scale was one of the big solutions to reduce this cycle time dramatically. Concentration of production units were fact of life.

Globalization became important and the main solution to cut cost prices down, boundaries became of lesser importance, distances became shorter because flying with airplanes became a commodity.

By improving production-efficiency, the cost price could be reduced but also with smart purchasing it became possible to cut cost prices dramatically. Purchasing became more and more a profession. Products were coming more and more from low-wage countries, first from China and later from Eastern Europe.

Later, also the assembly was transferred to the Far East. At that time, you could see that the production share of the cost decreased by percentage points, I think from roughly 15% to 10%. By purchasing smart and low wages in the Far East the cost price-share of the purchase price could drop from 65% to 60%. In short, by focusing on production efficiency and by buying smarter, the cost price could be reduced with at least 10% on average.

The end of further reduction of production efficiency became in sight, more attention was paid to logistics

In those years there was very little focus on logistics, but logistics became more important factor by lowering the production share and the share of the purchase-price. In addition, the logistics costs became higher as a consequence of the globalization. The efficiency discussions you saw in the 80ties and the 90ties were

shifting more and more to logistics costs. Transport costs were higher as well as inventory costs (as a consequence of the longer distances and lead times). At that time, logistics costs were 12-14%, of course depending on the sector you were looking at. Logistics costs were actually higher in percentage than production cost and that caused a movement to get a better grip on logistics or supply chain as it was called later. There was a lot of low hanging fruits easy to catch, similar to the early days of production efficiency. In subsequent years, the logistics became more professional and similar levels as you had at production sites occurred in logistics. In those years going to European hubs was hot, so you didn't need a warehouse in every country.

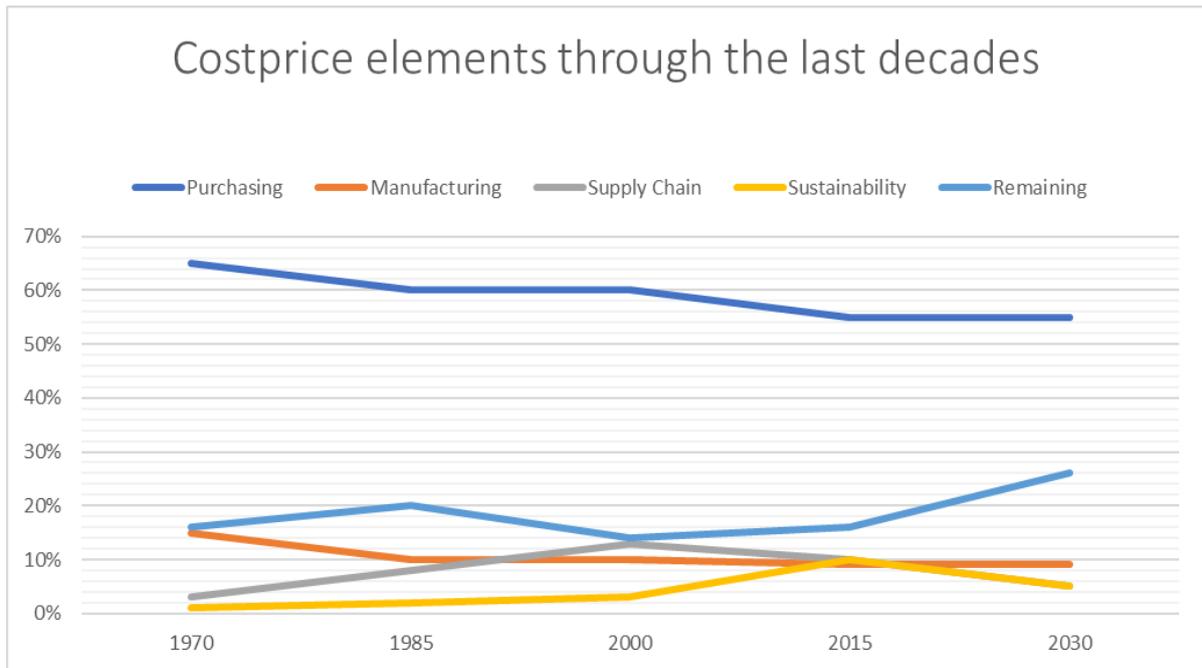
An example to demonstrate how that worked with the different cost price-elements

Let me use a compelling example to explain what happened in those years within logistics. In the 80ties I was working for Philips Small Domestic Appliances, an easy to understand example therefore I take is the Philips vacuum cleaner. This has nothing to do with Philips as such, but a vacuum cleaner is an example everyone understands, and I think it's regarded as is a token for the welfare of the people in those days. I might as well easily grab another product from another manufacturer. With competitors happened something similar of course.

