

Organic Agriculture

COMPLETE CHEMICAL-FREE ORGANIC AGRICULTURE: PRINCIPLES AND CAUTIONS

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Forward

In the autumn of 1952, I began to notice that agricultural science was heading in the wrong direction; that its aims were only concerned with the external appearance of the product and the quantity of the harvest, and not with the essence of agriculture -- that of health and life. Consequently, I began to research ways of returning agriculture to this essence of health and life. At the same time, I began conducting research on the effects agricultural chemicals have on people by observing patients, in particular farmers with lesions. My findings impelled me to issue warnings on the ill effects of these deadly chemicals.

By February of 1959, I was firmly convinced that, over time (anywhere from 10 to 20 years), the continual use of agricultural chemicals and chemical fertilizers in modern farming technology leads to an increase in such diseases as cancer, leukemia, stomach ulcers, liver disorders, kidney and endocrine problems, rheumatism, and other metabolic disorders, especially in people residing in rural areas. These chemicals also cause various mental disorders, such as depression, indirectly contributing to traffic accidents, suicide, and fitful and insane crimes, which are committed due to trivial or unknown motives.

In response to my findings, I felt compelled to act. I compiled my data into pamphlet form and distributed it nationwide. I also petitioned the Japanese government to immediately ban the use of agricultural chemicals with a high toxicity level, and to prohibit the use of weaker agricultural chemicals within five years. I also requested the government to research at a national level the potential use of traditional organic agricultural practices and, in the process, to re-examine modern agricultural techniques. During this time, the Kenko o Mamoru Kai (Association of Health Protection), the predecessor of the present Zaidanhojin Jiko-kai (Foundation of Merciful Light), began making a comprehensive study of complete chemical-free organic agriculture while cooperating with farmers associated with the organization. Our research has focused on the possibility of utilizing chemical-free organic agriculture in the present insect ecological system; a system that has become abnormal due to the excessive use of agricultural chemicals. We have also been researching organic agriculture in terms of economy, labor, the product yield, as well as product quality.

At present, we have established a thirty-year history of utilizing these techniques while growing vegetables. We have also been growing rice as well as fruit for over 20 years with success. The 4,000 households that comprise the membership of the Jiko-kai are satisfied with the products we supply them with; in particular the superior taste, aroma, and excellent preservation of our crops. The external appearance of our products as well is appealing to the eye.

I will now explain the techniques, as well as our experiences, in utilizing organic farming, keeping in mind that due to the complex system of Nature, we have to refine our techniques from time to time in accordance with its fluctuations.

Fundamental Problems With Modern Agricultural Technology

Plants are pulled up, dried, and then burned at high temperatures in order to make ashes from the plants. Then nitrogen, phosphorus, and potassium is extracted by resolving the ashes using acid, alkali, and other chemicals. From this, it is deduced, it is possible to create a chemical fertilizer which can be used to grow plants. I am firmly convinced that their deductions are seriously in error. First, proponents of this artificial fertilizer fail to consider the reality of life in their thinking; that the fertilizer acts as one in unity with the other members of the ecological system above and below the ground. And second, they rely on the unnatural conditions and elements of artificially high temperatures, acid, alkali, and other chemicals in creating this fertilizer. Thus, the general principle of chemical fertilizer, replacing the natural with the artificial, is in theory, defective.

