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Views and recommendations on 'Organic' Agriculture in Europe

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Since 'organic' production is not a system based on science, it shall inevitably yield worse results in relation to environment, food security and safety, ethics and human health than systems relying on the best scientific knowhow available. Accordingly, 'organic' agriculture is not sustainable production in terms of ecology, societal questions, economy, culture, or ethics.

During the history of humankind, the non-stop conquest of the richest areas of natural ecosystems for cultivation constitutes our most wholesale act in eroding biodiversity in the world. Consequently, we have an ethical obligation to utilize such already conquered areas in an efficient way for securing the necessary supplies of food, feed, fiber and energy for the humankind without going on emptying the remaining few wilderness areas and centers of biodiversity. No land should be cleared for cultivation any more. On the contrary, a considerable proportion of the current area of cultivation should in due time be restored to true natural ecosystems.[6]

Ineffective and low-yielding production constitutes a threat to the remaining wildlife in the earth. Namely, food production alone needs to be at least doubled in the forthcoming decades. That should be done within the limits of current area of cultivation; ergo, the (eco)efficiency in cultivation needs to be enhanced by far. Or else we must still clear large extra areas of nature for cultivation.[5–7,a]

– The yields per hectare of 'organic' crops in Finland reach roughly one half of the yields of conventional crops In Finland, according to official statistics. About the same seems to pertain to Great Britain.[b]

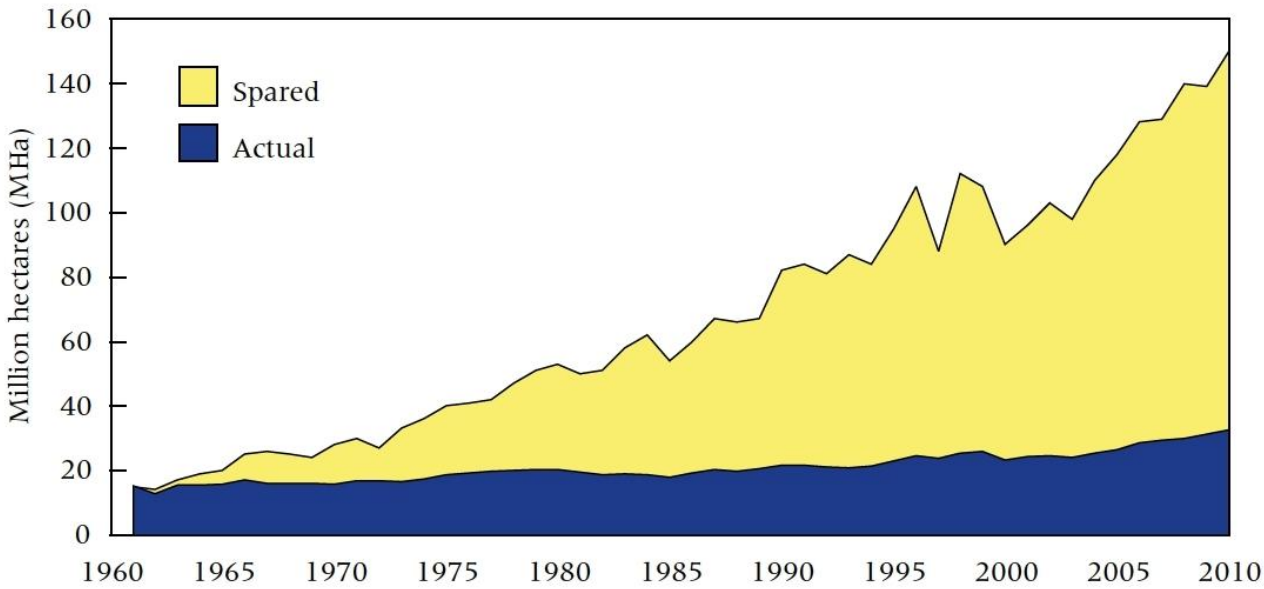

Figure 1. Actual and potential land harvested for maize production, China 1961–2010.
Statistical source: FAO (2012).[19]

