



Agriculture, Health, Environment

Interview with **Piero Bevilacqua**

by **Idamaria Fusco**

Piero Bevilacqua is a professor of contemporary history at “La Sapienza” University of Rome. He has also taught economic history, social history, history of southern Italy, and history of the Risorgimento at the Universities of Salerno, Bari and Rome. As a historian, he is well known for having founded, with other scholars, the Istituto Meridionale di Storia e Scienze Sociali (IMES) and the journal *Meridiana* in 1986.

A scholar with manifold interests, he has taken part in many national and international conferences and written numerous books and essays. He has a special interest in the history of Southern Italy, and in particular that of Calabria, the region where he was born. This interest is reflected in his books *Le campagne del Mezzogiorno tra fascismo e dopoguerra: il caso della Calabria* (Einaudi, Turin, 1980), *La Calabria* (edited with A. Placanica, in *Storia d'Italia: le regioni dall'Unità a oggi*, Einaudi, Turin, 1985) and *Breve storia dell'Italia meridionale* (Donzelli, Rome, 1993, 1997, 2005). This interest in southern Italian history has often gone hand in hand with an interest in the history of agriculture and landscape, which is especially to the fore in his edited books *Le bonifiche in Italia dal Settecento a oggi* (coedited with M. Rossi-Doria, Laterza, Rome-Bari, 1984) and *Storia dell'agricoltura italiana in età contemporanea* (Marsilio, Venice, 1989-1991, 3 vols.).

His research interests also include the history of migration, which he explores in his essay “Emigrazione transoceanica e mutamenti dell’alimentazione contadina calabrese tra Otto e Novecento”, in *Quaderni storici*, 1981, n. 47, pp. 520-555, and in his book *Storia dell’emigrazione italiana. Arrivi. Partenze* (coedited with A. De Clemente and E. Franzina, Donzelli, Rome, 2001-2002). More recently, he has been working with great passion and energy on the history of resources and environment, on which subject he has published some important books, including *Tra natura e storia. Ambiente, economie, risorse in Italia* (Donzelli, Rome, 1996, 2000), *Venezia e le acque. Una metafora planetaria* (Donzelli, Rome, 1995, 1998, 2000), *L’utilità della storia* (Donzelli, Rome, 1997, 2000, 2007), *Demetra e Clio. Uomini e ambiente nella storia* (Donzelli, Rome, 2001), *La mucca è savia. Ragioni storiche della crisi alimentare europea* (Donzelli, Rome, 2002), *Prometeo e l’Aquila. Dialogo sul dono del fuoco e i suoi dilemmi* (Donzelli, Rome, 2005), *La terra è finita. Breve storia dell’ambiente* (Laterza, Rome-Bari, 2006, 2008) and *Miseria dello sviluppo* (Laterza, Rome-Bari, 2008).

His latest works – *Il grande saccheggio. L’età del capitalismo distruttivo*, Laterza, Rome-Bari, 2011, and *Elogio della radicalità*, Laterza, Rome-Bari, 2012 – assess the disastrous impact of human beings on the environment at planetary level and contain some profound reflections on society and democracy. These studies focus especially on extreme capitalism and its effects on people and their environment, its destruction of social structures, democracy and the very meaning of human life.¹

The theme of the environment is thus prominent in Bevilacqua’s writings. This theme has undoubtedly become fashionable today. It is discussed at various levels and in various milieus, sometimes in calm and reassuring tones, but more often in agitated and alarmed ones. Health is of course a priority for all living beings, the basis of their innate survival instinct. And today our health, like that of the whole planet, is placed in serious jeopardy by the deterioration of the environment in which we live. Improper use – actually, a true “abuse” – of our farmland has contributed significantly to this

¹ Some of the above references were taken from <http://w3.uniroma1.it/dsmc/index.php?q=node/41> and <http://www.globalenvironment.it/bevilacqua.html>.

deterioration. Agriculture, health and the environment are thus an inextricable triad, a long-period study of which could help to shed light on many of the problems plaguing modern society.

The interview was done in June 2010. Today we are facing a situation of major environmental deterioration posing serious threats to our health. We are advised to eat fruit and vegetables, but we know that agriculture no longer supplies the “natural” products our organism needs. As you clearly state in your book *La terra è finita. Breve storia dell’ambiente*,² today we are faced with “one of the most serious paradoxes of our time: agriculture and animal husbandry, that is, the sector that provides our food, have become one of the most polluted and polluting sectors in the world economy”.

The present deterioration of world agriculture, and of the environment along with it, is a process whose roots go a long way back. In what measure can a historical perspective help us to understand this deterioration and offer possible solutions to remedy it?

I think that a historical perspective can indeed outline possible paths for change in agricultural management, because agriculture, especially over the last few decades, has been forced in an industrial direction to such a degree as to even obliterate twentieth-century agronomic science. I will give an example. An agricultural discovery made thousands of years ago is rotation. Cultivation is shifted from one plot to the other so as to not always exploit the same portion of the land of a farm. Besides preventing soil depletion, this very ancient technique - it was already known to the Romans! - also had another function, namely, that of fighting plant parasites. When the same plant species is repeatedly grown on the same plot of land, that plant will be inexorably attacked by its specific parasites - because every plant has its own parasites. If, instead, a different crop is sown in that same plot, the parasites, which in the meantime have set themselves up to attack the plant originally grown there, are thwart-

² Cit., p. 75.

ed, because the plant they now find is one they do not feed on. This is how farmers have kept plant parasites at bay for centuries.