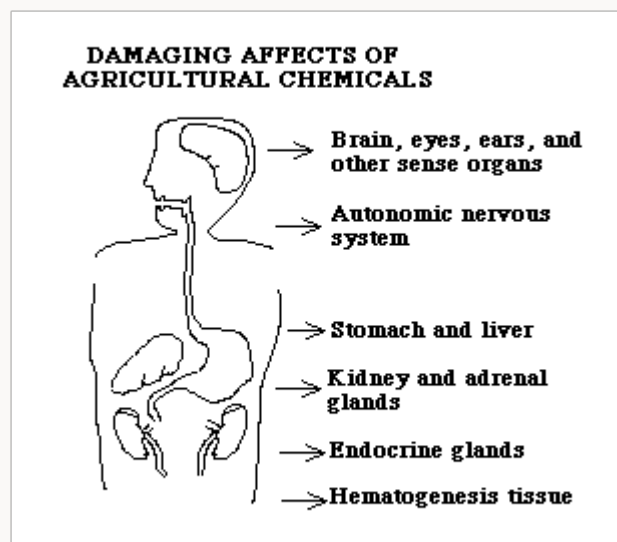
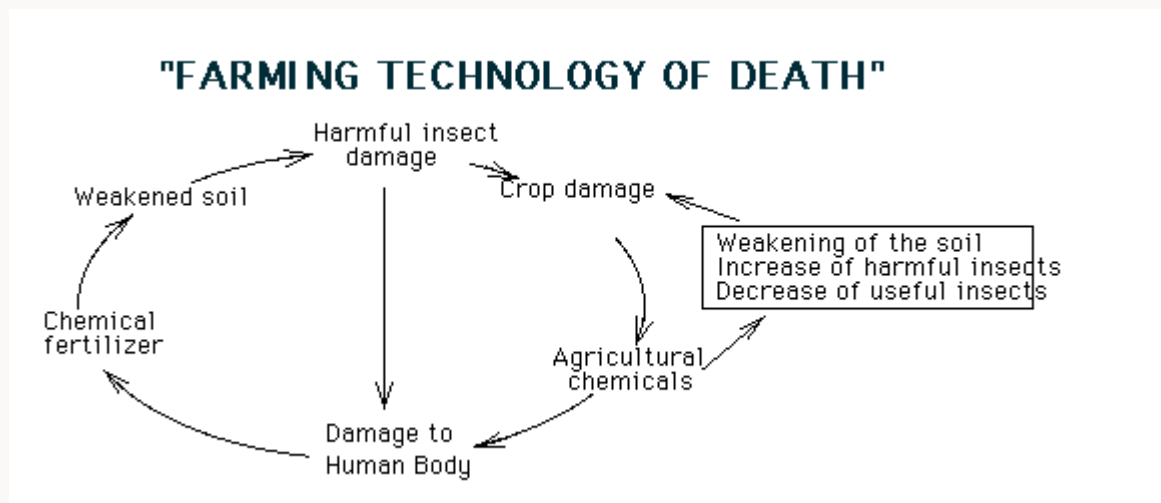
Spreading chemical fertilizer on the ground places the soil physically, chemically, and biologically at a disadvantage for growing plants. Physically, chemical fertilizer makes the soil stiff and clumpy. This weakens the roots of the plants as the soil loses its ventilative organization. Also, the soil loses its ability to hold warmth and water when these fertilizers are used. Chemically, these fertilizers cause the soil to turn acid as it loses many of the essential elements it needs for producing plant life. The acid in the earth converts the soil to matter that is unable to absorb water. Biologically, chemical fertilizers destroy many of the essential living elements (such as bacteria, mold, algae, earthworms, and ticks, in other words, the ecological system) that are necessary for the existence and growth of plant life. Plants trying to grow on such "dying soil" cannot obtain the nutrition they need; they only feed on the chemicals. Consequently, the plants lack firmness, nutrition, and taste despite being large in size. We are aware that people who feed on instant foods (those foods which, often through chemical processing, are able to be cooked quickly), as opposed to natural foods, are prone to sickness. Plants grown from chemical fertilizers, too, are weakened and afflicted in a similar way by blight and harmful insects.

Agricultural chemicals are used to prevent plants from being destroyed by harmful insects and plant disease. Yet, these chemicals kill not only the harmful insects, but the useful insects as well. Consequently, through the use of pesticides, human beings are able to realize a 100% crop yield for a short period of time. However, as harmful insects are herbivorous, not only do they have the strongest power of adaptability among living entities, but also the strongest life-sustaining ability as well. Thus over the long term (three to five years), they acquire the power to resist the chemicals.

Useful insects, on the other hand, are carnivorous. They do not have the power of resistance to agricultural chemicals that the herbivorous insects have and are completely destroyed by the chemicals. Over a period of time, the continued use of these chemicals results in an increase in the number and variety of harmful insects (as they grow stronger than the chemicals used to destroy them), and a decrease in the number of insects useful and necessary to agriculture. This creates an insect ecological system that works against human life. Stronger chemicals are employed in greater frequency and quantity to rid the crops of these harmful insects. These chemicals enter our body through our mouths, respiratory systems, and skin. This adversely affects the functioning of our internal organs (autonomic nervous system, endocrine system, sense organs, etc.), and eventually (within ten to thirty years), the chemicals act to destroy all systems of the human body. This is substantiated by the increase in various diseases and crime as mentioned in the forward of this paper.

