

# Co-dependency between organic and conventional agriculture: transient or long-lasting?

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## Introduction

At the end of a two-day seminar that I attended in Montreal in 2003, the renowned French pedologist and organic specialist of INRA Yvan Gautronneau, as he was discussing fertilization, said: “The problem with organic agriculture is that it cannot exist without conventional agriculture.” I was shocked. However, after devoting most of my professional life to the development of organic agriculture, I knew that he was right in a certain way. This has since triggered my reflection on the multi-faceted and often inconspicuous dependency of organic upon conventional agriculture. I also came to realize that this dependency goes the other way too, because conventional agriculture is also benefiting from the existence of organic agriculture, or at least from the existence of a “green” tendency in agriculture and society.

Some of you may be shocked by the content of this article as I was by Gautronneau’s words. The subject of the co-dependency of organic and conventional is rarely discussed openly or thoroughly, and even less has been written about it. My aim is not to portray organic or conventional agriculture in a negative way, but rather to expose facts. From these, I will propose possible solutions and research avenues that will enable us to maintain the positive sides of this co-dependency while weakening or eliminating the negative sides of it.

As my experience as an agronomist is mostly in the North American context, I will be using examples from plant and animal production in that context throughout the article. A different reflection may arise from other parts of the world.

## **Dependency of organic on conventional agriculture**

The dependency of organic agriculture on conventional agriculture lies mostly in the area of inputs, whether for fertilization, propagating materials or others. It also exists in other areas such as research or the development of new techniques and products.

### ***Fertilization***

#### **Fearing contamination versus recycling organic wastes**

One of the founding principles of organic farming is the recycling of organic wastes. Not only does fertilizing or amending soil with organic wastes respect the cycles of nature, it also is often the most appropriate food for soil life and turns into a valuable input what could be otherwise be considered a waste. For the forefathers of organic, any organic wastes were better than any of the new chemical fertilizers: beet pulp, abattoir wastes, wool wastes, etc. The idea of closing the nutrient cycle and hereby reducing pollution was and is still present in the principles of organic agriculture.

Over the years, the organic standards over the world have nevertheless constantly become more restrictive about the types of organic wastes that can be used. This stems mostly from the fear of contamination of soils and crops by chemicals, heavy metals and so forth. With the growth of organic production, what I call “double O inputs” (organic wastes from a certified organic source) are becoming available. They are still scarce however. The answer of organic farmers has been to reduce their use of conventional organic wastes (grass clippings, cannery wastes, etc.) that are risky and focus on safe ones, often not from agricultural sources (e.g. wood wastes, fishery wastes).

As the organic standards evolve, the dependency on conventional agricultural wastes is fading. At the same time, some conventional farmers also have learned to value these same wastes as cheap sources of fertilizers and amendments for their soils. Nevertheless, it may be worthwhile to look into ways to decontaminate some of these inputs to make them acceptable to the organic sector. Composting is possible to rid organic materials of some contaminants but it may also concentrate other contaminants. Other methods will have to be developed.

#### **Chicken shit farming?**

The case of manure from conventional operations is similar to that of organic wastes, but concerns a much greater number of organic farms. It appears to me as the most important dependency of organic agriculture on inputs derived from conventional farming.

Organic farming was ironically termed “chicken shit farming” in the 80s and 90s in the US, because, typically, one would find many mostly small organic farms within a short distance of large poultry operations, all highly dependent on the surplus manure from these operations as a source of fertility for their crops. North American organic vegetable production is also ironically still very dependent on these conventional sources of poultry manures, but mostly in a dehydrated and bagged form. At a talk he was giving in St. Hyacinthe in the winter of 2003, I asked the manager of Earth Bound Farms (California) how they were able to reduce their cost of production of organic greens from 200% of the cost of conventional to only 25% higher, within a few years? His main explanation was the cheap availability of these conventional poultry manure-based fertilizers.

There is however a constant underlying threat that organic standards might one day prohibit the use of manure from all conventional sources. Starting in Europe, a movement arose in the late 1980s against organic standards allowing the use of manure from “industrial” or “intensive” operations. Animal welfare activists asked: by receiving manure from industrial livestock operations, is organic farming becoming their “trash can” as well as indirectly promoting an industry with questionable livestock rearing practices? The movement was successful. Nowadays, manure from ILOs (intensive livestock operations) is prohibited according to CODEX management guidelines for organic agriculture. Different countries interpret this differently though. In Canada, the Organic standards, published in 2006 by CGSB (Canadian General Standards Board) and amended in 2008, prohibits manure from conventional operations where animals are reared in cages and cannot turn 360° and from operations where animals are kept in the dark. The US still has no constraints of any sort on the sources of manure in their organic standards.