Today industrial farms, since they use land as a mere physical medium, and thus behave as industrial businesses rather than agricultural ones – that is, as economic enterprises dealing with nature, chemistry and soil biology – adopt a different strategy. To prevent the parasites present in the soil where every year wheat or corn or soya or some other crop is grown from inexorably attacking those plants, the farmers preliminarily spray the soil with pesticides. And thus, of course, the plants are not attacked. But these pesticides eventually breed resistance, new resistant species of insects arise, so it becomes necessary to introduce new, increasingly powerful pesticides, and so on.

These pesticides poison the soil and contribute to mineralizing it, along with chemical fertilizers. The soil thus becomes inert. It becomes more and more a merely physical medium, which can nourish the plants only through the injection of mineral salts. These pesticides pollute underground water and the environment. They also undermine farmers' health. This is something we often forget about, but there is a significant occurrence of cancer among farmers, although unfortunately no “professional” statistics exist. At least as far as I know.

So we should bring back rotation. Today there is a mercantile logic in contemporary capitalist economy that clashes with nature and its rules. Agriculture does not produce automobile components, but food for social beings, humans, who also have the “shortcoming” of being natural beings as well: that is, they eat, get sick, and die. Therefore they need to draw from the earth products that are something different from automobile components, or furniture, handheld mixers, etc.

In this case, our past can be of use to us. And it is not an “old wives” past, a past of superstition. It is, in part, a scientific past. Rotation has also been studied scientifically by twentieth-century agronomists, who inherited it from farming lore, improved on it, and turned it into a science. Today all past science is shut out because we are in a hurry to cultivate the same plot over and over. We no longer practice rotation and we disregard rules that are the fruit of an ancient knowledge accumulated over the centuries. Besides, today even a traditional farmer will tell you that without chemical treatment you cannot draw

anything from the soil, because the fruit will be attacked by parasites. Which is partly true, but then how did past farmers, who certainly did not have pesticides, manage for centuries to produce fruit and feed humanity, this brutalized humanity that has survived down to our day?

Because of all of this, today the environment is at serious jeopardy. Once there was a biodiversity on farms that was not altered by chemical agents. Farms had hedges teeming with predatory insects feeding on “bad” insects, the phytophagous ones, that is, those that attack plants. And then there were more birds, etc. Nowadays our farms’ environment has become artificial. It is an environment whose natural balance has been upset.

Do you think that all this is irreversible?

By no means. I cultivate my plot in Baschi⁴ without chemical agents. Yesterday I gathered with my own hand a basket of cherries grown without any chemical treatment. On a more serious note, biological and biodynamic farming today bears witness, in Italy and the world, to the fact that industrial agriculture is not irreversible.

I would like to say something polemical: in one of the many interviews he has given, Umberto Veronesi, a great oncologist who encourages people to eat fruit and vegetables, was asked if it makes any difference to eat biological fruit or standard commercial fruit. Professor Veronesi – who is a great physician, but has a penchant for making authoritative statements about things he knows nothing about – affirmed that it is the same thing, that choosing one or the other is only a matter of taste. For our readers to understand just how false this statement is, I will give a fairly simple example. We are all familiar with apples, ever since the time of Adam. Well, apples are coveted by an implacable bug called the codling moth (*Cydia pomonella*). This terrible insect – which is very small, only about half the size of a regular fly – has the annoying habit of depositing its larva in an apple, which the larva penetrates quite quickly to feed on the seeds inside. If you cut open an apple infested by the

⁴ A town in the province of Terni (Umbria, Italy).

insect, you will see the typical tunnel dug by the codling moth maggot. Biological agriculture employs biological methods to fight this unwanted guest. One of these is mating disruption by pheromone release, as a result of which the male of the codling moth fails to fertilize the female and the eggs are hence barren. Another is spreading the granulosus virus, which is harmless to all other insects and does not even kill the codling moth itself, but just its larva. That is the method I use for the six apple trees in my plot. My apples are thus biological. Industrial apples, instead, may undergo over ten phytopharmaceutic treatments⁵ in a single season. So how can one even think of equating industrial apples with biological ones? The former are treated with pesticides, the latter are not. How can one say that this is a simple matter of taste? This is disinformation, and serious disinformation because it comes from a scientist, and furthermore one who is a physician, an oncologist.

In the past, agriculture was based on a sort of virtuous cycle, where the waste of agricultural production, animal husbandry, and even town life was reused in the agrarian cycle. The break of the virtuous cycle of agriculture, especially in Western countries, although it has contributed significantly to the present agricultural and environmental deterioration, has been regarded as a necessary evil imposed by the late-nineteenth-century demographic revolution and the consequent need to improve the productivity of the soil – a result obtained, in the long period, mainly by the use of chemical fertilizers – to feed a growing population.