Consumers, as well, are adversely affected by the chemical residue in the food they eat. It is reported that the less potent organic phosphorous chemicals break down soon after intake and do not chronically poison human beings. This, however, is not true. "Less-potent" does not mean "harmless." It just means that the consumer is not affected immediately. Farmers applying such chemicals to their crops soon feel their effects and become unhealthy, fall into depression (as these chemicals act on their brain) and lose their desire to work. This

drains the farmer of the energy needed to make organic compost forcing them to turn to easily applied chemical fertilizers. This cycle continues endlessly. Thus, "contemporary agricultural technology" based on the use of chemical fertilizer and agricultural chemicals, is in reality a "farming technology of death," killing the soil, useful worms, insects, and over time, human beings. This cycle is displayed in the following illustration.*



* When both organic compost and chemical fertilizer are mixed together, the destructive nature of the chemical fertilizer is not immediately evident. At first, it appears that the soil's energy has not been weakened. Over time, though, the soil will gradually weaken and, within ten to twenty years, the land will become barren and wasted. Also, the plants grown on such soil are liable to be afflicted with disease and harmful insects.

* If you decide to use oil cakes for additional fertilizer, it is best to scatter them thinly between August and October. Overscattering will only make the cakes turn black and muddy attracting harmful insects and cause plant disease.

Life Sustaining Agricultural Techniques: Principles and Cautions

The Ecological Cycle

It is important to remember that all life on earth is dependent on the water cycle; that is, the rain that falls from the sky and flows onto and into the earth and eventually into the sea and rivers. The sun's energy transforms this water to steam that, upon evaporating, forms the clouds in the sky. If, at some point, this cycle were to be cut off, it would result

in drought sending all life to perish. The same can be said for the oxygen cycle that exists between plants and animals.

There is yet another cycle which, similar to the two cycles mentioned above, all forms of life cannot survive without. This is the ecological cycle.

(a) Plants are producers. The energy from the sun provides them with the power to synthesize providing animal life with organic substances.

(b) Animals are consumers. They continue to exist through the intake of organic matter directly from plant life, as well as indirectly through their carnivorous diet.

(c) Microbes, such as bacteria and mold, are dissolvers. They dissolve excrement and animal corpses. They also dissolve dead weeds and fallen leaves. Once matter becomes decomposed, it turns to compost. This compost nurtures plants and is absorbed by the earth. It acts as nutrition for countless numbers of small animals such as bacteria, water weeds, ticks, and earthworms (the soil's ecological system).

Protein, fatty substances, carbohydrates, vitamins, enzymes, and other complex organic matter produced by the soil's ecological system, as well as inorganic substances found in both the water and the earth, are necessary foods for plants from which, as the next illustration shows, complex organic matter is composed.

As long as the ecological cycle is left uninterrupted, life will continue to thrive; the earth's forests will produce giant trees, thick weeds will continue to grow over the vast plains, rice fields will continue to yield abundant harvests; the soil will remain fertile. However, if the ecological cycle is cut at any point, the earth will lose its fertility and turn to desert. It is not difficult to imagine the consequences of this -- death to all life on earth. In Egypt and the Middle East, for example, too much cattle raising contributed greatly to the interruption of the cycle at the plant level. More recently, chemical fertilizers, pesticides, and other agricultural chemicals have caused disruption at the level of the soil's ecological system. This is especially evident, but by no means limited to, the situation found in the United States. The disruption of the ecological cycle has brought about a crisis as, what was once rich green farmland, has been turned into a vast desert. In Japan, thanks to abundant rain and numerous wild weeds, we have not yet experienced this problem. However, our soil is gradually weakening making the raising of crops much more difficult.

