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YOU CAN STOP SOIL DESTRUCTION

Mankind has had almost 6,000 years in which to learn sensible management of his environment. But sad to say, we have been a miserable failure in this exercise of dominion and rulership. Soil, plants, animals and man himself have all suffered; but SOIL -- the most fundamental part of creation to our survival -- is the most abused!

Is it not ironic that MAN -- the only life form with the power of intellect -- is the one misfit species, the one disruptive physical force that has constantly denuded, demolished and destroyed?

Instead of fighting against 'nature' we should long ago have learned to work with it and fit our lives into the pattern of laws by which the physical creation operates.

That soil is basic to man's environment is such a simple truth that most people would claim to understand it. However, collectively man has never acted as though he did!

This article aims to pinpoint the No. 1 killer of soil fertility and then show man's basic errors in soil management. We then go on to prove that soil destruction CAN and MUST BE STOPPED!

Healthy and productive soil is made up of at least four vital components:

1. ROCK PARTICLES -- finely ground
2. ORGANIC MATTER -- in all stages of decomposition
3. SOIL ORGANISMS -- living and active
4. MOISTURE -- available in optimum quantities

You might think that this is surely 'kid-stuff' especially to the average farmer, but it is not. Farmers are mostly far too pre-occupied with such things as weed-control, high yields, rapid crop turn-around and maximum grass utilization. In other words -- SHORT-TERM ECONOMICS!

These are just a few of the pre-occupations in man's long war with the soil. Destruction of virgin rich fertility of thousands of square miles has changed or banished plant and animal populations and drastically altered climatic conditions. Man's effect on his environment has invariably been BAD!

Farming -- Ancient and Modern

Anyone who has travelled through the dusty, barren, rock strewn nations of Spain, Italy, Greece, Asia Minor, Lebanon, Palestine, the sands of Egypt and 4,000 miles of North Africa, has witnessed the tragedy that can overwhelm once productive land! This is a direct result of tearing off the organic top-cover. The

deserts of North Africa, Mexico, Central Asia and what was once called The Fertile Crescent -- Mesopotamia, depict the ultimate in human destruction of God's creation.

Down through history many Middle East nations have hacked their environment to pieces, smashed every ecological law and trampled them into the hot sand underfoot. They were either swallowed up by history or now stand in swirling dust with the begging bowl extended for international aid. (This is not to condemn specific nations or people -- and those who would do so should remember one thing. We all stand condemned! We all have ancestors who came out of that area and had their hand in its reduction to the blinding sand and blasting heat of a semi-nomadic desert.)

Those of us who have moved on to 'conquer' the new lands of America, Australia, Canada, Rhodesia and South Africa have achieved a much higher rate of destruction than our ancestors! That which took them a millennium, we did in less than 200 years!

Much of the poverty of China, Russia and India has been caused by removing the protective plant material on top of the soil. The dustbowls, eroded hills and 2,000 completely silted dams in America have been created in this way! So have the bleak moors and treeless hills of Britain and also the dusty windswept grainland of East Anglia!

Grain Monoculture -- No. 1 Soil Killer!!

Yes, even in the highly protective environment of Britain, the whole nation has been regularly torn apart by the see-sawing effects of wrong land usage. The graph of destruction has shown a record upsurge in the last 25 years. This is due to following that same monoculture system that has produced such disastrous results in the main grain areas of the world!

There are three principle ways in which man has built up this deplorable record of dealing out death to a beautiful and productive living environment:

A. Cutting down forests and woodland.
B. Over-grazing of grassland.
C. Grain monoculture.

All three, individually and collectively, leave the previous top-soil exposed to sun, wind and rain. But grain monoculture brings the most rapid deterioration. Why? Because of:

1. Deep ploughing.
2. Long term fallowing.
3. Stubble burning.

Continuous cropping results from human greed and/or lack of vision. While repeated fallowing, (cultivation between successive crops) is done for two main reasons -- to kill every unwanted plant just as soon as it rears its head and (believe it or not) to conserve moisture!