Another concern about importing manure from conventional operations is the presence of antibiotics, heavy metals, GMO feeds, and possibly other contaminants (e.g. used oil utilized in dairy barns as lubricant for manure evacuation systems). Standards do not address these issues directly because to require systematic testing would be very costly and to determine acceptable levels of contaminants is a challenging task, considering that their absence is probably not a realistic objective.

## **Competing for manure and rationalizing manure use**

In an ideal organic world, organic farms would not use manure from conventional operations. However, entirely prohibiting imported manure from conventional operations in organic agriculture would have dramatic consequences for the sector, today. There is simply no organic manure available. Because organic livestock operations often have a land base in proportion to the feed required for their livestock, they do not have extra manure to share with fellow organic farmers, who may also be far away. Manure not from ILOs but from so called extensive livestock operations (conventional) is just as scarce, and often poor in nutrients, making it less interesting to transport long distances compared to dry and nutrient rich poultry manures from large operations. The use of manures from pig or ruminant operations is usually restricted to short distances because it is too costly to transport material at 85% moisture or more.

Even for proximal sources, the game is decidedly changing. While in the 70s and 80s conventional farmers were happy to give away their manure to organic farmers and preferred using chemical fertilizers, the situation is very different now. Conventional livestock producers have learned that manure is a valuable fertilizer, providing not only nutrients but also organic matter. They are more inclined to keep it on their own farms when they have the land base to use it. If not, then conventional farmers also want it. In certain regions, organic farmers are in fact in direct competition with conventional cash crop or vegetable farmers for the importation of manure to their farms, given the rising cost of conventional chemical fertilizers.

## **The elusive closed nutrient cycle**

In a perfect organic world, there would never be a need on a farm to import manure from other operations, whether it be organic or conventional. The ideal of a closed nutrient cycle on the farm is still very strong, especially with biodynamic farming. From my point of view, this ideal is attainable on a dairy farm (or other ruminant-based farms) situated on fertile soils. Forages rich in leguminous plants and a good balance between animal density and

land base permits compensation for the nutrients exported with the milk and animals leaving the farm (Roberts *et al.* 2008). The actual reality of organic farming - and this is especially true with demanding crops like corn and most vegetables - is that this closed cycle is impossible to establish because of high nutrient exports, even from a rich soil. Managing an organic vegetable farm is already very demanding; we cannot also ask vegetable growers to be livestock producers. If vegetable farmers were to depend totally on leguminous cover crops to supply the nitrogen for their cash crops, they would need at least twice the land base they need for the vegetables themselves. Is this a rational use of the land? The answer may vary whether the farm is located close to a major city where agricultural land is very rare or in another location. Another possibility is to trade land with an operation which has legume-rich forage in its rotation, on the condition that this operation is also certified organic.

The solution of using conventional manure and composting it before use is also far from rational from the point of view of nutrient management. When one depends on compost as a nitrogen source, large amounts have to be applied. This leads to a very fast enrichment of phosphorus in the soil, which is not desirable from an agroenvironmental standpoint. If certain contaminants are degraded by composting, others are concentrated. In a compost-based fertilization program, an even higher proportion of the land available should be dedicated to growing legumes.

## **Genetics**

If a decade ago, organic seeds were hardly available anywhere, the use of seeds produced in accordance to organic standards has now become a requirement everywhere. Although exceptions are possible for untreated conventional seeds, the dependency of the organic sector on conventional sources of seeds is thus slowly fading away. Or is it really? The development of new cultivars is still in the vast majority of cases in the hands of conventional breeding programs. Despite stringent standards for seed sources, certain countries continue to allow derogations, even for conventionally treated seeds, in the case of certain crops (GRAIN, 2008)). Although the picture has been changing rapidly in the last few years, the poor quality of some organically produced seeds and the lack of proper seed treatment substances is slowing down organics' move towards independence from conventional seed supplies. For perennial crops such as fruit trees and small fruit plants, there are some suppliers of organic stock. However, organic growers mostly rely on conventional sources. The necessary transition period when using conventional sources of perennials is rarely of great concern for growers, since these plants rarely produce fruit within three years. Unless standards become more stringent in this regard, dependency will likely continue for perennials.