Aerobic, Fully Ripened Compost

If you were to dig through leaves fallen in the mountains, you would find at the bottom a dry, black soil-like substance mixed with small roots. Rather than having a foul odor, it gives off a nice aroma. This is aerobic compost. Anaerobic compost, on the other hand, is what would result if you were to store your kitchen garbage for a few days. It will begin to smell and become sticky. I mentioned above that microbes act as dissolvers in the ecological cycle. These microbes can be classified into two types -- those that allow ventilation to pass through and those that block ventilation. The former are aerobic microbes and the latter are anaerobic microbes. Compost made from aerobic microbes is aerobic and compost created from anaerobic microbes is anaerobic. Compost made from fallen leaves in the mountains, being aerobic in nature and breeding aerobic microbes, is the compost desirable for organic farming. The damp kitchen garbage, due to it being anaerobic, does not allow ventilation to pass thus breeding anaerobic microbes producing a foul-smelling, sticky compost.

Plants feed on compost that is aerobic. This compost must also be completely dissolved; that is, fully ripened. Anaerobic compost, on the other hand, has an adverse affect on plant life. When you feed a plant anaerobic compost, plants grow rapidly in the beginning but, over time, they eventually succumb to harmful insects. Also, crops harvested from plants raised with anaerobic compost will lose their natural taste. Compost that is not fully ripened, even if it is aerobic, will turn anaerobic in the soil due to insufficient ventilation. This also will be damaging to the crop over time.

Thus, it is necessary to use aerobic, fully ripened compost.

It takes more than six months to produce fully ripened compost. In order to do so, 50% of the compost must consist of vegetation such as straw, dry weeds, fallen leaves, and sawdust (not from imported lumber). In order for the compost to receive proper ventilation, it must be turned over several times during these six months. Here in Nara, we use a tractor bucket and a cultivator to accomplish this. Before we use to thrust a bundle of bamboo into the compost in order to allow air to circulate through. (It is also important to give compost the proper amount of water while, at the same time, not "drowning" the compost with too much water.)

The amount of compost needed for crops varies according to the crop. For example, rice requires 2 tons and vegetables 3-5 tons per 10 are (about 1/4 of an acre). As we shall see later, cucumbers and eggplant require more compost than other vegetables. The best time to distribute the compost is during the time leaves fall from the trees in your country. In Japan, this season is from late October to the end of December. This rule of thumb, however, does not apply to autumn crops. For these crops we only add additional compost.

* These techniques are designed to control the breeding of harmful insects during the month of September.

Even completely ripened compost contains parts that are not yet fully ripened. Thus, it is important to give the compost time to ripen in the soil before the season when harmful insects are most prevalent begins; from the end of August until the beginning of October. We cannot emphasize enough the importance of making sure that, first, the compost used is fully ripened and, second, that it is applied to the fields during the time when leaves fall in your country.

Miscellaneous Remarks

- (1) If the compost you are using is not completely ripened or is slightly anaerobic, it is better to leave it be instead of plowing it into the soil with the plants. Over time, it will become fully aerobic and will ripen completely yielding better results.
- (2) If harmful insects do begin to breed in the plants, or if symptoms of disease appear, rather than become distressed over it, think back over the steps and cautions you took in making the compost. Plant damage due to disease and harmful insects are a sign to you of the existence of cultivation problems and that the harvested crop is not suitable for human consumption. If you are completely sure that you did not use chemical fertilizer or weed killers, you know immediately that the problem lies in your compost not being fully ripened. This may be due to your plowing too large a quantity of fresh weeds into the soil (If the ground contains too many weeds, you may have to cut them down and leave them be for a month or so in order for them to wither completely.) The presence of harmful insects should act as a warning to us and should not be looked upon as our enemy.
- (3) It is a good idea to rotate crops every two or three years.
- (4) Before sowing seed or planting, it is important for the compost to have been plowed into the soil for more than a month so that it can "familiarize" itself with the soil.
- (5) If raw oil or raw cotton cakes are used as fertilizer, it is important to scatter them over the soil away from the crops. Never plow them into the soil. Chicken manure, even if completely dried, must never be used on plants when the temperature is at its peak (between May and the end of October in Japan). This will lead to the destructive breeding of aphids and army-worms. Chicken manure, as well, must be fully ripened before it can be used. Compost must be mixed with the manure in order to completely release the gas.
- (6) It is important never to place straw, dry weeds, or other organic materials on the ground between the end of August

to the beginning of October. These materials only act as food or homes for insects leading to crop damage.