That's right! Intelligent men, thousands of them, (even from our great

scientific training establishments) advocate this system of moisture conservation. By keeping the soil bare it exposes the surface to every extreme of the elements. Evaporation is temporarily speeded-up with each tilling, but men still pursue it as the most popular method of conserving moisture!!

Soil Texture Breaks Down!

Multiple cultivations extending over many months are done for two other important reasons -- particularly during the latter stages of soil destruction:

A. Weed control.
B. To produce a fine seed-bed.

But once the texture of clay soil breaks down, (as it does through depletion of plant residues) it is cultivated only with increasing difficulty!

When wet, clay soil in this structural condition will hopelessly bog even a crawler tractor. And when dry it turns up in giant concrete-like blocks that resemble the fruits of a recent earthquake rather than a seed-bed for planting cereal grain!

Farmers then rely on months of freezing and thawing, or blistering heat and repeated cooling to break these lumps down. Even then only the most sophisticated farm machinery will smash them!

Right here in England soil structure in some areas is unbelievably bad. We have photographic evidence of a personal friend standing in one of his fields which is strewn with clay chunks bigger than a man's head! This degree of "tilth" was the sum-total of his progress toward a prepared seed-bed after three cultivations in 1969!

In recent months the London Daily Telegraph carried a picture of men actually digging roses in a nursery in East Anglia with a pneumatic drill!! Can anyone cap that story?

When structural breakdown in clay soil reaches these limits, (which is the equivalent of moving sand-dunes in light soils) it is surely time to start searching out a few simple answers.

However, man is still not willing to admit defeat at the hand of "Nature". In fact he has so long followed the bare-ground system of agriculture that to him, any other way appears wrong and doomed to failure! But the truth is that it is man and his environment that are 'doomed' ! Nothing short of a complete about-face will avert this catastrophe!!

This globe-encompassing turn around MUST come and we feel that preparing for it is the most important job of the Ambassador College Agriculture Programme!

Soil Structure

Good structure and high fertility in soil always depend upon a regular return of organic residues in an adequate quantity. This is a principle that is almost babyish in its absolute simplicity of concept, understanding and application. It

should NEVER be necessary to stress such a simple point. However, it is perhaps the most commonly disregarded principle in all man's agriculture!

So uncomplicated is the equation that it should never be misunderstood -- DEAD ORGANIC MATTER RETURNED TO THE SOIL EQUALS A FREE AND ADEQUATE SUPPLY OF NUTRIENTS TO THE SUBSEQUENT CROP!

The free and beneficial forces that this one step will trigger into action are quite remarkable. It is as though earthworms, bacteria and other soil organisms are constantly 'waiting in the wings' to spring instantly onto the stage of life. They appear ever-ready to jump in and fill any ecological gap, if only man will temporarily remove his grasping hand.

Soil texture is rapidly improved by these agents of decomposition. Water no longer hurries past on its quick journey to the sea. That which was impervious becomes porous, while that which was all too porous and prone to leaching, becomes more absorbent.

New-found moisture retention ushers in multiple benefits for the wise farmer. It reduces both the needed volume and frequency of rain and at the same time, the extra growth thus promoted encourages more precipitation. Organic residues, increased soil moisture, improved drainage and added top-cover moderate ground temperatures. These produce a warm-blanket effect in the depths of winter and a highly efficient protective shield in the blistering heat of summer. This moderating effect is double acting as it tends to telescope the periods of climatic extremes from both ends.

An Individual and National Responsibility

It should not be too difficult to visualize what would happen if these same simple principles were applied nation-wide. After all, who would not like to live in the comfort of a pleasant climate and the beauty of lush green surroundings?

The average farmer would do well to pause and ask himself just why he is so involved in grain production. Also, governments might ponder the minimum grain needs of their nation and the effects of current production on soil fertility! As crops make the greatest demands on fertility, it would seem logical to question whether we really need all our millions of tons of grain, let alone huge unsaleable surpluses!

