

The Final Empire

Chapter 5

THE PHANTOM AGRICULTURE

The spread of civilized agriculture is undoubtedly the greatest catastrophe ever to strike the planet. Previous disasters such as the die-off of the dinosaurs are measured by the number of species lost. Since the advent of agriculture we are beginning to count the number of ecosystems destroyed. Each major food gaining method of the imperial system—herding, irrigation, plow agriculture, and industrial agricultural—progressively depletes the ability of the earth to sustain life. Civilized agriculture cannot endure.

The incredible growth of food supply, which has supported the huge populations of past and present empire cultures, has been funded by extorting fertility from the planetary life. Use of fossil fuels has exponentially increased the damage. These very food production systems have ravaged much of the earth where empires have historically been based. Empire food systems short-circuit the natural energy flow systems of the earth, first by eliminating the natural vegetation, then by draining the fertility of the soil with alien crops species. The natural climax ecosystem's fundamental contribution to life on Earth is to build soil. The exhaustion of the solar gain deposited in the planetary soil bank for our future life is ultimately the most devastating effect of empire.

The most complex natural systems generate the largest amount of energy and provide maximum stability. One reason for this is because a complex system includes a large number of sub-systems (niches), which can be used as alternatives in case of crisis. Complex ecosystems generate specialized plants and animals uniquely suited to maximize the energy of the system. Diversity creates stability.

Russell E. Anderson, a student of biological energy flows and energy pathways explains the energetic potential of the climax ecosystem in his book, *Biological Paths To Self-Reliance*:

"An undisturbed ecosystem, ...will develop or mature to a level of complexity in which energy-use efficiency is maximized and a steady or 'climax' state is achieved in which no net production occurs, i.e., the total bio(logical)-mass does not change. This climax status, characterized by great complexity, redundancy and diversity in the food chain, represents the ecosystem with the greatest energy capture and use efficiency."¹

While the thrust of the life of the planet is to increase complexity (diversity) and maximize energy circulation (sharing), the thrust of Empire is to simplify. Even if the agriculturist did nothing but clear away the climax ecosystem, the planet's life would

eventually run down. Because the soil is a perpetual flow system itself, it must be fed so that it can continue to maintain. If deprived of feed it will decline. Civilized development of all types interferes with the creation of soil. The climax ecosystem is the real planetary life. The whole living system we call the "natural world" functions together as a unified whole. Every piece of vegetation removed from the planet's surface by freeways, housing developments, logging, dams, airports, cities, estuary destruction, and clearing for agriculture, represents a decline in the planet's life, a deficit in the solar budget.

The following chart gives a general illustration of what occurs in the drive of life toward maximum diversity and energy flow. This is seen as a forest ecosystem matures, by monitoring the increase of population and number of species of one kind of life form through the succeeding phases of development. Each living thing contributes a number of different benefits to the system. We see in the chart that the diversity of species and also the general bird population increases as the system moves toward climax. Rising populations of plants and other animals necessarily support this increase in the system.

STAGES IN ECOSYSTEM DEVELOPMENT AND ASSOCIATED INCREASE IN BIRD

POPULATIONS

Ecosystem	Grassland	Shrubs	Low Trees	High Trees
Years	1-10	10-25	25-100	100+
Number of different species of birds	2	8	15	16
Density (pairs/40 ha.)	27	123	113	233

*(From Human Impact On The Ecosystem, Joy Tivy and Grag O'Hare.)*²

Increased complexity potentiates life and life's energy pathways. Different species of birds disperse different types of seeds, control various insect populations, and become food for various predators who can then live in the developing forest. The activities of each species can be looked upon as a specialized organ functioning within the life of the earth. As each organ is added, the life of the whole is multiplied because each organ creates new paths for energy circulation, connecting individual parts of the system in new ways. Each factor performs more than one function.

Honeybees are an excellent example of this multiplier effect. The energy which they expend pollinating the flowering plants is far less than the energy created by their

activities. If a human helps the population of honeybees, the multiplier effect goes up even more. As the pollinated plants increase, the bees increase and as both increase, the honey and plants available to humans increase as well as other benefits to the surrounding life.