(7) When you sow seed directly into the field or nursery, you must use fully ripened, aerobic compost and allow it to "familiarize" itself to the soil at least one month before planting. Though the plant will germinate even if the compost is slightly raw, the roots of the plant, however, will rot soon after.

(8) Ticks and lady bugs will damage eggplant after the compost runs out. Be sure to give this particular plant plenty of compost in the beginning and add additional fertilizer afterward. A shortage of water in the summer will also yield similar results. Cucumbers, as well, need much compost. As the plant is weak, precautions must be taken to ensure that the compost is aerobic and ripe in the beginning.

(9) Watermelons, as well as other melons, will grow without compost if the soil is rich enough. In this case, too much compost will destroy the fruit. We call this "overfeeding." When the first fruit grows to the size of a ping-pong ball, it is best to cut it off as its shape is apt to be unusual and the inside hollow. At this time, it is good to add additional fertilizer if needed. Or, another technique is to scatter oil cake and compost separately over the soil more than one meter in distance from the plant. Likewise, for tomatoes, it is good to give the soil fertilizer only after the first vegetation begins to grow. As a rule, it is important to give additional compost to fruits and other fruit vegetables.

(10) We usually spread 5 to 10 bags of lime (20 kg./ bag) on a 10 are field every year. First sprinkle lime onto the field and then let it sit for about two weeks before plowing the field. It is a good idea to vary the lime substance every year (CaMg (CO₃)₂, calcium silicate, calcium carbonate, etc.). This is necessary to offset the smog and acid rain prevalent in Japan throughout the year. We also have to apply extra compost and lime to compensate for Japan's igneous rocky, acidic soil. Lime generally hardens the soil but, when used with compost, it actually acts to soften the soil.

(11) Wild weeds are very useful for compost. Be sure to cut them regularly. After cutting the weeds, it is best to dry them out before using them in compost. Be sure not to allow weeds to grow during the breeding months of harmful insects (from the end of August to the beginning of October) as such insects like to inhabit the weeds. In the dry months of July and August, though, it is not necessary, nor desirable, to pull the weeds out completely. This will only cause the soil to over dry. It is best to leave them to grow or, if unavoidable, cut them down. Never, however, pull them from their roots. For fruits, it is best to do this at least once a month during the summer and autumn months (especially around the roots of the trees). Weed killer must not be used to clear weeds as it kills the soil thus working against the principles of organic farming.

(12) In order to add extra minerals to the soil, it is a good idea to use seaweed or powder from aqueous rock. As seaweed is expensive, we sprinkle a seaweed solution over the plants. This has proven to work effectively. Also, weeds, particularly those from uncultivated land, are very useful in providing minerals to the soil when used in compost. We are against using even small amounts of artificial, synthesized micro element (such as the chemical compounds of B., I., etc.).

(13) Fruit trees are very particular to the kind of soil and the climate in which they are grown. Persimmons, peaches, plums, and oranges tend to grow very well here on our farm in Nara. We can easily cultivate these fruits without having to rely on agricultural chemicals. If the land is not suitable, fruit trees will be damaged by not only harmful insects, but also (even more so) by disease. Other organic farmers in the colder districts of Japan are trying to grow apples through organic agricultural techniques. Though it is possible to grow apples without having to rely on pesticides, they have found it necessary to add a solution of Carbon Bordeaux two or three times annually to the fruit. This is an ordinary germ killer and is not detrimental to our health. These farmers, though, would like to be able to farm without using this solution and are trying to cultivate a soil desirable for such farming. However, as the apple is a fruit that originated in

central Asia, it may not be compatible with the igneous soil and monsoon climate of Japan.

We have been ignoring the reality that humankind can only continue to inhabit this earth as a contributing member of the ecological system, living in harmony with other living entities through the graces of Mother Nature. Today we live in a modern civilization that has led us to believe that we are free to pursue happiness through the conquest, killing, and plundering of all other living entities. We, too, are now in a position of meeting our own demise through the pollution and nuclear weapons that we have created. Our agricultural system, too, is based on this concept of destruction. Yet, the very techniques we use in agriculture are what deprive us of food, of health.