Has anyone for example, ever determined whether the British barley-beef industry exists for the purpose of producing beef, or consuming barley???

The American Feed-lot system is similarly suspect because of its enormous grain consumption. It should hardly be necessary to point out that ruminants are specifically designed to eat GRASS. That applies regardless of the economics of 'cheap' grain and any national need to get rid of huge surpluses of low quality grain.

Soil Microbes Need Good "Grazing"!

The Bread, Poultry and Brewing industries appear to be the important 'legitimate' mass users of grain. And many farmers supplying these industries have

asked for guidance on the preparation and maintenance of their cereal acreage.

Arable farming makes heavy demands on soil fertility. You would therefore think it almost inconceivable that grain producers would destroy their cheapest source of organic residues. But they do! In some "advanced" countries they have been OFFICIALLY ADVISED TO DO SO! The current practice in the monoculture system is to burn the stubble or straw that remains after the grain harvest. Burning these already insufficient plant residues has been well described as the equivalent of building a bonfire out of pound notes!

Stubble burning will hasten soil deterioration even in semi-intensive cropping systems. Organic residues take on enormous value once a man orientates himself towards sound agriculture! On the other hand they are a positive embarrassment to monoculture farmers, especially where they depend most heavily on artificial fertilizers. Some grain growers have been surprised to find ploughed-in straw almost unaffected by decomposition even after one or two years. The reason -- their soil is virtually dead! No life remains to do the job of decomposition, because of the hostile environment. The classic symptoms are an acid pH, poor aeration, bad drainage and the absence of humus.

The penalties for poor soil management are self compounding. In other words, the more man relies on artificial fertilizers the more he has to apply. The more he applies, the more acid his soil becomes. The more acid the soil becomes, the more life will disappear from the soil. The more life disappears from the soil, the more plant residues remain undecomposed. Then the farmer "has" to rely on artificials.

Though plain straw is not a very balanced diet for earthworms and soil micro-organisms, they prefer it to chemical fertilizers! The value of straw residues can be be improved by under-sowing cereal grain with a low growing legume. Such correct soil management requires the farmer to plan his supply of organic residues one crop in advance. This practice acts like a type of insurance policy too, because it enables the farmer to make a quick switch from cereals to pasture at almost any time.

Undersown legumes will be established in the field by the time the grain crop is harvested. The remaining stubble will then continue to give good protection, ultimately breaking down into a useful mulch. Any grain that is passed over the tail of the machine at harvesting will germinate, adding both grazing and mulch material.

Management

Wise after-harvest grazing with sheep and/or cattle will ensure a return of valuable animal residues to the soil. The real significance of this light dressing of animal manure is something that practically NO-ONE appreciates and few even understand. We feel, that the vital impact of limited grazing comes not from the small addition of residues, but rather from the soil inoculation by rumen bacteria. These appear to be passed by the animals in their droppings. And their timely re-introduction into the soil corresponds ideally with a needed speedy late summer breakdown of organic residues before planting the next crop.

Once broken down these residues form a valuable additional source of plant

nutrients to the nitrogen already fixed in the soil by the under-seeded clover.

We are not prepared to claim that poverty-stricken grain-land can be continuously cropped and at the same time built up fertility-wise. But many successive grain crops could be taken under this system, from a rich soil, without 'artificials' and without lowering its fertility. Any discrepancy in yields should be more than offset by lower disease losses, improved grain quality and no fertilizer expenses.

Let no farmer think that it can't be done! The Australians and others who sow at one bushel per acre, might ask themselves: Are they getting yields of 33 bags to the acre under their present system? In Britain where the seeding rate is more like two bushels per acre, the farmers might ask themselves are they getting yields of 107 cwts.? Of course not! Sounds ridiculous doesn't it?

Well then, we suggest that you check in the Old Testament and see for yourself where the Patriarch Isaac (some 4,000 years ago) did just this!! (Gen. 26:12) He certainly did not have access to chemical fertilizers. His fantastic yields were produced on the NATURAL FERTILITY of Palestine's coastal plain.