In animal production, most sectors of organic production still need to use conventional stocks to a certain level, especially in a context of rapid growth. Unlike seeds, animals are not as easily shipped over very long distances. The poultry sector is dependent on conventional hatcheries as there are no organic hatcheries yet, in Canada. The choice of poultry and pig breeds well adapted to organic production is especially restricted in a North American context for an operation of medium to large scale. Organic dairy production is in rapid growth in Canada and raising enough replacement cows on an organic farm is not always possible. Again, this may be a transition period for the organic sector. Hopefully, it will be able to "wean" itself from conventional sourcing in the near future.

## **Machinery**

Of course, there is no such thing as "organic" machinery. However, certain pieces of machinery, especially weeding equipment, are most commonly used by organic growers. Organic producers generally benefit from the development of new equipment, whether it is

improved seeders for direct drilling, GPS systems, improved motors on tractors, etc. This is not dependency per se, but more benefiting from development in conventional agriculture in general.

## ***Pesticides***

Because of the general direction of society towards sustainable development, product development is often done with both conventional and organic in mind. Promoters of new pest control products cannot focus only on the organic market but they generally want to access it as it continues to grow. For example, in the development of Spinosad-based insecticides, BASF made sure that they would propose a formulation acceptable to the organic standards. This not only widens the market base for such a molecule but also reinforces the idea that the company is “green”. If a company aims specifically at the organic market, it will most often after a few years turn towards the gardening (domestic) market to sustain its sales. In both cases, the organic farming market is a complement to the main market. Again, organic is not dependent on the conventional sector in this case but rather benefiting from the general “greening” of agriculture.

In Canada, it is not illegal to use a pesticide registered for the domestic market, on a commercial operation. This is how rotenone, a substance that will be banned soon, was available to organic growers for many years in Canada, although in garden-size containers. There is therefore also a certain dependency of organic agriculture on gardening!

## ***Research***

Which percentage of the research and the technological development done in mainstream agriculture is useful to organic agriculture? The vast amount of money devoted to research in genetic engineering obviously does not directly benefit the organic sector. It is much more difficult to answer such a question for other areas of research. In a survey of research projects done in Quebec by various researchers in 2007, very few of the projects relevant to organic agriculture had been directly aimed at organic agriculture (Déziel, 2006).

Research centers devoted to organic agriculture are now numerous especially in Europe and they are developing elsewhere. In Canada, the research network of OACC is a good example. Quebec will soon have an organic farming research center for crop production under the supervision of IRDA (Institut de recherche et développement en agroenvironnement). While such specialized centers are more likely to yield useful results for the organic farms, networking with other research institutions is also important.

## ***By-products and certification***

A dairy farmer friend of mine has for years contemplated the idea of getting his operation certified for organic milk. He has been using organic techniques for over two decades. However, he told me six years ago that he could not live with the fact that culled animals go back to the conventional market: “If the cow that I had to treat with antibiotics is not suitable for the organic market, why would it be good for the conventional one?” His question was an ethical one as, for sure, he knows that the conventional market accepts such animals and consumers are willing to buy products from such an animal. His question raised the larger issue: Can’t the organic system handle the “wastes” it is generating? His wise observation has become an embarrassing reality in the recent past in the United States with the Aurora dairy affair in Colorado. US organic standards completely prohibit the use of antibiotics on

organic animals. A very large organic dairy operation had a sister conventional farm. If a cow could not thrive in the organic environment without recourse to antibiotics, it would simply be transferred to the conventional side. The conclusion is that organic agriculture is dependent on the willingness of the conventional market to accept what becomes decertified. In a theoretical “all-organic” context - we do have some time before such a thing happens - other solutions would have to be found.

## **Dependency of conventional on organic agriculture**

In the case of conventional agriculture, I may more correctly talk about benefits or positive influence than dependency on organic farming.

### ***Certification and traceability***

The development of certification systems for organic agriculture preceded many other types of agrifood certification, with the exception of seed certification, Kosher and some reserved appellations. An expertise has certainly developed in the organic certification sector that can be used by other sectors. In Quebec for example, organic is still the only appellation reserved by the government, although a few are in development. The maintenance of the regulatory system since 2000 has given an opportunity to build an expertise by the CARTV (Conseil des appellations reserves et des termes valorisants) and by certification bodies that applies to other certification systems.