Chemical-free organic agriculture is based on the idea of humankind living through Nature in harmony with the other members of the ecological system. It is based on a concept that we are recipients of food as opposed to a people plundering for food; a concept based on our being the recipients of life without having to kill for life. Human beings can only receive life and continue to exist on this planet, in this universe, through the graces of the Sun, the Earth, and the entire ecological system. In realizing this, humankind must humble itself to our sources of life in thanks.

Postscript 1

Up until this point, I have been discussing the theory and practical techniques of using chemical-free organic fertilizer for agriculture. We have been employing these techniques successfully for over 20 years at the Jiko-kai. Nevertheless, over the last ten years, and in particular the past five years, various abnormal phenomena have forced us to make adjustments in the way we farm organically. While these phenomena have further encouraged us on the importance of giving the soil fully ripened, aerobic compost, the following additional points must be considered as well.

The abnormal phenomena that I am referring to are as follows:

1. an abnormally excessive number of harmful insects (those that kill off the necessary insects and create an abnormal increase in the amount and variation of vermin, in particular resistive vermin) in the ecological system. This has come about by the increasing reliance on agricultural chemicals over the past thirty-five years.
2. acid rain
3. localized torrential downpours
4. droughts and long spells of rainy weather
5. an increase in weeds not indigenous to Japan that have strong powers of resistance and are hard to control

It goes without saying that we must take the steps necessary to exercise strict control over the use of agricultural chemicals, as well as the soot and smog (CO₂ sulfur, and nitrogen compounds, etc.) released by factories. We must also take the drastic action needed to preserve our tropical forests. On this occasion, though, I would like to limit my discussion to only that which concerns agriculture.

(a) To cope with the insect problem, it is necessary that more people become involved in non-chemical agricultural techniques. It is also important that the crops we choose to grow are resistant to harmful insects. Farmers should make efforts to exchange information with each other on such matters.

(b) Regarding acid rain, it is necessary that we increase the use of lime in order to prevent the soil from becoming acid. Lime, though, on the other hand, makes the soil hard and disrupts the mineral balance in the soil. To circumvent this problem, it is necessary that we apply more fully ripened, aerobic compost to the soil. It is also important to apply both

organic lime (for example, sea shells) along with non-organic lime to clay soil rather than sandy soil. Some crops might have to be raised in green houses or under plastic coverings for protection.

(c) In order to prevent crop damage from localized torrential downpours, it is necessary to cover the crops with rice hulls, straw, etc. during the planting season. It is also necessary to have growing at all times plants with strong resistance power, such as scallions and green onions in case of emergencies.

(d) To combat the imported weed problem, we find it helpful to rotate the rice paddies and crop fields every two or three years.

Postscript 2

It is lamentable that farm land in the major agricultural countries of the world, United States, Canada, Australia, and other countries, has lost its power of fertility and has undergone large scale desertification. This is the result of modern scientific agricultural techniques. Unless we take swift action and change to organic agricultural techniques to restore the power of fertility to the soil, we will eventually suffer global famine.

In view of all this, people of the world must cooperate in scaling down industry and, at the same time, take action to promote an agricultural industry that is chemical-free and relies on the use of organic fertilizer. With this in mind, every national government (working with and through local government bodies) must take the initiative to turn all kinds of kitchen refuse into compost and reduce it into the soil.

Conclusion

Recently, many scholars and well-meaning people have sent out warnings to the effect that, due to the massive destruction of our environment, we are on the verge of the total destruction of humankind. In deep prayer, we at the Jiko-kai hope that organic farming techniques not relying on chemicals, will spread throughout the world. At the same time, we hope to awaken people to the necessity of giving Mother Nature the reverence due to her in order for us to live in harmony with each other, while respecting all non-human life including plants and animals (in other words, the entire ecological system). This also means living a moderate life while realizing the importance of the subsistent goods needed for our survival.

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The Jiko-kai, located in Nara Prefecture, Japan, was founded in 1970 and given authorization in 1972. Its aims are to, spiritually awaken people to the reverence due to Mother Nature; restore culture to rural communities; and further promote the research, practice, and breadth of chemical-free organic agriculture.

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