Soil Fertility -- Only Road To Success!

Such agricultural production is not possible today in that same area, or in ours either! But it has been done in the past, so don't we need to ask ourselves -- what has man done to soil fertility since that time? PLUNDERED IT, of course, down through the centuries!! And most of us are still plundering!

Any programme for rapid re-building of soil fertility levels would almost certainly require that the area be turned over to pasture. However, much more can be done than at present even on ground that is still in grain production.

In some areas for example, farmers miss an opportunity for soil improvement by not grazing newly sown cereals. This can be done as soon as the plants' root system is developed enough to avoid them being pulled out of the soil by the animals. In England, many farmers roll their cereal crops in the early growing period, but few ever turn livestock in onto them. (All too many don't even own any grazing animals! Of course they don't see the absence of livestock as a fundamental error in a wrong system, but rather as a perfectly natural result of specialization.)

Early grazing of crops produces both the 'tillering' effect, (as in rolling) and a return of animal residues.

Where cereals are sown early, good initial growth will usually be achieved and regardless of whether grazing is practical or not, real success has been achieved by mowing. If done at the right time and at the correct height, it will have the same effect as 'topping' the rank growth of a pasture. It is widely accepted that this practice benefits pastures, but how many have ever considered applying it to cereal acreage? And why not -- are cereals not grasses?

Correct Cultivation

Under most circumstances, literal "ploughing" will be unwise, because it tends to bury a usually insufficient supply of organic residues out of reach of the

roots of most plants. This also interferes with normal decomposition. Deep burying of residues cuts off needed oxygen for the first stage of bacterial decomposition. (For further information on the "evils" of the "plough" -- see the book Plowman's Folly by Edward Faulkner.)

Long-term fallowing is an old established practice which cuts directly across most of the principles of natural farming, in ways that have already been pointed out. Take moisture conservation as an example -- it may sound heretical to many ears, but the way to achieve this is by keeping maximum top-cover on the soil! Fallowing is the antithesis of this!!

Consider also the subject of weed-control. Fallowing aims to dispose of "weeds" (they are well worth looking into) in their earliest stage of growth. This is yet another point on which man's views are totally upside-down. Weeds (which is a label men hang on certain plants) are not necessarily the ideal protective top-cover for soil, but they certainly come a long way ahead of the old idea of bare fallow-ground.

Incorporate Organic Matter

Most farmers are stopped by the fact that it costs money to buy seed and drill a crop that is just to be turned back into the soil as green-manure. It shouldn't, (because it is such a valuable soil-builder) but if you find yourself presented with such a crop -- FREE and growing at high speed -- why hurry out in a swirling cloud of dust and diesel fumes to kill it?

This is not an article on weeds, (we do recommend Joseph Coccanouer's book, "Weeds Guardians Of The Soil", published by Devin-Adair Co. New York.) and it is a subject on which it is difficult to generalize, but often farmers would be wise to postpone repeated cultivations for weed-control. At every cultivation one should aim to turn as much green matter as possible back into the soil, NOT as little as possible!

Sometimes it may even be both practical and profitable to use the mower and delay that cultivation until later. Anyway the main thing is to keep an open mind on this and any other controversial aspects of your agriculture. (We all allow our minds to get locked-in-gear with preconceived ideas. But then how did we come by such ideas in the first place?)

A thick crop of weeds will not only keep the soil covered, but bring needed minerals to the surface and provide a free source of humus-building material for bacteria and earthworms.

As far as the preparation of fine seed-beds go -- you'll achieve more success through adding plant residues, green-manure crops and by multiplying life in the soil than by anything you can do in the way of mechanically thrashing your land.

In other words "tilth" is something to be biologically obtained, NOT mechanically!! It must NOT be done by repeated cultivations and the exposure of bare ground to the extremes of blistering heat and freezing cold. (Did you ever reflect

on the economics of employing a 100 h.p. mechanical ripping device to do the same job that a little child should be able to do with its fingers?)