Do you think this kind of view can be regarded as valid? If so, how can we explain the widespread practice of destroying agricultural produce only as a means to get prices to hike up? To what degree have the economic interests of an extreme capitalism intent only on guaranteeing the profits of the few played a role in the break of the agrarian cycle?

Your question already contains its answer, and I agree with it. Ag-

⁵ Treatments with phytopharmaca, which are substances used to cure plants.

riculture has behaved like just any other branch of capitalist production. It has been driven, not so much by an intent to satisfy a need, as much as by an economic interest in meeting a demand, the demand for food, and in doing so it has gone far beyond real needs.

At one point the use of chemical fertilizing became a source of profit, as well as providing actual advantages. Chemical fertilizing has allowed, among other things, the specialization and separation of animal husbandry and agriculture. In the past, animals were necessary for agriculture, because they supplied manure, organic fertilizer. Today farmers go to the local farmers' service center, buy a bag of chemical fertilizer, spread it without much toil, and thus actually increase their agricultural production. But in doing so they forget all the negative and often yet unknown side-effects of this way of fertilizing.

In the past there was a virtuous cycle in agriculture whereby it sought within itself the means to fertilize, produce and regenerate the soil. Today, with chemical fertilizing, this virtuous cycle has been abandoned. Chemical fertilizing involves the overexploitation of mines at the four corners of the earth to obtain phosphates, potassium and petroleum – this last being needed to synthetically produce nitrogen. All these elements are indispensable to produce chemical fertilizers. Of course, to do so Western agriculture has relied, as it still does today, on the plundering of many former colonial areas. So a neo-colonial relationship lurks behind the productive triumph of the West.

But there is another aspect that has recently come to the fore. The “Green Revolution” – a technical breakthrough that came about between the 1960s and 1980s, based on so-called “improved seeds” as well as chemical fertilizers, herbicides etc., as well as the use of a great quantity of water – has increased the yield of cereal agriculture by 250 per cent; which is indeed an extraordinary result! Today, however, experts are able to measure how much energy has been inputted in Green Revolution agriculture in the same period. And do you know what the increase is? 5000 per cent!⁶ And it is all energy used for the fertilizers, because we need petroleum to make nitrogen and process

⁶ D.A. Pfeiffer, *Eating fossil fuels. Oil, food and the coming crisis in agriculture*, New Society Publishers, Gabriola Island (Canada) 2006, p. 7.

potassium, phosphorus, etc. Petroleum and the electric energy derived from it are required even to supply water, as this needs to be extracted and pumped to the production sites. If the price of petroleum goes up, as it will, this kind of agriculture will be at dramatic risk.

Compared with this agriculture, the agriculture of the past displays an extraordinary technological wisdom. Our ancestors practiced agriculture without fossil energy inputs and managed to keep up the fertility of the soil for thousands of years. This is amazing, because agriculture is a highly unnatural operation, insofar as it forces the soil to produce continuously. This does not occur in nature. While weeds do grow incessantly, uncultivated land does not yield a crop every year. It is we who force the land to annually provide a crop for our needs. In this regard, the human beings and farmers of the past have shown great ingenuity, allowing humanity to survive and grow. Whereas today our technocrats are draining the planet to increase production, extracting from its bowels the energy accumulated over millions of years.

There is something else that is absurd in all this. It is that this agriculture – whose aim, as we have seen, is profit rather than meeting people's needs – dumps food onto rich societies in such excess that it has been calculated that in Western countries, including Italy, at least 60 per cent of food ends up in the garbage untouched. This unused mass of food also pollutes the land because it ends up in landfills, and these landfills occupy space that could be used for agriculture instead. If there existed a minimum of household waste sorting, this food could be transformed into compost, organic fertilizer, which would end up in agriculture without energy loss. It would go back to the earth, as was the case in the past. This is something that can be actually done, and to a certain degree it is. But for waste sorting to grow and become widespread, a specific effort by our political authorities is called for. Although, as we know too well, today politics is at the zero degree of human creativity, especially in Italy.

So today the most serious problems of agriculture depend on the break of the natural balance, of the virtuous cycle that existed within agriculture itself. As you observe in your book *La terra è finita. Breve storia dell'ambiente*,⁷

the interruption of this virtuous cycle in European agriculture began in the first half of the nineteenth century, when an attempt was made to use a different fertilizer than that derived from the natural farming cycle or the waste of nearby cities, a fertilizer brought over from another continent, namely, Peruvian guano.

What gives us most food for thought, in my opinion, is that, aside from the undeniable agricultural and environmental problems we are facing today, this break in the agricultural cycle has been partly made possible by the extremely serious break of other, more far-reaching balances. More specifically, this break could not have been possible without the ruthless exploitation of the resources of developing countries by rich countries. You yourself in your previous answer have qualified the relationship between the West and former colonial area as “neo-colonial”.