– Better varieties and more efficient production methods have saved 120 million hectares of land from being cleared for maize production in China 1960–2011 alone – that is, an acreage representing 3.5-fold the

current maize production area in China was saved. Owing to disease resistant and more productive varieties and improved growth methods introduced during the 'Green Revolution', 65 million hectares of land has been saved from being cleared for wheat production in India in 1961–2010, i.e. 2.3-fold the current wheat production area in India. Whereas in USA, due to advances in scientific know-how, production of maize rose six-fold and its yield per hectare even 7.5-fold in 1930–2010, even if the area used for maize production was *reduced* by 20 %. [19,l]

Many fundamental achievements of modern Life Sciences are being averted or banned in 'organic' agriculture. Such commercial, "well-selling" but scientifically invalid premises turn 'organic' production into wastage of natural resources, with unnecessary losses both in eco-efficiency and food safety & security, and in the production of renewable raw materials and energy for future carbon neutral industries. In addition, 'organic' agriculture would be much more costly to us all than scientifically sustainable production. Consequently, the resources devoted to 'organic' production do not bring such significant environmental benefits as hoped for but shall mainly remain as a risk or waste of investment as regards environmental protection. Multifold more improvements in environmental matters could be achieved by allocating such resources in the sustainable intensification of global agriculture in a scientifically, economically and environmentally solid way.[5,6,a,b]

Quite a few scientifically unproved, "commercial" claims and even curious beliefs strictly contrasting the basics of science are occurring in the practices, legislation and strategies of 'organic' agriculture. Any such undue hindrances should be fully cleared from 'organic' systems, if 'organic' agriculture is to be considered a worthy option in world agricultural production. A few examples are considered below.

1. Synthetic organic chemistry

One of the gravest and most devastating errors in the foundations of 'organic' production is the so called ban of synthetic organic chemistry or the principle that "man-made chemicals should not be used" or that "chemicals obtained from nature are better than the ones made by man" . That leading principle lacks any scientific basis whatsoever but it originates from the ideology of *vitalism* – "old wives tales" that died out of science at the latest with the emergence of biochemistry as a novel discipline in 1840's. However, the ghost of vitalism is still widely wandering among laymen especially in Europe.[4,8,10,a–c]

– In practice that anti-scientific ban may lead to such absurd results as the ever continuing use of an *inorganic* poison, copper sulphate, for controlling fungal diseases in 'organic' viticulture, relying on 'exceptional' permits applied for annually. This heavy metal poison does accumulate in the soil, and it has during decades polluted the wine-producing hillsides e.g. in the 'biodynamic' Switzerland. Whereas in conventional viticulture, such fungal diseases have for long been controlled with harmless (synthetic) organic chemicals rapidly disintegrating in the nature.[8,10]

– Another typical example is *benzoic acid*. That chemical can easily be made in organic chemistry laboratories, and mummies have been using it (with trade name 'Atamon') for decades for preventing mold growth in jams. Consequently, 'organic' potato growers hoped that it would help in controlling potato blast, a devastating fungal disease in their fields. Namely, 'organic' potato production equals grave waste of natural resources in practice, as the fungus is destroying their potato yields in most years, because the compounds accepted for its control are not permitted in 'organic' potato culture. However, the existing and approved benzoic acid is "man-made" and so it did not serve the concept. In consequence, 'organic' benzoic acid should have been obtained from lingonberries(!). Therefore, lingonberry mash was dispersed

on potato leaves for quite some time in a “cutting edge” study in the bygone great research program for ‘organic’ agriculture in Finland. (Final result: this chemical proved not efficient in potato fields).

2. Genetically modified crop varieties

Another grave error hazardous to the environment and human welfare is the prohibition of genetic modification in ’organic’ plant breeding and production. On the contrary, extremely impure and fuzzy old breeding methods, dating back to bygone centuries and based fundamentally on ”trial and error”, are allowed and in use without any restrictions whatsoever. Unaided by this ”ideological” revival the bulk of such relics would have been on their natural way out of wide use in crop breeding. In ’organic’ breeding, even the by far oldest and most primitive genetic modification method can be applied without restraint, i.e. the 75 years old *mutation breeding*.[1] Despite the fact that this method yields chaotic results – impossible to forecast – and hundreds of thousands of unwanted hereditary changes are generated in the genome of the plant per one almost hoped-for mutation.[2,6,b]

