NATURAL FARMING

Clay pellets to grow agro food products and revegetate deserts, mountains and wastelands

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Introduction

By Panos Manikis

Sixty-five years ago, Masanobu Fukuoka, just after the end of Second World War, went back to his native village in Japan and started working in order to realize his vision: an earth-friendly agricultural method without using chemicals, fertilizers or technology. He called it natural farming, but he could have also called it "do-nothing farming", since Fukuoka's approach was that of getting rid of unnecessary practices and work. It is zero energy farming as no oil (petroleum) is used.

Forty years later, his method reached the climax of simplicity. We can simply cover the seeds of forest trees, fruit trees, vegetables, grains and green manure plants with clay, make clay-balls and sow them before the rainy season starts, that is September and October for the Autumn seeding or March and April for the Spring seeding. In this way we can establish vegetable gardens and natural farms, we can grow grains and we can revegetate the deserts or barren mountains and wasteland.

The natural farming method has five principles, speaking about orchard trees: no tillage; no fertilizers; no pesticides; no weeding; no pruning. These principles are valid under any climatic or soil condition, although type or variety of vegetation might change from place to place.

Soil erosion, floods, landslides, lowering of the level of the underground water, decrease of the oxygen in the atmosphere, gradual increase of the temperature of our planet Earth and millions of hectares of fertile land turning into a desert are the heavy price the heavy cost paid for the loss of forests. On the other hand, chemical agriculture not only has failed to solve the hunger problem in the world, but has also polluted the air, the soil and the waters; on an economic level the farmers become poorer and poorer and the agricultural population is rapidly decreasing. Moreover, world's financial crisis will lead to further exploitation of the natural resources and will exacerbate the above-mentioned problems. We should have a holistic approach and we should solve all the problems at once and natural farming has such an approach. Natural farming unites religion, philosophy and science that were one in the past.

During his life, Fukuoka received many awards such as: Magsaysay Award in the Philippines, the highest award in Asia; Deshikottam Award in India from the ex-Prime Minister Rajhiv Gandhi; Earth Council Award. He wrote six books, which have been translated into many languages, among others: The One-Straw Revolution; The Natural Way of Farming; The Revolution of God, Man and Nature.

In Greece, the first effort for the reforestation of barren mountains and hills started in 1993 by a group of volunteers. They started realizing small sowings and in 1998, with the participation of Fukuoka himself, they organized a 10,000 hectares seeding, the largest ever realized. In 1999, they established the Natural Farming Centre in Klisohori, near the town of Edessa, in Northern Greece.

The Natural Farming Centre collaborates with organizations of many countries interested in promoting natural farming, and offers, through its experts, technical assistance to implement projects utilizing this innovative know-how.



What problem does it solve?

Natural farming has three main goals: to create a rich, fertile soil; to control soil erosion and to create balance or harmony in order to solve the problems of diseases and insect attack. The key to achieve these three goals at once is a big variety of plants and living beings living together, that is the big biodiversity.

We can grow two kinds of grains in the same field, year after year, that is a winter grain (wheat, barley, rye or oats) and a summer crop (rice, corn, millet etc.) in a continuous rotation. Fukuoka had managed to produce from 600-800 kg of barley and up to 1 ton of rice per year per 1000m square, thanks to his high-yield varieties of rice, which he called "Happy Hill", creating at the same time a rich soil.

Speaking about vegetables we can establish a rotation of two or three different types of vegetables thus producing more and improving the soil. As far as the fruit trees are concerned we can establish an orchard where forest trees, fruit trees, vegetables and green manure plants growing underneath live in harmony together.