These considerations bring to my mind what is still happening today, when the West enthusiastically promotes campaigns – undoubtedly commendable ones – to save the Amazon forest, while forgetting that the solution to our agricultural and environmental problems cannot be sought only by interventions abroad, but also, and above all, requires personal sacrifice. What I wonder is whether all this is once again an effect of our extreme and selfish Western capitalism, which is unwilling to give up anything it has, even if this goes to the detriment of weaker countries and their sustainable development? Is it really reasonable to believe in a sustainable development in the West without worldwide sustainable development? In sum, I would like to know what you think of the de facto imbalance between Western countries and developing countries.

The reason for this imbalance is that the West is asking these countries to conform with its own development model. The Green Revolution we were discussing before is not just a “technological package” containing a water pump, chemical fertilizer, a weed killer, and improved seeds. That would hardly be sufficient. The Green Revolution also needs vast cultivated surfaces, that is, a large-scale organization and mechanization of agriculture. This means, once again, the destruction of smallholding

⁷ Cit., pp. 37 ff.

and the suppression of agricultural biodiversity and the typical mixed agriculture of farming families. A farming family has trees, grain and animals, all that it needs to survive. If it produces a small extra, it can sell it on the market. The Western model today is completely different: it is not based on small farms, but on very large ones that are increasingly market-oriented. And this model is causing terrible damage to the agricultures of the South of our planet. I could go into some technical details. For example, the elimination of trees in tropical zones results in strong exposure of the ground to the tropical sun. The soil thus quickly becomes barren, as these are areas where the vegetable cover and humidity play a major role in preserving soil fertility. In sum, we have a fragile habitat that nature has built over thousands of years and an agricultural wisdom developed by local farmers over the centuries, and Western technicians are now disrupting both following a technocratic master plan drawn up in Washington. Today this appears as absurd violence.

I should add that our eating models, which are culturally imposed by Capital's advertising machine – let us start to use this Marxian term, “Capital” – entail a huge consumption of meat; and it is to produce meat that forests are chopped down. That is why they are destroying the Amazon forest, to clear land for the vast *ranches* of livestock owners, where the animals are amassed. The meat of these animals sells well, both in the United States and Europe, to keep up our immoderate consumption. This is an issue – on which you have rightly dwelled in your question – that we, the citizens of rich countries, could do much to address, even as conscious consumers, by actions such as decreasing our meat consumption. But this would require a political class that did not merely pander to their electors by chasing outdated cultural models based on mass consumption.

To return to poor countries, once they have been put on the international market, once, for example, their micro farming businesses have been merged and transformed into large mechanized industrial ones, then the work force employed in agriculture decreases and a great mass of former farmers throng to the shanty towns of the megalopolises of the South.

Besides, when the prices of the farming produce the new industrial farmers of the South of the planet sell to the West go down

– and for years they have indeed been dropping dramatically! We have only to think of coffee, cane sugar, etc. – these farmers attack the forest. Having become market-oriented, to survive they sell the prized lumber of their forests. This is what happened, for example, in Bangladesh and many other countries. And then, of course, by effect of deforestation they suffer from ruinous floods. One of the areas most heavily threatened by global warming are the Indian foothills of the Himalayas, because the glaciers there are melting and the rivers are drying up, so that eventually there will be a scarcity of water for irrigation. And, if there is a lack of water, this will happen because there has been uncontrolled deforestation in that area.

Let us return to the West, and especially to Europe. Today European countries are making a joint effort to place limitations on excessive food production and the non-sustainable exploitation of farmland it is based on, most notably through the implementing of CAP (Common Agricultural Policy).⁸ To set limitations and create a liaison committee at the European level could be a good way – although not the only, and possibly not even the main one – to address current agricultural and environmental issues. You have dealt with this subject in your writings.⁹ What is your opinion about CAP? For example, can the use of incentives to discourage farmers from using the land intensively and indiscriminately contribute to improve agriculture and the environment?

Although with many contradictions, CAP has indeed been useful, because it has helped to contain hyperproductivity, especially through its “set-aside” programs.¹⁰

In an episode of *Annozero*,¹¹ milk quotas were discussed. One of

⁸ For further information about CAP and its developments in these last years, see the website of the European Union (http://europa.eu/pol/agr/index_en.htm).

⁹ See, for example, Bevilacqua, *La mucca è savia* cit., pp. 124 ff.

¹⁰ Programs offering incentives to discourage the cultivation of a certain quota of productive land.

¹¹ A television show hosted by Michele Santoro, broadcast by the Italian public channel RAI 2 from autumn 2006 to summer 2011.

the invited experts, who was not known to the general public – kudos to the conductor for not inviting one of the usual talk show regulars – proved to have a short memory. He argued that the whole problem with milk quotas – how complicated it was to determine them, the low price of milk, breeders’ revolts, etc. – was due to the absence of a free market. He was obviously forgetting that, before CAP, we did indeed have a free market, and had it not been for CAP who knows where European agriculture would have ended up! Before the “set-asides” came into force, in the storerooms of Bruxelles, where private producers brought their goods, millions of liters of fresh milk and millions of tons of powdered milk, grain, meat, etc. were amassed due to excesses in production. So encouragement of and support to the reduction of cultivation, especially in marginal areas, became necessary in order to avoid overproduction and overexploitation of the land. Of course, CAP has only gone half of the way; first of all, because even the large farming companies get money, while we should be more selective. (We have learned that even the queen of England receives money from CAP, which is frankly ridiculous!) We should also have a more active policy, for example, actions in support of traditional agriculture, biodiversity, and landscape conservation. Europe does have some adequate legislation, such as the Agenda 21,¹² but the processes are still slow and contradictory.