Philips vacuum cleaners were produced in Hoogeveen in the Netherlands in the 80s. Vacuum cleaners began to come increasingly from China and the Eastern countries in those years because the globalisation was already going on. Companies like Philips took over companies in the East, their businesses started initially with Dutch staff but became later more and more real Asian/Chinese operations. At that time, I think by getting commodities from far, to do the assembly also over there, the purchasing and production shares of production could be reduced by at least 10%. At the same time, the logistics costs were increasing. Initially there was little attention for the increase but when the volumes grew and the wages were rising, you saw logistics costs rising as well. Logistics costs were before not really measured, reference models were absent, so in the start these rises were difficult to see.

At the start of the outsourcing the logistical costs were usually around about 12-15%. I would think by outsourcing it was possible to cutting back the logistics costs by roughly about 5% plus the reduction already mentioned of 10% purchasing and production, which meant a decrease of about 15% at the start of the outsourcing, and I think that is still conservative side counted.

In the meantime the standard of living in the Far East was rising, wages overthere went up and the costprices are on level similar to what they would be when production is done here. But the logistics costs are still there. Since there are more people living in the Far East then in Europe the total picture still looks better then if we wouldn't have started the outsourcing and production in the Far East. But the pricedifferences aren't that high anymore as at the start of the outsourcing-wave.

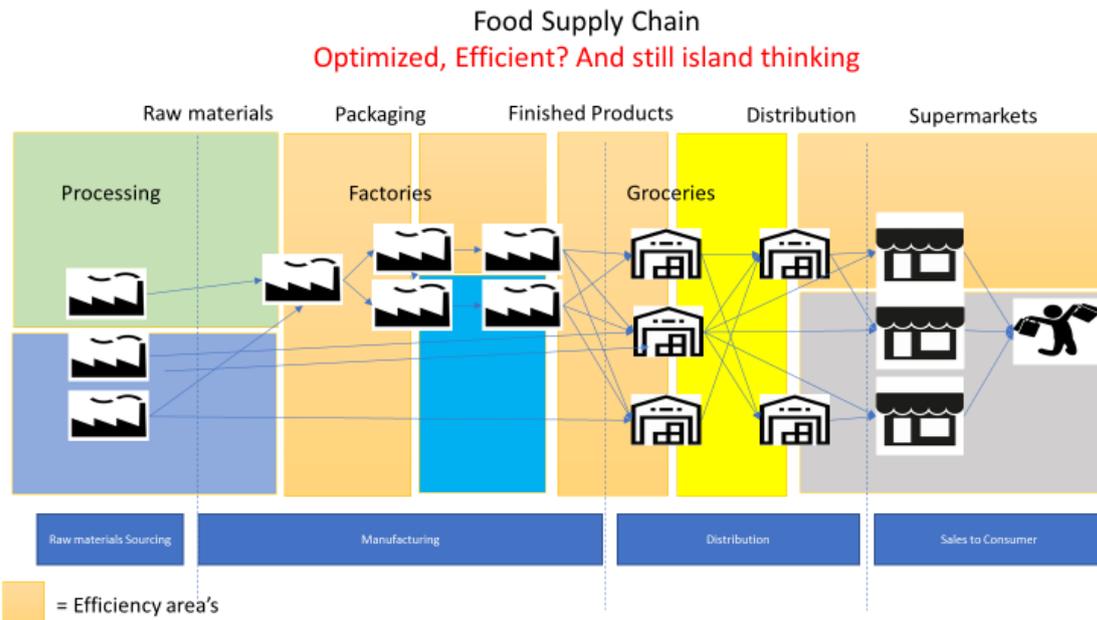


The non-food efficiency improvements were also made in the food. And deforestation continued, energy consumption increased further

Meanwhile you saw the moves, made in the non-food also done in the food. TQM, Lean, Manufacturing Excellence, 5S. All the tools used in non-food also entered into Food. Today we find it normal to put one single crop on a big field, just one farmer with heavy equipment is able to maintain a big plot of land. The crop is exported to all parts of the world. Netherlands is one of biggest exporters of agriculture products, while the country belongs to one of the countries with the highest density of people per km². In reverse a lot of agricultural products is imported to be processed in a factory and then exported again in large quantities. Think of coffee, cocoa and also meat. Living cows are transported from the Netherlands over the Alps to be slaughtered in Italy so Italy can export Parmaham labelled: 'producted in Italy'. All this is done using lot's of energy, creating all kind of by-products and waste

If you look at the Food Supply Chain from a distance: The raw materials are stored in warehouses, processed somewhere in the country by a big food-manufacturer, stored in a warehouse of the producer/processor. The Retailer is very efficient organised as well so the manufacturer has to bring the goods to a freight forwarder, who brings it to the Retail-warehouse and from there the Retailer distributes the goods to a supermarket, where the consumer can pick it up. The new trend is that retailers bring the goods with small van's to the homes of consumers, if possible 24/7. How efficient is that?