The natural farming method tries to solve the problems caused by scientific farming. In his last book: The revolution of God, Man and Nature, Fukuoka wrote:

"To put it very briefly, my theory is that human knowledge and actions have destroyed nature, and thus, if we abandon them and leave nature to nature, nature will recover on its own. This does not, however, mean non intervention. In the case of places like the desert, which have lost their regenerative power, we must mix seeds and microorganisms of every variety in clay pellets and scatter them from the air. In India there are more than 500 varieties of trees that bear edible nuts and 500 varieties of fruit trees. In addition, we should sow among them a mixture of 500 varieties of grains, vegetables, and green manure plants, ideally on the Deccan Plateau and in the desert. My supposition is that, no matter how bad the conditions, there will be some seed varieties suited to that place that will germinate. Even though some will wither and die from extreme dryness and heat, if we sow various green manure plants, vegetables, and grasses along with drought and salt-resistant plants, a number of them will survive. If for even a short time the surface of the earth is covered with vegetation, its temperature will be lowered. The role of the pilot plants is to aid in creating conditions that will allow other plants to germinate.

A second purpose in sowing a variety of plants and microorganisms is to awaken the sleeping earth. Among deserts, there are deserts of sand that have lost the ability to support life and have died, but most savannas are young clay deserts in which the nutrients needed by plants are only sleeping. In order to cause chelation, in other words, to rouse the earth and bring about the rebirth of life, a variety of seeds of lower plant forms and microorganisms are necessary.

The earth will not come back to life if we only plant a number of useful trees in the desert. A plant cannot grow up in isolation. To grow, a hundred-meter tree needs enough soil for one hundred meters of roots. Also, trees of seventy, forty, and twenty meters are necessary. Furthermore, trees are needed to protect the base of the tall trees, and beneath them, undergrowth vegetation and microorganisms are necessary. Only with the aid of all these, can a tree grow to a height of one hundred meters. Life does not exist in isolation, and a large tree is the crystallization of the cooperation of numerous living things. When a large forest is created, and the degree of nature or density of vegetation is high, then rain will begin to fall. Clouds will form over the mountains and rise up from the valleys. The principal actors in the forest are not just the tall trees. Ferns, moss, and fallen leaves all have roles to play.

Rather than trying to secure water and cause rain to fall using human knowledge, we should stop ignoring the mind of nature. Then the earth will naturally be covered with lush green vegetation. The mind of nature is the core or heart of nature. If we do not know the heart of nature, the fundamental source of the creation of the cosmos, then no matter how much we observe the outer aspect of nature, the recovery of nature will be impossible."



The Natural Farming method, in practice

Method for making Clay Pellets

We make clay pellets to protect seeds from ants, rodents, birds, etc. Inside the clay pellets, seeds will remain protected until conditions will be the proper ones to make them germinate.

How to make clay pellets

When we want to make clay pellets by hand, we mix one measure of all kinds of seeds, 40 measures of clay and then we add water enough so that we can form a mass that is humid but does not get stuck into the hands. After we make the mass, we beat it against a hard surface many times. The more we beat it the more compact the mass becomes.

The size of the clay pellets varies according to the size of the seeds, from ½ cm up to 2 or 3 cms.

We can dry the clay pellets under the sun or in the shade. The process is faster under the sun. When we make clay balls with seeds from leguminous plants like chickpeas, lentils, beans, brood beans, we have to soak them in water from half an hour (lentils) up to 2 hours (broad-beans). The clay pellets can have different forms (round, flat etc).

If we want to prepare big quantities of clay pellets we can use a cement mixer without the inner blades. In this way, with a small group of 5-6 people and eight hours of work daily, we can make up to 30-40 tons of clay pellets within a month.

We usually sow the dry clay pellets from September – October before the autumn rains start or from March – April before the spring rains start. If there is a green cover covering the earth we sow and then we cut the grass.

Clay Pellets for desert re-vegetation

From the book: The Ultimatum of GOD NATURE:

"The following is a method for making multi-layered bittern and clay seed pellets to be used in desert re-vegetation.

Put a variety of seeds in a mixer. While rotating the mixer, add fungi that will aid the growth of the plants to the outer surface of the seeds. Spray a mixture of water mist and uncontaminated, baked clay powder onto the surface of the fungi, coating them, while routing the mixer. Next spray a mixture of powdered bittern, clay powder, and slaked lime over the surface of the baked clay powder, while rotating the mixer, thus creating multiple layers.