The now extinct dodo bird of the Mauritius Islands in the Indian Ocean had a unique relationship with the Calvaria tree. The tree fed the dodo and the dodo transported seeds for the tree. The heavily coated seeds of the Calvaria tree had to pass through the abrasive digestive system of the Dodo in order to germinate. Now that the dodo is gone the Calvaria trees are dying out. None have germinated for three hundred years since the last dodo died.³ It is probable that this tree has vegetation, insects or other animals that lived in association with it or the microclimate that it created. Those connections are being severed also.

Howard T. Odum is perhaps the foremost student of ecosystem energy flows. Odum points out that "loop rewards" or "positive feedback loops" are necessary in any energy flow system. Odum explains how this energy sharing principle works:

"In ecological studies there is the positive feedback loop through which a downstream recipient of potential energy rewards its source by passing necessary materials back to it. For example, the animals in a balanced system feed back to the plants in reward loops the phosphates, nitrates, and other compounds required for their growth. A plant that has a food chain which regenerates nutrients in the form it needs is therefore reinforced, and both plant and animal continue to survive. Species whose work efforts are not reinforced are shortly eliminated, for they run out of either raw materials or energy. They must be connected to input and output flows to survive."⁴

Odum propounds the rule that states; "That system survives which maximizes the availability and use efficiency of power from all sources." This, the organs of life do by establishing themselves in a way that they potentiate the whole system so that other organs can grow upon them to further continue the purposes of life.

In order to clarify this further, by contrast, we can look at the way in which the culture of empire has replicated itself upon the Great Plains of North America. When the invading Europeans broke up the landmass with fences and private property, the net photosynthetic production of the Great Plains was degraded tremendously. Sixty million buffalo and millions of individuals of other species were eradicated because the European diet and system of mass production could not utilize this ecosystem in the way that the forager/hunters had for centuries. As the buffalo were slaughtered, there was no adequate market for all the buffalo meat or even all the hides. The "sod busters" who plowed the prairie sod had less usable product in terms of protein than the previous tribes of "buffalo hunters" who utilized the buffalo, deer, pronghorn, elk and other species. The present industrial agricultural system cannot produce the Net Photosynthetic Production or the variety of life of the original climax system. It is designed to interlock with a greatly simplified, but massive, food system based on bread, milk and meat eating, which lends itself to mass production and sale to markets. To the industrial agriculturist, biological energy efficiency is irrelevant. The industrialists' purpose is to provide production and profit, not to be biologically efficient.

Industrial Agriculture

Pundits and propagandists of the Chamber of Commerce and the "boomers" of the industrial system are fond of claiming the great productivity of industrial agriculture by pointing out how few farmers there are in ratio to the population. In reality, the most efficient systems are the most "primitive." Industrial agriculture is by far the most energy inefficient system of food production.

Hundreds of industrial workers participate with each industrial farmer. There are the oil field workers, oil refinery workers, the truck drivers, the plastics plant workers, the workers who create the packaging of farm produce, the packagers, distributors, wholesalers, delivery people and retail clerks. An enormous amount of machinery is required for this process. All machinery is produced by factories somewhere, by people who must be counted in the food production network. All the seed is dependent upon years of development by cadres of technical workers. The drying, freezing, canning, distribution and other processes rely upon an infrastructure of transportation and industry. If the food is from irrigated fields the input of effort stretches back through the digging of canals, the building of dams, laying out of the electrical systems to run the pumps, the planning of these systems and often the disruption of many lives that formerly occupied the space where the dam and its accouterments now exist. The industrial agriculturist does not simply go out to the swidden plot by his village and eat a fruit from the tree. Industrial agriculture is not just a planting of seed; it is a vast complex, expensive, energy intensive, destructive system that will ultimately collapse without possibility of recovery.

Like the imbalanced systems of grazing and irrigation, the industrial agricultural system is simply an extrapolation of the imbalance of the basic, time-honored agriculture. The great difference is that with so much energy invested in it the destructive results are apparent much sooner. Industrial agriculture is tremendously destructive of soils, of the nutritional content of the food and of the environment. The water borne runoff of manure, fertilizer and agricultural poisons are unbalancing life on a continental scale. The cost of this must be added to the already huge cost of producing industrial food. Every deformed baby in farming regions and every poisoned farm worker must be added to the cost.