The Source Of Your Organic Supply

Most farmers today are horrified at the thought of not being able to rely on bagged fertilizer, (usually artificial) but what will happen to their yields when the sources of chemical fertilizers are exhausted? (There are areas where this has already happened.)

The system adopted by so-called "organic farmers" is charged with the inherent weakness of depending on begging, borrowing or stealing plant residues from the next-door neighbour. In many cases this is quite true, their system does. But is that any different to chartering a ship and sending it to load rock phosphate dug out of a hill-side owned by someone in North Africa, or bringing Chilean nitrate from South America?

There is only one system that can work effectively and indefinitely on a world-wide basis. That is one where man learns to handle his land so that each square yard produces its own organic residues. This doesn't have to be an inflexible rule, but the overall principle is basic. Any other system developed by man is total foolishness in the context of millenniums of time and embracing the whole of creation on this planet!

This is what makes the growing of your own plant residues so fundamental in any form of agriculture you undertake. All the evidence is before us. We need only to open our eyes and minds to it. It's in the creation all around us!

We Must Learn From Natural Surroundings!

Take a look at the forest floor. It best illustrates these laws in operation. Here there is always an abundance of organic residues, in all stages of decomposition. These residues have many beneficial effects, but two that point up the futility of long-term fallowing are:

A. They drastically curtail temperature fluctuations.
B. They act like a sponge in conserving moisture.

(As we have already seen -- warmth, moisture and a supply of organic matter are three pre-requisites for the maintenance of healthy, living soil.)

One of the most rapid and effective ways of bringing about these "forest-floor" conditions is through the maximum use of the mower during the growing season. Under restricted grazing conditions a lot of top growth will be made. If the mower can be put over the fields regularly after the stock have been rotated to a new pasture, much green organic matter will be left lying where it can rot back into the soil. Three inches is a good mowing height, but this will vary with density of the pasture and current weather conditions. Don't mow too high or grasses will shade your clovers out. Don't mow too low or surface moisture may dry out with a few days' sunshine. On the other hand you may leave a too thick blanket of mulch and kill any re-growth.

Protecting soil with a covering blanket of plant material is nothing new.

We did not discover it! And neither did anyone else! It is a God-given law that has been staring man in the face since Creation.

The Life-cycle Is In Man's Hands!

The only areas of soil that are bare and exposed in a productive climate are rendered that way by human action. Through self-deception, man has ignored the fact that God's system of natural law has always operated toward building a protective top-cover over the soil. Take away that protection and you have smashed the whole cycle of physical life!!

First to disappear are the soil organisms, (the agents of decomposition) then there is an immediate shortage of plant nutrients. Legumes and the finer, surface-rooting grasses disappear and eventually even the deep-rooted plants die out. By this time no animal can survive on this barren wind-swept plain, so man himself must hurry off over the horizon before he too is overtaken by starvation and death!

We Must Face Facts

Our environment is not something to be treated like a toy. And yet the story of man can be summed up as 6,000 years of frustrated human manoeuvring and manipulating every conceivable combination of those forces which provide our only true source of natural increase and in fact -- life itself.

At the first sign of break-down in the life-cycle other problems begin to develop. They start up their own cycles of degeneration, to which are attached many costly and painful penalties.

As soon as the supply of plant nutrients is upset, disease begins to appear in the various forms of vegetative top-cover. Man could correct the problem in his soil, but he usually treats the symptom by spraying his plants with certain chemicals, (herbicides, pesticides, or fungicides). These are expensive and will NEVER solve the problem. How can they, if they are not treating the CAUSE? They do however, often intensify the problems by reducing natural biological protection.

A Chain-reaction From Sick Soil

If a plant is "saved" that means it should have been destroyed, because in order to need "saving" it must be unhealthy. Healthy plants survive anyway! Our actions often interfere with that important function of "pests" -- to prevent unhealthy plants arriving in the animal feed-trough and on the human dinner-plate.

