

2. The Soil Is the Foundation

In our seminars we teach the fundamentals of Sustainable Agriculture. Some call it Organic Farming, some Nature Farming, others Natural Farming. There are subtleties that can make them a little different, but the commitment is to safe, quality food production without chemical inputs. If we feed the soil organic matter, then the microbes will feed the plant. Pest and disease management can be obtained naturally. Building up the soil and managing the organic matter as it is converted into humus is an age-old method.

A Natural Farming System for Sustainable Agriculture in the Tropics

Humus is the rich, sticky, yet crumbly substance found in healthy soil that is the world's greatest resource. It has to be properly managed, preserved and can be increased through microbial activity that converts organic matter from roots, compost, manure or crop residue mulched on the surface or plowed under as a green fertilizer.

Did you know rain forests never get "sick"? That's right. They have reached a climax vegetative state that keeps them stable permanently. If you don't kill all the grazers, prairies can function indefinitely also. That's why indigenous North Americans used natural grass fires to keep the land productive. A localized forest fire can create better forest as it burns off undergrowth and releases certain nutrients locked up in the cellulose. Even humus and peat can burn if one is not careful.

Of course when systems are altered unnaturally, things go bad rather quickly. As soon as we disturb the soil, clear trees or concentrate livestock, we have special management challenges. Natural farming is a bit of an oxymoron because tilling soil by the hectare isn't natural. Once you plow or rearrange the soil, it is unnatural, but we can copy the systems that help our plants grow. We can simulate the forest floor effect by using the ten fundamentals discussed later in this book.

Practices such as minimal tillage and inoculating with beneficial microorganisms quickly build up effective soil systems that have the structure, nutrients and microbial balance to produce food for generations to come. By adding organic matter in the soil and on the surface, the soil is fed. Actually, it is the microbes in the soil that

consume the sugars, nitrogen, complex carbohydrates, fats, and all the other goodies that accumulate in topsoil. They excrete amino acids, root dividing hormones, anti-oxidants etc. This in turn is made bio-available to the roots in the rhizosphere (root zone) down in the soil. That's why we say; “feed the soil, don't feed the plant.”



Biologically, soil is a complex food web that creates stability when properly fed and nurtured.

Dr. Elaine Ingram, who is the founder of Soil Food Web Inc., <http://www.soilfoodweb.com>, is a leading proponent of bacterial and fungal balance through proper composting, inoculation, testing and regular monitoring. She teaches her farmer-clients to supplement their

A Natural Farming System for Sustainable Agriculture in the Tropics

organic practices by using high quality composts, fed with molasses, fish emulsions, and trace elements while being aerated. Called ACT, aerated compost teas populate to high numbers while crowding out pathogens. The finished tea is sprayed throughout the farm or garden. She emphasizes high fungal counts for perennial plants, orchards and trees, while higher bacteria counts can be obtained from specialized compost teas for vegetables and annuals. They even test and review compost, soil, and tea as well as tea brewers.

Ancient inoculation systems have been very useful for small-scale applications. Both Korean and Japanese farmers have been gathering soil from the forest floor and mixing it with rice bran. They utilize a process of fermentation for favorable composting and propagation of large numbers and varieties of microorganisms. This is anaerobic composting without disease build up or foul odors.

They place the mixed soil and bran into clay jars for up to one month, and then use it in their farm system. They also make garlic and ginger extracts for insect control. Often referred to as KIMCHI farming, this method has proven the powerful effect microbes can have on a simulated natural environment. Their techniques have been utilized for their foliar sprays more than soil



management. They have a soil treatment with rice bran and microbes, but for unknown reasons, it is not being promoted at this time.

The Korean method still thrives to this day. We have used the complete system with success and continue to integrate components of this ancient technology in our cropping and livestock operation.

The Japanese word for fermented plant matter is BOKASHI. We have adapted a formula for use in the Philippines utilizing industrial wastes such as coconut (copra) meal, rice bran, charcoal and manures. The formula is highly adaptable and will be discussed at length later in this book.



Korean Natural Farming – We started our microbial program by multiplying beneficial microbes through anaerobic fermentation in clay jars.

A Natural Farming System for Sustainable Agriculture in the Tropics

Professor Teruo Higa, at the University of Ryukyus, Okinawa, Japan, has studied and isolated the naturally occurring beneficials for large-scale utilization. His method is to group different families of microbes together to form a cohesive unit, a symbiotic consortium of compatible microbes that keep out disease and efficiently convert waste into wonderful organic amendments, feed stock, and fertilizers. This is one way we build up our soil for the long run.

He has proposed a soil classification based not on structure, but on microbial health. The soil is classified according to the types of microorganisms present, including beneficial microorganisms. The most productive of the 4 classes: a soil that is not just disease suppressing, but zymogenic, able to influence plants so that they grow into disease resistant champions. He focuses on the oxidative and fermentative by-products the microbial colony produces.



Higa has packaged the technology and priced it according to the economy of each nation it is produced in. There are over 50 countries that sell Dr. Higa's Effective Microorganisms (EM1) through the Effective Microorganisms Research Organization (EMRO). They all contain hundreds of different beneficial species, with 3 main families of microorganisms. They are all naturally occurring and not modified at the genetic level (Non-GMO). In the US they are OMRI approved as organic inputs. Completely safe, these little workers are like soil livestock. They are not chemicals, but a living consortium of microbes that convert waste

into plant food, root dividing hormones, amino acids, etc. EM1 also works as a probiotic in livestock.

Dr. Higa found the phototrophs indispensable to the technology. These photosynthetic microbes synthesize sunlight when applied to leaves, thus enhancing the UV utilization. They convert the sun energy into plant food that will be taken in through the leaves pores (stomata). The microbes produce foliar feed, but they are not fertilizer. Most batches contain *Rhodospirillum rubrum* sp., *Rotobacter*, and like species of Purple Non Sulfur Bacteria (PNSB), because of their adaptability in different environments.

They can actually work without UV in an oxygen free vessel or buried in soil or compost. Anaerobically, these adaptable little agents use heat energy instead of sunlight to convert organic matter into fertilizer or higher quality feed. They must be present in sufficient quantities. Molds, Actinomycetes, and fungi are found in a typical mix of EM1. They are important because they convert cellulose into outstanding soil components like humus, humic acids, mycelium, etc. That means the finished product is *high-quality-crumbly-rich-friable-compost*. Lactic acid bacteria make lactic acid. These surgeons of the microbial world biologically exclude pathogens by out eating the competition. You don't need to kill off the bad guys, just starve them out by radically outnumbering them with the beneficials. They all work together to stabilize the soil and produce great food while minimizing disease. They are part of an overall program that is helping tropical farmers succeed with lower risk. They help build up the soil if properly inoculated. Let's see how we do it here at Aloha House.

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The Backpack Sprayer is standardized in Asia. It holds 4 gallons or 15 liters and is easy to repair. We can always find replacement parts. It can be refilled efficiently and is economical; one man can cover up to 2 hectares using this clever invention.