As humankind has deviated from the natural balance, the energy cost and labor cost of feeding populations has gone up. The tribal Tsembaga people of the highlands in New Guinea raise sweet potatoes at an expenditure of approximately one kilocalorie of energy for each 16 kilocalories of food produced. Studies of the industrial system indicate that approximately 20 kilocalories of energy are required to produce one kilocalorie of food. The industrial system is obviously a high-cost, energy intensive system when all production factors are counted.⁵

The following table shows the true energy cost of selected agricultural methods and foods. In this table, rice grown in Indonesia is the most energy efficient crop/method while feedlot mutton has the highest energy input cost per unit of protein formed. For example, to raise peanuts in Florida required 1,000 kilocalories of energy for each pound of peanut protein grown while it cost 10,000 kilocalories of energy to gain a pound of egg protein in the factory egg raising system of the U.S.A.

Energy Input Per Unit Protein Formed (Kcal/lb.Protein)

Peanuts, Florida	1,000
Eggs, USA	10,000
Feed lot mutton, USA	100,000

This chart from the British magazine *Ecologist*, shows relative inputs of energy per pound of protein output for selected food producing systems.⁶

The largest part of the industrial farming system is the industrial infrastructure itself. If that infrastructure falters and machines are not produced, the food production system will not function. Within this general support of agriculture by the industrial infrastructure there are a few basic systems that support it directly. Each of these is an unsustainable, disintegrating system.

The first of these factors is the enormous energy investment. Through the techniques of industry, trade-offs have been made that replace the organic cycles of soil and climate. No longer do soils need to be replenished by organic feed. Now, fertilizer is injected into the soil that is directly translated from fossil fuel energy or fertilizer created from ocean fish- itself a part of the factory (fishing) system that is basically dependent for fuel upon petroleum. Petroleum is the base of artificial fertilizers. This is shown by one of the three main components, Nitrogen. It is industrially synthesized out of the atmosphere and requires five tons of coal equivalent energy for one ton prepared nitrogen. The industrial infrastructure relies upon oil for transportation, research and it comes directly to the field in terms of trucks, tractors, irrigation pumps, fertilizer and poisons.

With a system of food production that is so energy intensive, and is being spread to the Third World so rapidly, we must ask about the energy to sustain this. The myth in the imperial centers is that the First World is assisting the "Under developed" countries to reach the same standard of living as exists in the First World. This notion which is generally held, does not involve the reality of the petroleum resource base. The research team that produced the study *Limits To Growth*, found that if the whole world population had the standard of consumption that exists in the USA, the basic reserve of resources on the planet would be gone within ten years.⁷ Similarly, "If

every nation expended as much oil per head in agriculture as the U.S., current world oil reserves would be emptied in a dozen years."⁸ But, as this unsustainable survival system develops, it becomes more energy intensive each year. There is a definite law of diminishing returns in the industrial agricultural system:

"The best and most sobering example of that law comes from an assessment of the cost of past agricultural gains. To achieve a 34 percent increase in world food production from 1951 to 1966, agriculturists increased yearly expenditures on tractors by 63 percent, annual investment in nitrate fertilizers by 146 percent, and annual use of pesticides by 300 percent. The next 34 percent increase will require even greater inputs of capital and resources."⁹

The agricultural poisons that are a necessary part of the system translate from petroleum. During World War I, it was the oil industry that began to create the poison gases for the war. After the war their market began to wither until they realized a new market for the nerve gases as bug killers on the farm. Although not all farm poisons are now nerve gas related, the origins of the pesticide industry lay in WWI and are still based in the chemical-petroleum industry.

Many millions of people in the world today are fed by the increased food production produced by petroleum based agriculture. Georg Borgstrom said in 1969, "Close to 600 million people depend for their survival upon artificial fertilizers. Without this annually repeated supplementation of the soil with man-extracted minerals, approximately that number of humans would lack food."¹⁰ By 1980 we see that this system, even with added petroleum input, cannot keep up with population increase and when the petroleum runs out, the millions will be sitting perched on a branch with no trunk. There is no going back to the farmed out fields. We have already seen what these artificial fertilizer fed soils will be- exhausted. At that point, monstrous disasters will take place.

In addition to the petroleum base of the pesticide industry becoming exhausted, there is another unsustainable aspect of the pesticide industry and that is that insects develop immunities to the poison so that more is needed in greater strength, more often. The number of insect, tick and mite species that are now immune to agricultural poison is set at 428. As the pests develop resistance the industry turns out new and more deadly poisons but the industry is now hard pressed to keep up with insect resistance. The best plan the industrialists can come up with- which is costing them hundreds of millions of dollars- is to create plants through biotechnology that can withstand greater and greater amounts of poison.