On the contrary, the novel methods of precise genetic modification – the advances of 40 recent years of research in biology, biotechnology and genetics – have been denied in ‘organic’ breeding. For example in the current millennium, the Life Sciences have succeeded in developing almost ten extremely precise breeding methods, which can be applied in fine-tuning any one of the plant’s own genes (or its regulatory sequences), in its original location in the chromosome, with one DNA base precision. Thus, for example, one chosen DNA base in the chain of billions of DNA bases in plant’s genome can be changed to another, selected DNA base. This is (hundreds of) thousands-fold more precise, controlled, pure and respectively safer way than can ever be possible by using ’conventional’ breeding methods allowed in ’organic’ breeding.[2,6,7,a,b]

The discrimination of genetic modification in breeding lacks any scientific foundations conceivable. Namely, any advantages and disadvantages provided by a plant variety to human life or the environment depend on the traits bred in the plant and not on the methods used in their breeding (provided that the impurity inherent in the older methods is being disregarded). That central conclusion has been stated again and again during recent decades by major research organizations in Life Sciences around the world in a broad consensus.[1–5,11]

3. Homeopathy and herbs (phytotherapeutic preparations)

Homeopathy and herbs had a preferred position in the former ’organic’ husbandry regulation (EC No. 1804/1999). Scientists are not happy to notice that even in the newer ’organic’ regulation (EC No. 834/2007) gross superstition has retained its prime position over science in regard to the treatment of sick ‘organic’ animals. That is, the use of homeopathy and herbs is not only allowed but it is ordained by the Regulation to constitute the first and preferred choice in their “medication”.

– A quotation: ”chemically synthesised allopathic veterinary medicinal products including antibiotics may be used where necessary and under strict conditions, *when the use of phytotherapeutic, homeopathic and other products is inappropriate*”. Furthermore, the Regulation has the nerve to call proper, science-based medicines “allopathic”, thus even adopting the anti-science terminology of homeopathy in full. True medicines are only allowed if ”appropriate” magically shaken water is not available.

[1] GM legislation in EC does define that also mutation breeding comes under ’genetic modification’. That definition is not at all changed by the “practical” decision that mutation breeding was anyway left out of the *scope* of our GM legislation, owing to the long-time “experience” supposed to have accumulated in relation to its use.[6]

– In the sentence quoted above one word should be amended to alleviate the anti-science premises and the disdain towards science inherent in the ‘organic’ ideology and Regulation. Hence, I propose that the word “when” should be changed for “because”.

Of course the use of homeopathy and herbs should be forbidden in ‘organic’ production altogether – for ethical reasons and aiming at animal and consumer protection. The efficiency of phytotherapeutic treatments is far from acceptable, and it varies wildly ”from zero to deadly” owing to many poorly controlled and hardly known factors. Furthermore, the potential toxic residues from the herbs in the animal products ending up in consumers are poorly known. In conclusion, people should not anymore be misled to make worse choices in regard to environmental, ethical and often also product quality issues.[8–10,a–c]

– Herbal treatments should be banned in ’organic’ production for the conservation of world biodiversity as well, because the collection of medicinal herbs threatens hundreds of endangered plant species with extinction in India alone.[9]

– Until such prohibitions come into effect, the consumers should be provided freedom of choice by imposing a compulsory label on ’organic’ animal products: ”May contain ingredients from animals treated with homeopathy or phytotherapeutics”.

4. Inadequately protected plants and their risks to consumer health

A crop plant being exposed to suffering due to inefficient plant protection (typical of ’organic’ production) may not be as healthful to consumers as a healthy one. E.g. ’organic’ maize grains in Southern Europe may on average contain hundred-fold higher concentrations of injurious mold toxins such as fumonicin than is occurring in genetically modified maize varieties resistant to European corn borer. Fumonicin is known to cause incurable brain, nervous system and spinal cord development damages to human babies during pregnancy. Accordingly, the frequencies of such developmental disorders is tenfold in the “Tortilla zone” developing countries where the diet contains plenty of ‘organic’ maize damaged by moth pests.[6–7,b]

Figure 2. Mold has conquered the core of ‘organic’ apple via the tunnels of a codling moth caterpillar, and it is polluting the apple with patulin toxin. ©J.Tammisola 2006

According to a well-known proverb “Organic apple is to be identified on the basis of its healthy worms”. However, damaged apples often contain too much of mold toxin patulin, and therefore several manufacturers have ceased making apple puree for small babies. In ‘organic’ apple production, owing to its aversion to chemistry, codling moth has been controlled far too one-sidedly with viral sprays. Due to such unsustainable preoccupation, resistances to the control virus are rapidly developing in the moth pests of Europe.[20]