So this looks a bit schematic like:



For years we're talking about integrated supply chain but let's be honest: 'ok it has been improved maybe but in reality it's still suboptimized, we're still thinking in islands, not optimizing the whole chain but only partly. I am using the word optimizing and not efficiency because optimizing means also taking into account environmental impact, waste and byproducts etcetera. Transportation grew over the years astronomical.

If you move yourself from home to work over the road for 45minutes and you drive over a 4-6lains highway certainly 2 lains are just filled with trucks going from A to B. Imagine that 30% of them are empty because they had something to be delivered but nothing to load going home. Doesn't cross it into your mind: 'Pffff..... what a mess we made of that Food Supply Chain?'. Well I did!

The vegetable garden model

We need to organize the Food Supply Chain completely different from Electronics for example. I think we need to rethink. Food has to come from near to you, minimal transportation needed. Minimal processing, because processing means energy consumption. We need to produce minimal Greenhouse gasses, spillage and waste shouldn't be produced. Therefore I want to propose the 'vegetable garden model' to rethink the whole supply chain. So start thinking what if I had a vegetable garden and rethink constantly from there. Of course simply having a vegetable garden isn't realistic but what I mean with rethinking model is that you question yourself every time, imagine if am not allowed to transport, or to process etcetera. It's a bit the same as leanthinking. Eliminate the non-added value steps. Only in this 'Vegetable garden model' we should think, don't add unnecessary steps to it, don't produce greenhouse gasses, spillage, byproducts. At least force yourself to minimize them.

First question obviously is what should we grow in the vegetable garden?

- We should avoid Meat and fish in the first place, their CO₂-contribution is tremendous. In this article I don't want to go into much further detail on meat replacers. The point I want to make is that we should eat more vegetables, preferable from near to home. But how do we get 'our' proteins? Beans but also Soja are good alternatives. A lot of real good meat replacers are already on their way now.

- Completely without meat and fish might not work, certainly not at the start, I can see that. We need to make some transition, I guess. Assume we keep meat and fish in our baskets, let's at least try to obtain it closer to home. Fish coming from the Mekong Delta in Vietnam comes to us, frozen in containers, should be really banned. We need to stop the grazing of the ocean, if we want to keep on fishing let us do that at least at much smaller scale, only fishing on the types of fish you are fishing at. So try to eat fish from nearby so the north sea in the case of the Netherlands for instance. Similar accounts for meat as well. The footprint of chicken is much better than for beef for example.

- What do we do with all those factories and retail organizations? Well that huge concentration which is still going on should be stopped. For whom are we doing that? Perhaps there are some exceptions where some scale might be useful, for example Tomatoes or in a factory to process as that in terms of CO₂ amounting perhaps more interesting than to let everyone grow tomatoes separately and processes in their kitchen little machine.

- It is impossible to have a national debate, but I think we should let it happen, there are already many initiatives, tell about it and see how people respond and try listening well to go in a certain direction. We cannot suddenly not use the existing supply chain say goodbye and investment. There must be a break. That begins with the consumer themselves.

Our KPI's

As we started measuring Logistics, there was no real standard, there were different ways of measuring many different KPI's. Today we have a pretty good convention on which KPI's are relevant, they are measured pretty the same way. We all agree how to measure stocks, customer service and forecast accuracy.

KPIs should be measured by a standard method, so we can compare, it easily can count on. Now KPIs are a bit complicated, different etcetera

Regarding the sustainability we see a bit the same. Today it's a bit unclear how we measure the greenhouse gases, there is no standard. We're not very clear how we measure CO₂, CH₄ and N₂O.

So, let's just start at various locations with KPIs and then if there are several in circulation at any given time, they hold together, compare, improve

Vegetable garden

Food should be coming from a source very nearby or at least not too far away. Also, too many translation steps are just not good. For instance if we want to drink milk, it all starts with growing grass, then we need cows to eat and digest the grass, then we put the milk into containers, lorries to bring the milk to the factory, it's processes, packaged, it goes to a DC and then to a supermarket and then we buy, put it in the refrigerator and then finally we drink it. Meat is similar but a bit more complex. It is simply too many steps to obtain the calcium, vitamins etcetera. We talk in the industry about lean, but this isn't really lean. So, let's start really making this lean and in parallel we probably saving on environmental impact, because I am convinced the less we process the food, the less impact this will have on the environment. So, if we are really thinking lean and we are convinced we need milk for instance why aren't we looking how we can derive milk directly from grass. I know these kinds of investigations are done, so it's not new. And of course, we have already milk alternatives like rice milk or almond drinks.