In its war with nature the industrial system literally kills the soil community with poisons and the beneficial work of that ecological community stops. Dead also are the predatory insects that would eat the pests that the agriculturist seeks to eradicate. Dead also are birds, animals, and people. "In 1981, OXFAM stated that there were 750,000 cases of accidental pesticide poisonings a year. Third World countries, accounting for less than 15% of world pesticide consumption, suffered 50% of poisonings and 75% of the resulting deaths."¹¹

Agriculturists sell food by weight- not nutritional content. Taxpayer financed research that is pointed toward increasing yields and profits, has nothing to do with taxpayer

nutrition. As yields have increased by weight, nutritional content has declined. The authority, Georg Borgstrom states: "In modern high-yielding rice strains the protein content is down to between 5 and 7 percent, in high-yielding wheat strains to 10 percent, in hybrid corn to 7 percent. A piece of cheese or ham has to be added to the sandwich to become equivalent in terms of nutritive value to the same sandwich without any additions around the turn of the century." As a comparison, Borgstrom mentions Russian wheat strains with 22% protein content.¹² Even as modern yields increase it has less meaning because the nutritional content declines. This is another failing subsystem of industrial agriculture.

Living on Oil—The Green Revolution

The Green Revolution is simply the insertion of petroleum based industrial agriculture into Third World societies. Necessary factors of industrial agriculture are: large acreage, specialized seed, adequate water- on demand, artificial fertilizer in large amounts, agricultural poisons, agricultural machinery, fuel, and shipment of product. Industrial agriculture is the most highly developed in the First World industrial nations. It is simply the application of industrial technique to agricultural mass production.

Given this intense focus, it is the most productive system in gross terms. With the industrial system, huge energy inputs, relatively good soils and a temperate climate, the U.S. produces so much food that more than half of the food on international markets originates there. "American farmers produce 15 percent of the world's wheat, 21 percent of oats, 36 percent of sorghum, and 46 percent of maize on only 11 percent of the world's croplands."¹³

Empire culture and the industrial system are inherently centralizing and simplifying forces. When the Green Revolution moves into a country it must have large acreages so that it can achieve "economies of scale," meaning simply that within the mass production system it is cheaper, on a per unit basis, to produce a large amount of one item, than it is to produce only one of those items. This means that self-supporting, subsistence agriculture families in the area must move to the periphery, attempt to farm the hillsides and gain occasional labor on the new industrial farm. This means that the hold of the colonial elite grows stronger on the population that is no longer self-sufficient. This means also that the hold of the international political/financial system grows on the colonial elite. Either large loans or opening the country up to the transnational corporations are necessary to start the industrial agricultural system because the factors of production must be shipped in, the trucks, the seed, the irrigation works, the fertilizers and the other components. Because of the huge capital investments needed for industrial agriculture, the chances are good that the country will ultimately be forced into the hands of the international bankers for loans. When the system is well established and the indigenous population is heavily in debt, (in the tradition of the more advanced First World farmers), then the international banking system will send in teams of bankers to administer the government's economic planning and will promote austerity measures that milk the population for interest money to send to the imperial capitals. As the farm system centralizes and the profit making industrial farmer takes more land, homelessness increases. The phenomena of cities exploding as people are forced out of the countryside is a familiar one in industrial societies. This trend is now particularly serious in the Third World where

there is a low level of industrial infrastructure in urban areas. As the "labor saving" machinery is brought in, unemployment increases and people are forced to work at a lower wage under worse conditions. As the production of food increases with the industrial system, the people grow hungrier because much of the food is now in the international system. **The food is grown for export to bring in hard currencies to repay loans, purchase manufacturing equipment for the industrial centers and consumer items for the colonial elite- not to buy food for the poor.** A major point must be emphasized, the calculation of how much food a country grows has nothing to do with how well fed the people of that country are. The important question in the industrial system is how much money people have to buy food. The international flow of protein goes to the First World countries; they have the money to bid for the food.

The Monocultural Instability

There are at least 5,000 plants that have been used for human consumption on the planet yet the civilized diet is made up of less than ten types of plants. The reason for this is the cultural style of using agriculture itself, dietary habit, mass production and profits (or quotas in the socialist industrial variant).