– Plants are known to produce about 200 000 different secondary metabolites. Those are small-sized compounds usually aimed at the self-defence of the plant. When plants are being protected inefficiently against their diseases, pests and predators, as is often the case in ‘organic’ production, the plant must activate its own defence systems to much higher levels than when the farmer has taken care of proper plant protection measures.[b,c,j]

– Every second one of these plants’ own control chemicals cause cancer, mutations, deformations or cell damages – if used in high concentrations in mouse experiments – just as man-made compounds also do, according to toxicological studies. There is one difference, however: the consumer does ingest such plant-made control chemicals in 15 000-fold amounts in comparison with the minor residues of agricultural control compounds ending up on their plate. Such tiny quantities do not harm our health, contrary to the misleading assertions commonly propagated e.g. in ‘organic’ marketing. Namely, the amount of such agricultural residues that an average (American) consumer ingests *in total* during one year has just as much carcinogenic effect as one cup of coffee does.[8]

5. Hygiene

Aversion to science in ‘organic’ systems weakens the safety of their products. Due e.g. to the irrelevant frightening of people with chemistry, the level of hygiene may remain significantly lower in ‘organic’ than other types of production. Such a phenomenon is exemplified in the household use of ”ecological” washing nuts – machine wash by applying such nuts shall leave the laundry decidedly more dirty than similar wash done with pure water alone, as is shown in the studies of the Swedish Consumer Organisation.[g]

When necessary preservatives and food additives are avoided, unnecessary waste of foods increases remarkably. In addition, the consumer may unintentionally ingest half-rotten foodstuffs more often than before.

– As an example of inadequate hygiene, 50 people died and more than 4000 ones got seriously ill in EU in 2011 after eating ’organic’ sprouts contaminated with EHEC bacteria causing bloody diarrhea.[12,b,h]

6. “Close to nature” production and risk of zoonoses

In ’organic’ agriculture animal husbandry tends to be arranged in an ”open interaction” with nature. Such a “close to nature” ideology results in wide-ranging contacts of domestic animals with wild species, diseased wildlife included. Such contacts will, of course, enhance the risks that diseases occurring in the wild are spreading to potentially devastating epidemics in animal husbandry.

– For example, the prevalence of trichinellosis is high among wildlife, especially predators, in Finland. Consequently, ’organic’ pigs reared partially outside the barn in pens may have up to 28 000-fold higher risk of carrying *Trichinella* parasites than conventionally produced pigs – and accordingly also the risks for consumers would grow higher, respectively. Hence, pigs should not be reared outdoors in pens in Finland at all – and there is no environmental justification for that either, because ’organic’ pig husbandry pollutes

our environment fourfold as much as conventional one would do, as is shown by multidisciplinary studies in the Swedish University of Agricultural Sciences.[13,17,b,i]

– 'Organic' poultry (e.g. hens and turkeys) have to be reared in part outdoors, where bird flu has much increased possibilities of passing to the poultry from infected wild birds. Another example is the Classical swine fever, which at the latest caused devastation in Great Britain in 2000. Typically, its epidemic started from pigs reared outdoors along a local tourist route.

However, it is even more worrying that such "romantic" ways of production are greatly enhancing the danger that novel and dangerous zoonoses are being developed by evolution for the torment of mankind. Zoonooses are infections that can be passed from animals to humans. In 2003 the numbers of such infectious human diseases we share with domestic animals were as follows: 65 diseases in common with dogs, 50 with cows, 46 with goats and sheep, 42 with pigs, 35 with horses, and 26 in common with poultry. And novel ones are approaching... [j]

– Pigs reared outdoors started to get ill and their farmers began to die to a brand new virus disease emerging in Asia in the turn of the millennium. On that occasion, its spread to a pandemic could be prevented, owing to the rapid slaughter of all millions of pigs around the center of infection. The virus originated from bats, and pigs received it from fruits partially fed by bats and dropped down under the trees.

– Whereas, the latest news from China are telling that bird flu virus is now developing a new and more dangerous strain (H7N9), which kills an alarmingly high proportion of people catching it. That is no surprise to scientists, because in China and elsewhere in Asia all kinds of multispecies outdoor pens, "grandma's backyards" and bird markets with thousands of living birds are still a commonplace. Sadly, fascination to such a "living tradition" is still quite common among 'organic' enthusiasts as well.