Furthermore, we should think of Europe and its agricultural policy as a battlefield, because within the European continent there are also lobbies pressing for the introduction of GMOs¹³ as well as subjects concerned about landscape, food quality, environment, etc. European common agricultural policy is hence contradictory, because it reflects different inspirations within the continent, different political orientations, different cultures, and different levels of awareness. Nevertheless, there is indeed a drive towards quality, since there is a

¹² Plans for the programming of coordinated actions in favor of the sustainable development of an area, in a perspective taking account of global, national and local needs and issues.

¹³ A GMO (genetically modified organism) is a living being whose genetic material has been altered using genetic engineering techniques.

growing awareness that many European countries, and that includes Italy, cannot compete on quantity. A country like Italy can conserve its agriculture – and hence its landscape – if it practices a typical agriculture, rich in biodiversity, that others are not able to practice. An agriculture bound to the country's specific terrains, climates and habitats, to its traditions, including culinary ones, and so on. This is our wealth, this is our path.

Staying with the subject, as regards Europe,¹⁴ it seems to me that the wealth of the countries it is made up of lies precisely in their diversity, in their different identities, and that these different identities are also based on typical forms of farming production that have developed through centuries-old (agri)cultural practices. So, could promoting local agricultural peculiarities, traditional farming practices, in a word, Europe's rich agricultural biodiversity, also contribute to promoting landscape diversity and the distinctive historical and cultural identities of the peoples of Europe, avoiding homologation and teaching everybody to respect differences? In other words, could the battle in favor of traditional agriculture and biodiversity translate into a cultural battle to recover the historical and identity resources of the countries involved and against capitalist-imposed massification? Finally, what do you think is the role that Europe has had so far and could have in the future in this battle?

This is a well formulated question. I cannot but adhere to the logic and philosophy informing it. Europe is a blessed continent as regards its natural habitat, which has also been modified in felicitous ways. Just think of the great advantage of having alternating seasons – they do not at the Tropics! – and hence the benefit of winter killing the insects. This helps us to limit the use of chemical fertilizers. Also consider the fact that this land has regular rivers, and no monsoons but rainfall distributed throughout the year. So Europe has a number of natural advantages that are also agricultural, economic,

¹⁴ Bevilacqua, *La mucca è savia* cit., p. 142 ff.

and environmental advantages. In India, when the monsoons come, they certainly bring water, but they can also bring destruction; or sometimes the rains do not arrive and you get a drought instead. Our situation is much more propitious.

The European landscape is also the result of centuries of human work, which is why we have such an extraordinary variety of landscapes. I have talked about this in my opening essay in *Storia dell'agricoltura italiana in età contemporanea*.¹⁵ And they are very diverse and beautiful landscapes. Some extend along roads, others surround woods. In Germany for example – although few people realize it – there is a remarkable variety of landscapes, as there is in France and in Great Britain. I discovered the latter country some years ago and was left spellbound by the diversity of its green fields. This is an invaluable heritage because it is the fruit not just of the nature of our continent, but of its history, of its individual national histories. In the north of England, for example, the countryside is crossed for miles by Hadrian's Wall,¹⁶ an imposing construction, and just about everywhere there are Gothic cathedrals, picturesque villages set in verdant spaces, etc. This reality cannot be reproduced by any economic activity, by any industry. Only those crazy Americans can think of building a fictitious Venice in Las Vegas! I have visited the Paul Getty Museum in the United States, near Los Angeles, which was housed at the time – it has been moved elsewhere since – in a full-size replica of an ancient Roman villa in Herculaneum. But Herculaneum is under the ash of Vesuvius, out of which it was dug with its scars and its heritage of art and death. There can be no other Herculaneums.

So this is an immense heritage that should not go wasted. Today we are being flooded – this is something I repeat ad nauseam – by a sea of commodities. How many times have you opened your wardrobe and noticed some item of clothing you have never worn?

¹⁵ Id., “Tra Europa e Mediterraneo. L'organizzazione degli spazi e i sistemi agrari nell'Italia contemporanea”, in *Storia dell'agricoltura italiana in età contemporanea*, vol. I, *Spazi e paesaggi*, P. Bevilacqua (ed.), Marsilio, Venezia 1989.

¹⁶ Hadrian's Wall, designated by UNESCO as cultural heritage of humanity, is a stone fortification built by the Roman emperor Hadrian in the second century AD.