Seeds of more than a hundred common varieties, including trees, fruit trees, vegetables, grains, and other useful plants are coated with microorganisms that are necessary for the growth of the plants.



This kind of clay seed pellets can be produced easily, in quantity, using a mixer such as a typical cement mixer with the inner blades removed.

In order to produce enough pellets to sow one hectare of desert land, the standard ratio is five parts finely-powdered clay, such as fired brick or porcelain clay, to one part of the above-mentioned seed mixture, but adjustments should be made taking into account the size of the seeds. The bittern is brine obtained by boiling and concentrating sea water and should be 5% of the weight of the seeds. In place of the bittern, highly polymerized compounds may be used. Slaked lime should be 5-10% and water 5-10%.

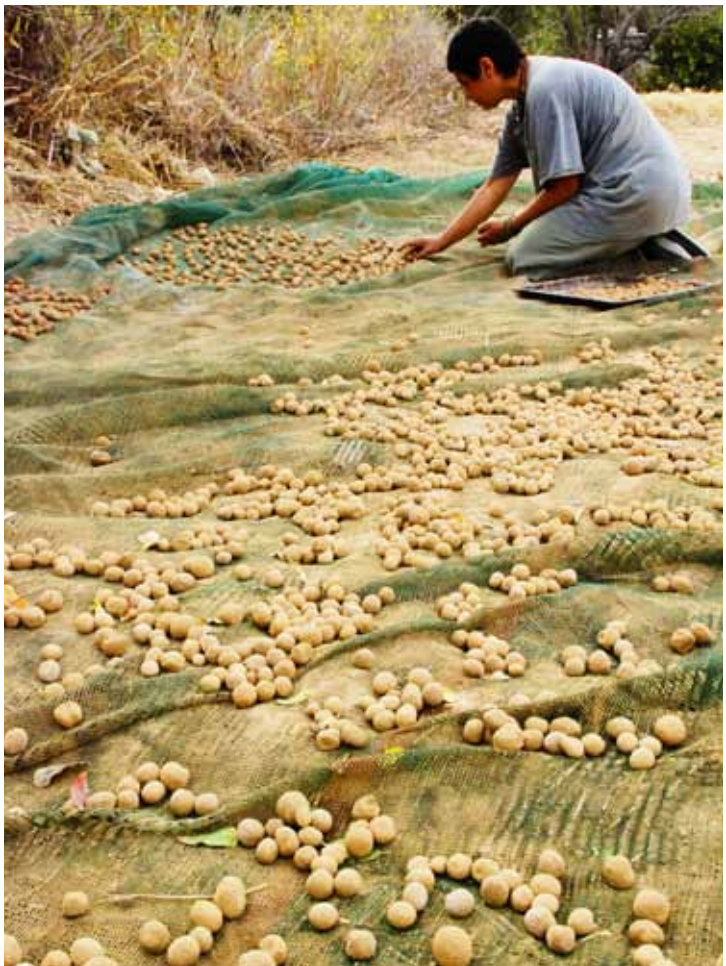
Various layers are formed

The inner layer is made by putting seeds and fungi into the mixer while it is rotating, so that the fungi coat the seeds. Next uncontaminated baked clay powder and water mist are sprayed in together as the mixer is rotating, creating the clay central layer, which encloses the fungi. Then the bittern solution, powdered clay, and slaked lime are sprayed in together as the mixer is turned. In this manner, round clay seed pellets, usually 0.5-1.0 cm in diameter are made.

Because the seeds in the multi-layered bittern and clay pellets are enclosed by layers of clay, they can, with the help of useful fungi, germinate and develop normally.

When bittern is added to powdered clay and they are kneaded together, the arrangement of molecules in the clay is changed, and the pellets become stable, light, and hard. They not only can withstand the fall to earth following aerial seeding, but also adjust to changes in dampness and dryness related to rainfall, becoming shrunken and solid. Thus, they seldom crumble or break and the seeds are protected by the bittern in outer layer from damage by most insects, birds, and other animals until germination is achieved. In addition, the slaked lime included in the outer layer aids the germination of seeds by neutralizing acidic soil.