The next effect in this chain-reaction, if it is allowed to go unchecked is a weakening of both animal and human health.

At this point, yet another of these endless series of cycles is triggered off and each stage becomes more expensive than the one before it. When man rushes to suppress the disease in his animals he once again treats the symptoms by using drugs. The cause is in his soil and the animals he rescues are the ones that should die and not reach the dinner-table.

If the human diet is largely made up of deficient plant and animal products

even a child can guess the end result! And again what is the basic cause? The soil! Now begin to add up the cost of treating human disease, it is astronomical!! Pile on top of that the cost of treating plants and animals. Add to that the huge quantity of produce that is written off and finally try and total-up the human suffering and millions of lost man-hours. How can you begin to put a price on healthy soil? And yet we take it so much for granted!

Law-breaking ALWAYS Exacts A Penalty

Why is man prepared to continue paying this incalculable price when we get nothing but trouble in return? There are three main reasons:

A. It often looks expedient to do so.
B. We have been falsely educated into a wrong system.
C. Men's minds are naturally hostile to obeying the laws that govern our environment.

Every individual food grower and every specific nation that has fallen victim to the habit of soil destruction must pass through the fiery and painful process of rebuilding.

Experiments! Experiments!! Experiments!!!

In many areas experiments are going on for the purpose of comparison between lots of different systems of soil management. The variations are endless, but all can be divided into TWO basic divisions:

A. CHEMICAL or ARTIFICIAL
B. ORGANIC or NATURAL

Every experiment is evaluated from one great false premise -- will it give a higher financial return than the other systems and a return comparable with all other industries?

This is comparing a system that obeys the natural laws with those that break them! People can therefore sit around "comparing" and "evaluating" for as long as they like, but that won't change one tiny aspect of the iron-clad laws governing man's environment!

Don't say -- one can't ignore economics, (and does our present sick society make economic sense?) No! A nation, or even the whole world may set up a social order that completely discriminates against the producers of quality food. But it will ultimately be the "social order" that changes -- NOT THESE LAWS!!

To summarize the main points again:

A. Healthy soil is made up of: 1. Finely ground rock material. 2. Organic matter. 3. Soil organisms. 4. Moisture.

B. Modern farmers are too pre-occupied with: 1. Weed-control. 2. High yields. 3. Rapid crop turn-around. 4. Maximum grass utilization, to care about soil fertility.

C. Man's history has been one of creating deserts, but we are quicker at

doing it in the 20th century.

D. Forest to desert in two easy steps: 1. Cut down the trees. 2. Overgraze by heavy stocking, or follow grain monoculture.

E. Grain monoculture is the No. 1 soil killer, usually via 1. Deep ploughing, 2. Long-term fallowing, 3. Stubble burning.

F. Man's environment is doomed unless we rely on a regular return of organic matter to the soil in order to supply plant nutrients.

G. Does man need to produce such huge quantities of grain?

H. Returning crop stubble, under-seeding with legumes, together with intelligent use of mower and grazing animals are fundamental to soil fertility in arable farming.

I. Make every square yard of soil produce its maximum of plant matter, (even weeds, if that's all it will grow) but return as much as possible right back into that same square yard.

J. Soil tilth is achieved by returning plant residues, turning in green-manure crops and multiplying soil organisms, instead of mechanically thrashing soil!

K. Our environment surrounds us with the action of visible dynamic laws that ensure soil protection and fertility by providing a permanent top-cover.

L. Smashing the cycle of life produces a chain-reaction of sick soil, sick plants, sick animals and sick people!

M. Soil problems have always plagued man because: 1. He naturally does the thing that is most expedient. 2. He has devised his own system of false education and 3. He is always fighting "nature", thus proving his hostility to natural law.

N. The majority CAN be WRONG! And whether the process if painful or otherwise, we have no alternative but to change from a system that is <u>doomed</u> to <u>failure</u> to the ONE and <u>ONLY</u> way that <u>WILL</u> SUCCEED!

AGRICULTURE DEPARTMENT

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