India, China, Brazil and other countries still, whose productivity is growing, will flood our markets with their products and the value of commodities will keep going down. This is an uncontrollable trend: when the scarcity effect is no longer there, everything loses value. Water once had no value because it was abundant and largely unutilized; there was no scarcity of water. In the future what will be in scarce supply is beauty, unpolluted cities, silence, healthy food, landscape: that is where the value of commodities in our society will shift. These are priceless “commodities”, whose value is destined to increase in a society that produces too many cheap goods.

Returning to more strictly “agricultural” themes, we know that achieving the right balance between agriculture and the environment also has an immediate effect on our health. You have repeatedly argued that the most serious damage to the environment, and hence to our health, is caused by the indiscriminate use of chemical fertilizers to increase agricultural production. At the same time, you admit that these fertilizers have remarkably increased land productivity, especially since World War II, allowing Europe to achieve food self-sufficiency.¹⁷

We well know the tremendous damage these fertilizers can inflict on our health through the food we eat and the water we drink. Still, do you think this enormous growth of agricultural production could still have been achieved without the use of these fertilizers? You are a staunch advocate of biodynamics and biological agriculture.¹⁸ Do you really believe that this growth of agricultural production would have still come about if biological and biodynamic methods had been employed instead of chemical fertilizers?

¹⁷ Bevilacqua, *La mucca è savia* cit., pp. 69 ff.

¹⁸ The website of the European Community defines biological agriculture as follows: “organic farming is an agricultural system that seeks to provide you, the consumer, with fresh, tasty and authentic food while respecting natural life-cycle systems.” It is based on “a number of objectives and principles, as well as common practices designed to minimise the human impact on the environment, while ensuring the agricultural system operates as naturally as possible” (http://ec.europa.eu/agriculture/organic/organic-farming/what-organic_en).

As to biodynamic agriculture, it is inspired by the thought of Rudolf Steiner, an Austrian philosopher, exoterist and pedagogue who lived between the nine-

I would venture to say that the output achieved with chemical production would not have been equaled, but we would nevertheless have produced enough food for everybody, wasting less and producing less waste, and keeping society, the countryside, and people's lives healthier. All this would have been possible. Although we are moving in the field of hypothesis, I feel entitled to say that mine is not a rash statement. Some historical comparisons between different cultivation methods made on some European farms, in Germany for example, support my conviction. On some laboratory farms, the same plants were grown with the biodynamic method, with traditional methods, and with chemical farming methods. The differences between the respective yields were minimum. In the long period, biodynamic farming sometimes achieves better results than traditional farming. Biodynamic agriculture is an agriculture that produces in sufficient quantities, reduces environmental impact, and banishes pesticides. It is also more cost-effective, as by not using chemical agents it requires less external outputs, which cuts down costs.

Of course, "agriculture" is a bit too generic a term, because not all crops are the same. In biodynamic and biological agriculture, more work is required to produce some crops than in industrial agriculture, because the latter widely employs mechanical equipment, herbicides etc., which allow it to save on labor costs. However, mechanical equipment is also used in biodynamic and biological agriculture, although less intensively.

But there is another aspect worth mentioning: I think that in the future, as far as work is concerned, biological and biodynamic agriculture will become increasingly important, because there will be less and less work in our societies. This is a time when the automation of work is destined to accelerate. As we know, every two year the speed of computers doubles. As a Silicon Valley engineer, Martin Ford, recently stated, in the next few years in the United States

teenth and twentieth centuries. Biodynamics has been applied all over the world from 1924 onward. "Biodynamic farmers strive to create a diversified, balanced farm ecosystem...[they] also recognize and strive to work in cooperation with the subtle influences of the wider cosmos on soil, plant and animal health (<https://www.biodynamics.com/biodynamics.html>).

everything that can be automated will be.¹⁹ So many jobs will disappear. Now, we must by no means forget that Capital will still need to sell somebody the commodities it produces with an increasingly small human labor input, otherwise it will collapse. It will therefore become necessary to provide an income to citizens whose job has been swallowed up by automation. And citizens may actually find some enjoyment in gathering biological strawberries and cherries! Of course, today we are only talking of a prospective future, but it is one that is not so far removed in time. Today future comes fast.

Even in less developed countries with abundant labor, biological and biodynamic agriculture could become an important sector.

Exactly. Tractors in traditional agricultures can be a curse. Just think of what many American technicians engaged in transplanting the Green Revolution in the South of the planet did. They brought tractors to villages where there were more workers than work, or only women who did not know what to do with those huge machines.

Turning to a theme that is close to the heart of those who study agriculture, what is most striking about the recently recorded productivity boost in agriculture is that it absorbs great amounts of water. As you have noted elsewhere, agriculture as it is practiced today is the chief consumer of water in the world.²⁰ Water is a resource that has become especially scarce today and that we must take special care to preserve. Is it possible to rationalize the use of water, and could biological and biodynamic agriculture contribute to limit its waste?

Definitely, because agriculture accounts for 70 per cent of the world water consumption, which is a huge percentage. Of course, water is also the basis of the increased yields brought by the Green Revolution

¹⁹ M. Ford, *Lights in the Tunnel. Automation, Accelerating technology and the Economy of the Future*, Acculant Publishing, Sunnyvale, USA 2009.