Although it is possible to prevent damage by birds with pellets of clay only, in deserts and savannas it is difficult to prevent damage by mice, goats, and, in particular, strong insects such as red ants. Most insects and other animals are repelled by the extremely bitter outer layer and will not eat the pellets. This not only ensures the seeds' germination, without the use of extremely toxic poisons, but also makes possible indiscriminate broadcasting of seeds over a wide area.



The plants on earth exist in reciprocal relations with other plants, animals, and microorganisms and none can develop and flourish alone. In desert regions, in particular, not only are a variety of symbiotic plants necessary, but plants also cannot establish themselves without the cooperation of microorganisms in the soil. For example, pines used in revegetating the desert require the inclusion in the clay pellet of the hyphae of the matsudake mycorrhizal fungus, which can be cultivated using the natural culture medium invented by the author. Pines cannot live without the cooperation of the matsudake fungus. In connection with this, the cause of pine blight lies in the death of the matsudake fungus. In addition, if mycorrhizal plants are not inoculated with mycorrhizal fungi, and leguminous plants with nitrogen-fixing bacteria, we cannot expect their proper development.

Furthermore, the powdered fruits and leaves of the following herbs are included in the clay pellets, at approximately 3% of the volume of seeds. Derris root (used against beetles), Japanese star anise (goats), Japanese andromeda (cows), Japanese bead tree (small harmful insects), sumac, and so on will protect seeds in the desert, before and after germination, from cows, goats, ants, and other harmful insects. It is also possible, in a region that is completely desert, to make and broadcast seed pellets of fertile jungle soil (black soil). This soil is a treasure house of soil microorganisms and seeds and is of great value in actual use. Also, in the case of broadcast from airplanes, the pellets may break easily, so it is good to coat them with the synthetic resin Polyzol, which is porous and absorbs water well. In place of Polyzol and other high polymers, seaweed paste may be used.

In addition to the fact that the fungi in the clay pellet described here facilitate the development of the seeds and the bittern and herbs protect them from being eaten; the slaked lime improves the soil. Thus, even in vast desert areas, where conditions for germination are poor, revegetation can be achieved simply by sowing the seeds, without concern about time or place. The practical results achieved in Africa, the United States, India, and the Philippines are backed up scientifically by my fifty years of following the natural farming method of no cultivation, no fertilizers, and no agricultural chemicals.

This pellet is not limited to the above mentioned examples, but can be put to use in various ways, given suitable changes. For example, it is possible to add seeds inoculated with fungi to kneaded clay and push the mixture through a screen or net."

Method to use Clay Pellets in growing grains

From the book The One-Straw Revolution:

"Rice, barley, and rye can be successfully grown while the fields are covered with clover and weeds all year long. Let me review in greater detail the annual seeding and harvesting schedule in these fields. In early October, before the harvest, white clover and the seeds of fast-growing varieties of winter grain are broadcast among the ripening stalks of rice. The clover and barley or rye sprout and grow an inch or two by the time the rice is ready to be harvested. During the rice harvest, the sprouted seeds are trampled by the feet of the harvesters, but recover in no time at all. When the threshing is completed, the rice straw is spread over the field.

White clover is sown about one pound per quarter acre, winter grains and rice 6.5 to 13 pounds per quarter acre. For inexperienced farmers or fields with hard or poor soil, it is safer to sow more seed in the beginning. As the soil gradually improves from the decomposing straw and green manure, and as the farmer becomes more familiar with the direct seeding non-cultivation method, the amount of seeds can be reduced.

If rice is sown in the autumn and left uncovered, the seeds are often eaten by mice and birds, or they sometimes rot on the ground, and so I enclose the rice seeds in little clay pellets before sowing. The seed is spread out on a flat pan or basket and shaken back and forth in a circular motion. Fine powdered, clay is dusted over them and a thin mist of water is added from time to time. This forms a tiny pellet about a half inch in diameter.