There are basically ten food plants grown in the world today when looked at on a volume basis. Wheat, rice and corn alone make up one half of the food consumed on the planet, with barley, oats, sorghum, and millet making up the next one quarter. "Ninety five per cent of our global nutritional requirements are derived from a mere 30 plant kinds and a full three quarters of our diet is based upon only eight crops."¹⁴ If we add beans and potatoes to the above eight plants, these ten species of plants are the essential basis of world agriculture. These varieties of plants are adapted to mass production. Harvesting the tubers of cattails or many other plants could grow much more protein per acre, but the harvesting is difficult by machine methods. The few plant varieties that are used are given extraordinary chances of producing. The plant is grown on vast acreages that are completely controlled. The plant receives as much artificial fertilizer as its roots can take up, it is given adequate water at all times that it needs it and the area is sterilized by agricultural poisons because the plants often have little natural resistance. It is this optimum and energy/capital intensive conditioning that allows the tremendous production.

In the U.S. where we have the example of the most advanced state of industrial agriculture, we also have the example of its tremendous destruction. "An astonishing 80 million hectares [193.36 million acres] of U.S. croplands, an area almost twice the size of California, have been rendered unproductive, if not ruined outright. The nation has lost at least one-third of its best topsoils, and erosion rates are now worse than ever, as much as five billion tons [4.45140 billion tons] per year."¹⁵ Organic materials are carbon compounds, and the level of carbon compounds in the soil is the measure of soil health. Soil scientists calculate that, "On a global basis, we have squandered more soil carbon than the fossil fuel variety. Roughly a third of our [world] soil carbon was lost with the opening up of the North American continent."¹⁶

Because we stand on top of the ground and look at plants, it slips from our consciousness that by far the largest volume of organic material normally lays in the soil and the largest volume of living things are the lives in the soil community- spread

all over the whole planet. This measure of carbon loss (most ultimately translated to gases in the atmosphere) shows the profound loss that has occurred.

The nitrates from fertilizers and agricultural poisons now pollute many underground aquifers in agricultural regions. Where it does not kill them, the runoff of poisons makes the fish and shellfish in inland and coastal waters dangerous to eat.

The industrial agricultural system is contrary to "family farming" in many ways. Contrary to the image most of us have of the family farm, modern industrial agriculture is a complex technical pursuit that requires many exotic inputs. Many of these inputs are highly dangerous such as hormones, antibiotics, and poisons. One might say that these factors are also part of the failure of industrial agriculture in that they maim and kill the customers from whom they seek to make a profit. There are cases such as in Puerto Rico where the use of hormones, apparently in excess of the levels used on the mainland, have created the maturation of sexual organs, breasts and the growth of pubic hair in human babies. The hormones in dairy and meat products spread over the civilized population certainly have some effect on the sexual health of the population, just as in selected cases it can be shown that these "agricultural" hormones cause the development of sexual organs in babies one and two years old and create female sexual development in boys.¹⁷

Because of the crowded and unsanitary conditions in which chicken, pigs and cattle are raised, the animals are subject to many diseases. Because of this the animals and their feed must be subjected to many drugs. Antibiotics are one class that is used in large volume. These are passed on in the tissues of the animals to the top of the food chain- the consumers- and alter micro-organic communities within the human body.¹⁸

As of 1995, one-half of male U.S. citizens and two fifths of females will have cancer in their lifetime (but not necessarily die). "In 1900, cancer was the tenth leading cause of death in the United States, and was responsible for only three percent of all deaths. Today it ranks second, and causes about twenty percent of all deaths."¹⁹ Many agricultural chemicals are proven carcinogens. These toxins come to the animal through their feed. Fish, poultry, dairy and meat products contain high levels of toxics. Even a Reagan era Environmental Protection Agency publication reports that: "Foods of animal origin [are] the major source of...pesticide residues in the diet."²⁰

With 99% of the mother's milk from every part of the country containing significant concentrations of DDT and PCB's, we know that the entire ecosystem is also saturated with it. Human mother's milk we know from tests also contains dieldrin, heptachlor, dioxin and many other toxic substances ingested from food, air and water.²¹