The point I am trying to make is that a lot we take for granted, let's start new again and using the 'vegetable garden model' as the starter.

There is also a lot of food we're using today but don't ask ourselves to do we really need them? Would we miss them if we couldn't get them? As an example, I would call canned pineapple. Pineapple contains basically no more building materials than we can't achieve with our own fruit. Do we want to get this over to Europe? Don't think so, right? We have enough alternatives. Would you miss it, maybe but it might have more value to you if you are in the country of the pineapple that you can really enjoy a pineapple.

What we need besides the 'vegetable garden model' is a list of what we really need. In the Netherlands we have an institute called: 'voedingscentrum'. This a governmental institution which is publishing a lot on healthy food, what you need etc. They also published the 'schijf van vijf' or the pie chart with 5 pieces which contains the basic 5 areas you need every day, but within that pie part you have still a lot of choice to choose from:



De nieuwe schijf van vijf

-  Veel groente en fruit
-  Vooral volkoren, z zoals volkorenbrood en pasta.
-  Minder vlees en meer plantaardig. Varieer met vis, peulvruchten, noten, eieren en vegetarische producten
-  Genoeg zuivel, zoals melk, yoghurt en kaas
-  Een handje ongezoeten noten.
-  Zachte of vloeibare smeer- en bereidingsvetten.
-  Voldoende vocht zoals water, thee en koffie

So, translated into English this means: -

- 1) More fruits and vegetables
- 2) Use wheat available in dark bread- and specific pasta form
- 3) Less meat, more plant based. Use a variety of fish, pulses, nuts, eggs and vegetarian products
- 4) A handful of unsalted nuts
- 5) Soft and fluid fats and oils when you bake/prepare certain food
- 6) Enough water which is in tap water, tea or coffee

Vegetable garden worked out

I hope it is clear that the vegetable garden is a metaphor for growing and retrieve food so close to home as possible. By the way many Dutch could have and would like to maintain their own vegetable garden. That should be especially encouraged. But what in the city for example?

In city we should design buildings otherwise, using a different design, maybe more communal allotments

I think we should build really differently. Certainly, regarding logistics cities have been always difficult. So, if we should really try to avoid transport, it does mean we need allotments nearby. Obviously these don't have to be literal gardens you manage yourself but you can also think of larger gardens where a farmer is managing the daily matters but is supported by the consumers a regiment of volunteers who get in exchange for their labour vegetables, food cheaper. There will also be people who really don't want to maintain a vegetable garden and who are willing to pay. I see a kind of continuum. We will have to design different buildings, to use them otherwise.



Retail certainly the fresh part is an outdated concept

The primary function of Retail is combining food streams, basically being one market for the consumer where he/she can buy everything needed in one single stop. For a long time, Retail was more non-fresh products. Only not so long-ago Food-retail started focusing on Fresh (meat, fish, fruits&vegetable). You would almost forget that but that focus on Fresh meant the end for the local bakery and butcher. 'Fresh' isn't that easy for a Food-Retailer.

Several years ago, I was doing a project in the fresh fish. In Norway and Scotland, you have big fish farms. These farmed fish are put into trucks to Belgium and France to be further processed and then subsequently transported to the Retail-Dc. 'Fresh' fish is on her way minimum 10 days and fresh fish may be sold as fresh fit doesn't exceed the 16days. In other words, the fish you are buying in supermarkets is between 10-16days old, you can't really call that fresh, do you? And all that farming, and transporting is a huge contribution of CO2.

Vegetables and fruits are a similar story. Apples and pears are picked in August to October from the trees, then put in large cooled warehouses to be delivered almost the whole year through. And what about the Kiwi's from Australia or the oranges from Spain.

If we want to reduce the environmental impact, we have to take the Retail out of the chain of fresh foods. We need to use the fish, fruits and vegetables from nearby. Stop with transporting kiwis from Australia, that is really ridiculous. We have to bring back the local butcher, baker and greengrocer again. Do we need really different local shops? Not really but at least we should try to get bread, meat/fish and vegetables from as nearby as possible. So we could still use the supermarket but the products are coming not from a DC but from a local partner.

Summary

I hope I made clear that our Food Supply Chain is outdated, not very lean organised. We need to rethink, I have introduced the 'every one a vegetable garden' model to support the rethinking process. Basically the idea is we should really obtain our food from as nearby as possible. When's not possible we should really ask ourselves do we need those products.