Another method for pellet production

First the unhulled rice seed is soaked for several hours in water. The seeds are removed and mixed with moist clay by kneading with hands or feet. Then the clay is pushed through a screen of chicken wire to separate it into small clods. The clods should be left to dry for a day or two or until they can be easily rolled between the palms into pellets. Ideally there is one seed in each pellet. In one day it is possible to make enough pellets to seed several acres.

Depending on conditions, I sometimes enclose the seeds of other grains and vegetables in pellets before sowing.

Between mid-November and mid-December is a good time to broadcast the pellets containing the rice seed among the young barley or rye plants, but they can also be broadcast in spring. A thin layer of chicken manure is spread over the field to help decompose the straw, and the year's planting is complete.

In May the winter grain is harvested. After threshing, all of the straw is scattered over the field.

Water is then allowed to stand in the field for a week or ten days. This causes the weeds and clover to weaken and allows the rice to sprout up through the straw. Rain water alone is sufficient for the plants during June and July; in August fresh water is run through the field about once a week without being allowed to stand. The autumn harvest is now at hand.

Such is the yearly cycle of rice/winter grain cultivation by the natural method. The seeding and harvesting so closely follow the natural pattern that it could be considered a natural process rather than an agricultural technique."

International interest

In 1979 when Fukuoka was in the United States he understood intuitively that rain does not fall from the heaven; it rather springs forth from the ground. In 1986 during his second visit in the United States, the director of the Committee for Desertification of the United Nations in New York asked Fukuoka to develop a project for the prevention of the desertification in Iran and Iraq.

Since that time Fukuoka had been travelling for more than twenty years all over the world, leading efforts for the regreening of the deserts in Asia, Africa and Europe.

The Fukuoka's farming method has gained recognition in the international scientific community.

More than twenty five years ago, the Japanese Ministry of Agriculture, after a long investigation, officially announced that Fukuoka's method was the simplest and most effective method in growing grains and the best one from an economic point of view.

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- Seeding in Greece and other Mediterranean countries in order to create a green belt from Portlugal to Iran, Iraq.
- Establishment of vegetable self-sufficiency gardens and natural farms in Greece and abroad.
- Collecting seeds in collaboration with individuals and groups for the realization of sowings.
- Practical workshops with students of Primary and Secondary school.