7. Recycling of faeces and slaughter waste into alimentary products

In 'organic' systems, the recycling of slaughter waste and faeces is preferred even for the production of food plants. Though, composting is far from reliable method in the elimination of the toxins and harmful pathogens occurring in such waste materials. Namely, according to various studies, even supposedly finished compost may sometimes contain "too" high quantities of such undesired constituents.

– The epidemic of bloody diarrhea in EC in 2011 was caused by a contamination of sprouts with a particularly aggressive strain of EHEC-coli bacteria. In general, such epidemics are often due to a faecal contamination in the food chain.[14]

– Conditions in different parts of the compost may often vary significantly, and temperatures suited for killing harmful microbes may not occur everywhere. The course of the composting process is also dependent on the constitution of the waste material in question and many other factors. Accordingly, the process proves hard to control reliably even in professional composting, as was noticed e.g. during the years of struggle with the colossal and stinky composting drum introduced for waste treatment in Turku, Finland, a decade ago.[e,f]

– The overstretched ideal of recycling has also compromised human and animal health to the degree that slaughter waste (bone and meat meal) was allowed to be spread in 'organic' pastures even during the worst years of "mad cow" disease.

Thus it might be wise to redirect the recycling of potentially harmful substances from alimentary to e.g. energy production. Nutrients could finally be returned even from there to the benefit of plants, provided their safety can be adequately confirmed.

– E.g. decomposition could often be better solution to waste treatment than composting. [e] Municipal composting plants are currently producing great volumes of compost soil, which cannot find reasonable uses due to its health quality problems.

8. Price and health

The low efficiency and great wastes in the production of 'organic' vegetables and fruits raise their prices 2–6-fold higher than the prices of conventionally produced ones. According to scientific studies, changing conventional vegetables and fruits for 'organic' ones would cause great damages to public health. Namely, the higher is their price, the less vegetables and fruits are being used by the consumers – and that hits especially hard to families of limited means, which can offer much less vegetables and fruits to their children than other population groups even at the current prices.[15,16,b]

In many European countries, the current consumption of fruits and vegetables does not reach anywhere near the level being recommended by WHO – e.g. in Finland and Great Britain their consumption is about one half of the suggested level. That shortage shall unnecessarily increase the frequencies of getting ill or dying from many degenerative diseases such as heart illnesses, cerebral diseases and cancer.[17,b,k]

Furthermore, the soil in Finland does not contain any selenium at all in practice, even if it is an essential nutrient, necessary e.g. for the prevention of the above mentioned degenerative diseases. Consequently, 'organic' plant products raised domestically in Finland do generally not contain any selenium at all. Hence, any increase in their consumption would actually worsen the risks of degenerative diseases, especially as regards 'organic' animals and vegans.[b]

'Organic' regulations, marketing and strategies should not contain misleading claims of the alleged health benefits of 'organic' products. Nor should there be stated any objectives for increasing the share of 'organic' production, particularly not based on tools such as administrative inequality, subsidies paid from common financial resources, or "ideological" campaigns.

Namely, with one 'conventional' euro we gain multifold more health than with one 'organic' euro.

9. Product labels

It has become a predominant practice that when 'organic' products do not sell (due to their low quality or/and high price) those are mixed within conventional products – without any notice for informing the consumers. That is ethically unacceptable.

For enabling the freedom of choice of consumers for ethical and health issues, such hidden 'organic' components should always be described in product labels, provided that the product contains 'organic' materials in a higher concentration than, say, 0.9 per cent of the ingredient in question (somewhat higher threshold values could perhaps be considered).

In order to make true control of label information possible, compulsory and functioning tracing and surveillance systems through the whole production chain from the fields to store shelves should be imposed on 'organic' products.

– Reliable tracing and surveillance of 'organic' products would be important for public health as well. Due to the specific disease and quality risks connected with the 'organic' way of production, the authorities should be able of finding out the causes of serious epidemics and recall dangerous products from the markets far more efficiently and rapidly than is currently possible. Inadequacies in the system may mean scores of unnecessary deaths, as we learned from the bloody diarrhea disaster in EC in 2011 – its cause ('organic' sprout seeds) could finally be only resolved with the help of certain "fortunate" coincidences.[12,h]

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