²⁰ Bevilacqua, *La mucca è savia* cit., p. 97.

over the last few decades. Still, we need to limit its use. And it must be said that over the last few decades industrial agriculture has come up with some useful systems to save water, such as drip irrigation.²¹

However, cultivation methods, methods for the regeneration of fertility, also influence the consumption of water resources. For example, if one employs organic rather than chemical fertilization, less water is needed. In the latter, the mineral fertilizers work best if there is water. It is water that dissolves them and makes them absorbable. The soil obtained with natural fertilization, instead, is rich in organic substance, in humus, and hence much more retentive of water and humidity.

Of course, much depends on the size of the farm. On small and middle farms growing a variety of crops, if there are trees, for example, some plants will need less water during the summer. In sum, there is a whole body of traditional knowledge about water saving that should be revived and take its place alongside the teachings of contemporary science. Dry-stone walls, for example, retain water,²² as well as having other uses.

All this also involves a different organization of spaces, both rural and urban. I will give an example: it is no longer acceptable to allow rainwater to be wasted in future decades in cities where it rains intensely, as it did this year in Italy; it is no longer acceptable that these cities have no reservoirs or underground cisterns to collect the water and re-employ it in the city itself for a variety of purposes. So far we have felt free to waste resources in this way because we thought that water was infinite. This kind of culture is no longer sustainable. Today, cities are built, expanded and altered without thinking that a city is an ecosystem with its own rules. Of course, a city is different from a forest, a jungle or a desert, but it is still an ecosystem, which is populated by human beings, who are social beings, but natural beings as well. We should hence reorganize according to a logic that makes the most of natural resources. We could collect and use so much of the rainwater

²¹ “Drip irrigation” is an irrigation method that supplies water to plants slowly, thus reducing water consumption.

²² Dry-stone walls are stone walls built without any kind of cement or other binding material.

that today is causing our sewage systems to overflow and producing all sorts of damages! For example, how much of our abundant winter rainfall do we use to wash our cities? Today we are back to square one. There is an environmental, town and land planning incompetence in our country that is simply dismaying.

Allow me now to ask you a question arising from a personal curiosity of mine about biological farming. In one of your essays²³ you mention the potential evils of the “increasingly accelerated process of artificialization of agricultural life and animal husbandry”, which induces farmers to experiment with any available means as long as they can increase the productivity of agriculture and livestock.

I was especially struck by your comments on the widespread practice, in Italy as well as elsewhere, of using the excrement of silkworms to feed livestock. This practice is part of an approach to livestock raising which, for the sake of increasing the production of milk and meat, feeds animals with the remains of other animals – as in the case of certain meals – and thereby transforms them from herbivores into carnivores. Which is decidedly unnatural.

We know, instead, that using the waste of silkworm farming as fertilizer in agriculture was a common practice, for example, in Calabria, and it was a “natural” and “biological” one. So can the same practice be “biological” in agriculture and not “biological” in animal husbandry? Is it true then that the concept of “biological” is not obvious, but very variable and complex? Is it truly possible to define “biological”? I would like to know your thoughts.

“Biological” is a broadly used term, but a largely inadequate one. What does “biological” mean? Literally, it designates something that “studies life”, and we could render it with the term “vital”. But when we characterize agriculture as “vital”, we are saying something obvious. So “biological” is hardly a felicitous term, but by now it has come into common use, so we are stuck with it. We could speak of “natural” agriculture or “organic” agriculture, although in Italy the latter definition

²³ Notably in the section *L'alimentazione “razionale”* of *La mucca è savia* cit., pp. 34 ff.

– typically used for a school of agriculture mainly based in the United States – is only used to distinguish biological agriculture from agriculture based on chemical fertilizing, that is, fertilizing done with inorganic substances. The term “biodynamic”, instead, is very accurate. It designates certain specific techniques, based on certain preparations.

But to return to your question, it is clear that some things that are “natural” can become “unnatural” if applied in different contexts. An example is animal meal. This is derived from an idea of Justus von Liebig, the great German chemist who invented chemical fertilizers.²⁴ In Uruguay there were some livestock farms producing stock cubes (“Liebig cubes”); that is, they butchered animals to produce meat concentrates in cubes. What happened is that, after a few years of industrial meat processing, large mounds of carcasses of butchered animals had piled up. So some breeders turned to Liebig for advice on how to use them. Liebig counseled them to burn them, reduce them to a meal, and use them both as fertilizer and as feed for horses and pigs. So, from a naturalistic point of view, von Liebig gave advice that, if not totally acceptable, was at least cautious.