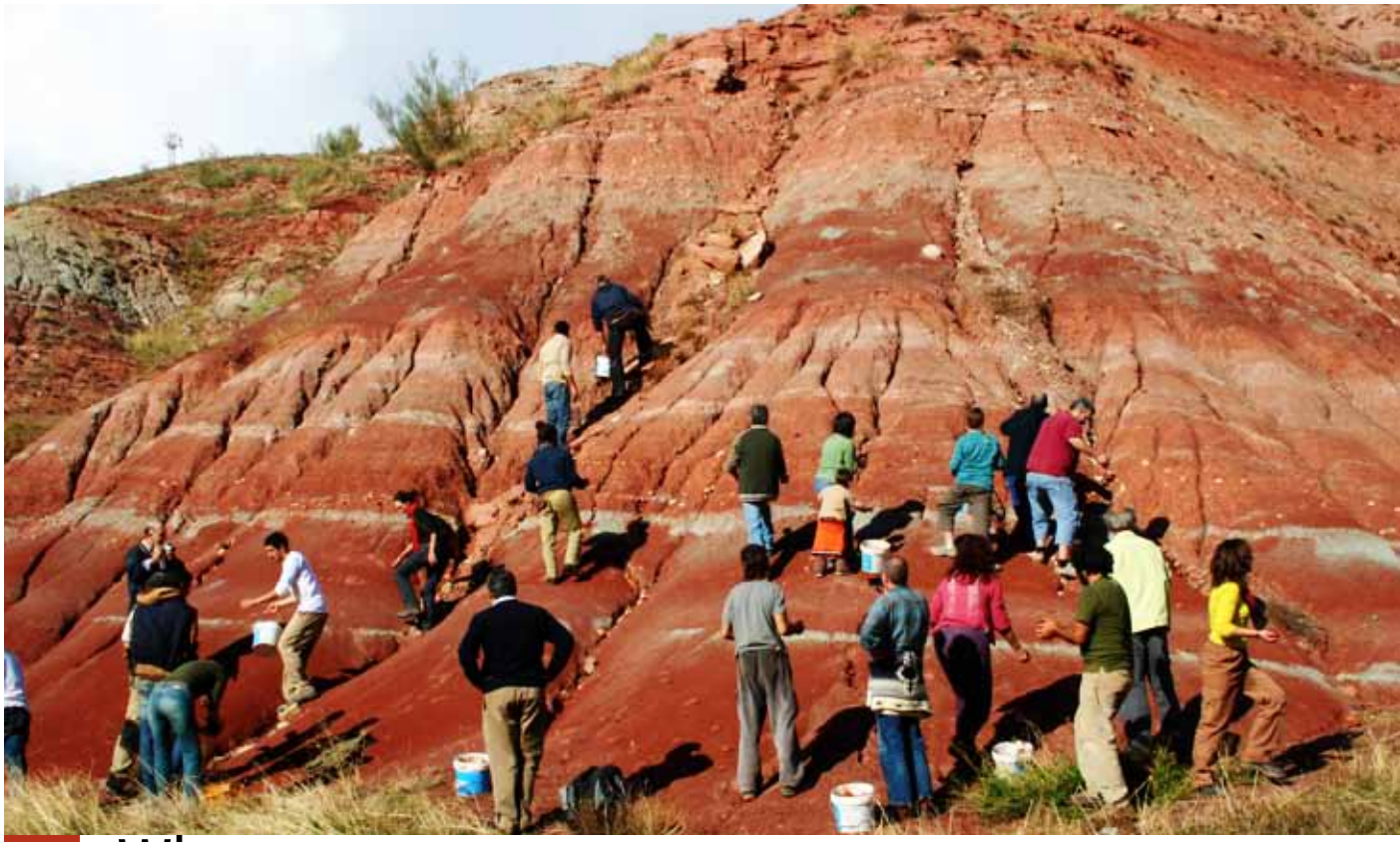
Every year, from August to mid-September, volunteers from different parts of the world make clay-balls for the realization of large sowings in Greece. Up to now, similar sowings have taken place: in India, on the initiative of the ex Prime Minister Raman Rao; in China, in cooperation with the Ministry of Forest; in Tanzania; Portugal; Italy; Argentina; and in other countries.

To learn more

http://www.naturalfarming.eu

The texts of Masanobu Fukuoka have been translated and published in many countries:

- The Ultimatum of GOD NATURE
- The One-Straw Revolution
- The revolution of God, Man and Nature, Masanobu Fukuoka
- The Road Back to Nature
- The Natural Way of Farming, Masanobu Fukuoka



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The IDEASS Programme - Innovation for Development and South-South Cooperation - is part of the international cooperation Initiative ART. IDEASS grew out of the major world summits in the 1990s and the Millennium General Assembly and it gives priority to cooperation between protagonists in the South, with the support of the industrialised countries.

The aim of IDEASS is to strengthen the effectiveness of local development processes through the increased use of innovations for human development. By means of south-south cooperation projects, it acts as a catalyst for the spread of social, economic and technological innovations that favour economic and social development at the local level. The innovations promoted may be products, technologies, or social, economic or cultural practices. For more information about the IDEASS Programme, please consult the website: www.ideassonline.org.

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Innovation for Development and South-South Cooperation

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In the interested countries, ART promotes and supports national co-operation framework programmes for Governance and Local Development - ART GOLD. These Programs create an organized institutional context that allows the various national and international actors to contribute to a country's human development in co-ordinated and complementary ways. Participants include donor countries, United Nations agencies, regional governments, city and local governments, associations, universities, private sector organizations and non-governmental organizations.

It is in the framework of ART GOLD Programmes where IDEASS innovations are promoted and where cooperation projects are implemented for their transfer, whenever required by local actors.