### ***Research and Innovation***

Organic practices remind conventional growers that, even if artificial, farming is an ecological system. The persistent use of rotations, green manuring and cultivation are emphasized by organic farmers, even if some conventional producers have never stopped using these methods. For example, when resistance to pesticides appears, conventional farmers look for alternatives and often find them on organic farms. The fact that the OACC website has many hits from conventional farmers looking for ways to reduce their input costs and to lessen their impact on the environment also supports the idea that the conventional sector is benefiting from expertise developed in the organic sector (Ralph Martin, pers. comm. 2009). It is apparent that research results designed for organic systems have an impact far beyond the adoption by certified and non-certified organic farmers.

Many farmers, whether organic or conventional, are very creative in finding solutions to practical problems. However, because of the absence of availability of very powerful authorized substances to use against insects, diseases and weeds, organic farmers have been especially creative in the area of pest control. Thus, the use of these innovative practices by conventional farmers is not uncommon. For example, the potato beetle collector, developed by the German organic farmer and inventor Walter Kress, was used by some conventional growers when potato beetles had developed resistance to all insecticides in the early 90s.

### ***Co-dependence on arguments***

On one side, the market for organic products developed rapidly after some major scares related to conventional agriculture (Alar in the 80s; BST in the '90s; Terminator gene, etc.). On the other side, organic farming is often conveniently used as a foil by proponents of “progress” in conventional agriculture to put forward their technological solutions. Organic farming is thus challenged by some on its founding principles and generally depicted as not truly sustainable. Without getting into arguments on this long-lasting quarrel, suffice it to say

that it takes two to have an argument. Organic is a handy straw man for conventional and so is conventional for the organic sector.

## Research needs

I would like to propose possible solutions and research avenues that will enable us to maintain the positive sides of the co-dependency between organic and conventional agriculture while weakening or eliminating the negative sides of it.

Dependency of organic agriculture on manure from conventional operations is probably the most challenging of the problems exposed here. Research into production systems not relying on manure needs to continue. Some growers are actually achieving very good results without manure. Most of them rely on leguminous green manures, are located on very good soils, and restrict the proportion of demanding crops in their rotation. We will have to develop systems that can work in more diverse situations.

Research into decontamination of organic wastes that would make them acceptable as inputs for organic farming is also desirable. If composting is often a solution, it is not sufficient in many cases. Other techniques have to be developed based on physical or biological methods ideally.

Dependency of organic agriculture on conventional genetic development and sources is increasingly being dealt with. The tightening of standards worldwide helps in this move. Organic seed supply is increasing although the choice of cultivars is still restricted for many crops. The challenge of producing hybrids for a yet limited market is an important one, especially for zones with climatic limitations. Techniques and inputs for the production of high quality seeds and seed treatment in an organic context have to be developed. In the context of rapid growth and increasing scale of organic operations, the supply of suitable breeds of certified animals remains a challenge in several livestock productions.

As far as machinery and pest control are concerned, organic and conventional agriculture are more in a mutually beneficial relationship rather than a dependent one. This mutual benefit should simply continue, hoping that more and more money will go into developing biological solutions instead of chemical ones.

## Conclusion

When I became interested in organic farming 30 years ago, I was mostly motivated by the idea of producing food without chemicals. For the general public, that is what organic is all about. For people involved in the industry however, we know that it is much more complex, especially with the development and refinement over the years of certification systems and standards. Still somewhere, for many of us, lies a dream of producing clean food in a clean environment and in an almost closed system, relying only on its good design and the bounty of nature. Is this a worthwhile endeavour to pursue? Can we live in a perfectly independent organic world? If we want to influence the future of farming, I think we should rather aim at developing a mutually beneficial relationship with the conventional sector.

## References

Déziel, Marie-Hélène, Julie Ouellet and Nicolas Turgeon. 2006. État de la recherche et du développement en agriculture biologique au Québec. MAPAQ:

[http://www.agrireseau.qc.ca/agriculturebiologique/documents/%c3%89tat%20R-D%20en%20agriculture%20biologique%20Qu%c3%a9bec%20\(2\).pdf](http://www.agrireseau.qc.ca/agriculturebiologique/documents/%c3%89tat%20R-D%20en%20agriculture%20biologique%20Qu%c3%a9bec%20(2).pdf)

GRAIN. 2008. Whose harvest: The Politics of Organic Seed Certification.

<http://www.grain.org/m/?id=167>

Roberts, C. J., Lynch, D. H., Voroney, R. P., Martin, R. C. and Juurlink, S. D. 2008. Nutrient budgets of Ontario organic dairy farms. Can. J. Soil Sci. 88:107 - 114.