The same cannot be said for the use of the residues of silkworms as feed. Whereas if these residues end up in the earth, then the natural cycle of fertility restoration is complete, because they are organic substances returning to the earth. Liebig used to say that only one thing should not return to the ground to fertilize it: the bodies of the dead, which, for ethical reasons, should be buried in a graveyard. All the rest should go back to the earth. Von Liebig was dominated by this holistic vision of life: Agriculture is based on the use of substances found in the earth, phosphorus, nitrogen, potassium, calcium, and so on, which we absorb through our food. So all that passes through our body, calcium, phosphorus, nitrogen etc., must go back to the earth, otherwise the earth will become sterile. And at the present rate the earth will indeed become sterile, because we are digging these substances out of its viscera, in phosphate or potassium mines, and many of them are not renewable. Nitrogen is obtained by synthesis

²⁴ Baron Justus von Liebig (1803-1873) was one of the first creators of mineral fertilizers to stimulate plant growth.

from petroleum, and petroleum is not renewable. Phosphates will become exhausted, as will the potassium mines.

One last question. We mentioned the concepts of biological agriculture and biodynamic agriculture. From your words, should we conclude by saying we are for biological agriculture in any context. And is it no GMOs, in any context?

No GMOs, in any context. I have nothing against genetic manipulation per se, because it is just a technique like any other - although in the case of soya, for example, it is a highly unstable one. Some scientists say: "Why are you so hostile to GMOs? Farmers have always manipulated nature. They have created hybrids, they have created plants." Very true, but GMOs do not exist in nature. Let us consider the example of BT maize (*bacillus thuringiensis*): this is a maize that has been modified through the insertion of genetic material of the *thuringiensis* bacillus, a bacterium living in the ground which is regarded as a natural pesticide. This material is inserted into the maize to prevent it from being attacked by the pyralid moth, a pest of maize. Thus, a genetic fragment of the animal world is inserted into a vegetable. Such a plant does not exist in nature. These are manipulations whose effects are not fully understood. We do not know, for example, what effect this genetic fragment of a bacterium we feed on when we eat maize will have in our intestine, among intestinal bacteria.

These uncertainties are all the more unacceptable when we consider that GMOs are used both for animal and human food. Besides, GMOs do not solve any of the major problems agriculture is currently facing, namely, environmental pollution, reduction of biodiversity, soil barrenness, energy-dissipating consumption, and the expulsion of farmers from the land. The purpose of thus manipulating the maize is to keep the pyralid moth away, but the insect will soon develop a resistance. Even should it disappear, other insects would infest the crop. Actually, what was the original intent behind this genetically modification? Well, the original intent, publicized especially by Monsanto²⁵

²⁵ The company Monsanto Agricoltura Italia s.p.a., whose offices are in Milan.

which produces this type of GMO, was to allow savings on pesticides. It has been proved, however, that this is not true. It depends on how the cropping year goes. Besides, pesticides have to be sprayed anyway, and not just against the pyralid moth. And statistics tell us that the use of pesticides has increased even on genetically modified plantations! So GMOs do not solve the problem. Like I said, even should the pyralid moth be definitively suppressed, in nature there are no “vacuums”: surely other insects currently kept out by the present supremacy of the pyralid moth would step in.

Biological and biodynamic systems, instead – as used, for example, in Third World countries – employ repellent plants grown next to the maize to keep it from being attacked. These are the systems that work best. At a small scale, of course, but they work, they do not poison the soil. A farming business intending to make high profits will certainly use different systems. But what is it we want, healthy food for people or high profits?

Let us consider another GMO, the so-called “Roundup soybean”. Roundup is a powerful herbicide, which some plants, such as soybean, are genetically modified to resist.²⁶ This is another way GMOs are used: they allow more toxic herbicides to be applied, saving on weeding costs. However, it has been ascertained that herbicides have a secondary effect, destined to emerge over the years: they cause the variety of infesting flora – that is, the biodiversity of weeds – to decrease, but at the same time they favor the selection of some weeds

On Monsanto, see M.-M. Robin’s important book *Le monde selon Monsanto. De la dioxine aux OGM, une multinationale qui vous veut du bien*, preface by N. Hulot, Edition de La Découverte, Paris 2008.

²⁶ “Roundup” is the name commonly used for glyphosate, the most widely employed herbicide in the world. 71% of the genetically modified maize planted in 1998 was engineered to resist herbicides such as the glyphosate produced by Monsanto under the “Roundup” brand name. Companies producing herbicide-resistant plants have been obtaining permits for the raising of the legal thresholds for herbicide residues in the food produced from their plants. For example, Europe and the United States have given Monsanto permits for higher thresholds of herbicide residues in its genetically modified soybean (http://academic.cengage.com/resource_uploads/downloads/0170186288_243677.pdf, p. 118).

which, although they comprise fewer species, become especially resistant to herbicides. Thus, over time even genetically modified soybean will be infested by plants that have evolved to resist herbicides. Which is what is actually already happening today.

So GMOs, while touted as a product of the future, actually pollute and do not solve the problem of environmental quality. Neither do they solve the problem of the energy gap, since their energy output in food calories is far less than the energy inputted to produce them (fertilizers etc.). I have written about this, using calculations made especially in the United States as well as other countries. So this problem is not solved. And neither is that of soil fertility. GMOs pollute the soil and do not contribute in any way to the renewal of organic matter. Nor do they facilitate farmers' lives. Genetically modified seeds are even subject to royalties, being protected under patents, so that farmers have to pay not only for fertilizers, weed killers and so on, but also for the seed, which they once could put away themselves.