The Seeds of Monoculture

One other serious matter for the human family is the seed system of industrial agriculture. (It will become serious indeed when civilization collapses and we try to grow our own food). The plant varieties of each species of the "ten plants" of industrial agriculture, as well as a few others, developed with empire culture. They are basically the grains that were originally developed when agriculture started and have been spread by various empires to conquered territories. The origins of the ten plants

are primarily the temperate regions where empire developed; though a few items have come from tropical rainforest cultures (tomatoes, chocolate). These regions are called Vavilov centers after the Russian botanist N.I. Vavilov. They are: Chile, the Amazon, the Andes, Central America, the Mediterranean, Ethiopia, Anatolia-Caucasus, Central Asia, India, Northern China and Southeast Asia. At least until recently, these regions contained many strains of primary plants. These strains were held and selected over thousands of years by native and peasant cultures that lived an agrarian lifestyle. In older times there were hundreds of varieties of each of these plants in each region. For example, in each small valley in Afghanistan, farmers might develop their own strains by selection over long periods of time. These selections would be appropriate to that specific soil, the specific pests that are in the area, the specific amount of rainfall and the climatic temperature variations. From this inventory, modern agriculture has selected the best producers and after manipulations in research stations, spread these worldwide. Because of the techniques of the industrial agricultural system (ordinarily, only the most productive variety will be used) only a handful of varieties of each species is spread worldwide. The following table gives some examples of: 1. crops, 2. the number of dominant varieties and 3. the percentage of the whole crop that those mass production varieties represent, in the U.S. ²²

CROP	VARIETIES	%
millet	3	100
cotton	3	53
soybeans	6	56
dry beans	2	60
snap beans	3	76
peas	2	96
corn	6	71
potatoes	4	72
sweet potatoes	1	69

Any large acreage of any single variety is extremely vulnerable to pests because any species of pest successful in feeding off the variety will have a population explosion of many descendants that will do the same. When only a few varieties are spread worldwide, the vulnerability is spread accordingly.

"The genetic uniformity of a crop amounts to an invitation for an epidemic to destroy that crop. The uniformity itself may result from the inherent pressures of the market

place (machine harvesting, processing, etc.) as well as the absence of genetic variety in the crop-breeding program. As 'erosion' spreads in the Vavilov Centres, the danger of crop epidemics in the industrialized world will increase. Southern corn leaf blight is only the most recent of a long history of epidemics common to every continent.

"Historically, the most dramatic example in the western world was the Irish Potato Famine of the late 1840's. At a European symposium on plant breeding held in the summer of '78, Dr. J. G. Hawkes traced the disastrous potato blight back to its root causes in South America. English explorers returned from the Caribbean coast in the Sixteenth Century with only one variety of potatoes. Planted everywhere in northern Europe, it was only a matter of time until this genetically uniform crop was struck by blight. In a remarkably short space of time, the Irish lost their primary food source, leaving at least two million dead and two million more searching for a new life in other countries. Although significant efforts have since been made to diversify potato varieties, Europe still remains vulnerable and in need of additional genetic material."²³

Amazingly, the First World potato crop is still based essentially on the same variety of potato that was involved with the Irish potato famine. The native communities of the Andes where the potato originated grow some 40 varieties of potatoes. They have not yet been reached by the Green Revolution.

Each of the props of the industrial agricultural system, petroleum, water, air (acid rain), sun (climate-greenhouse effect-ozone layer depletion), soil and seed are degenerating, non-sustainable, systems and each of these props have degenerative subsystems. The elimination of gene banks (the ecosystems where target seed is produced) is one of the degenerative aspects of the seed prop, along with the elimination of seed varieties themselves by the transnational seed companies.

The seed system of modern agriculture works by creating a facsimile of the natural change in plant genetics. Selected varieties are grown by researchers who strictly control pollination as they genetically mix varieties for particular results (usually increased volume, almost never for increased nutrition). As modern varieties and hybrids are bred, ancient and wild strains which have productivity and resistances of various kinds are bred with the modern varieties to create new strains. The ancient and wild strains that are used are generally taken from the Vavilov Centres, those areas where that species developed historically. A point of crisis now in the seed business is that these regions are being wiped out by destruction of habitat of the wild plants and by the new seed of the Green Revolution replacing old family varieties. For example, a researcher who had seen "Virtually thousands of flax varieties growing on the Cilician plain [in Turkey] returned after twenty years to find only one variety-imported from Argentina."²⁴

As the Green Revolution invades, the people eat up the old seed and become dependent upon the new seed and thus the strains that have been selected for thousands of years for their strength and productivity are lost. This has special significance for regions outside of the Vavilov Centres, because there are no wild or selected varieties outside the Vavilov centers to use to continue to develop the plant strains. The seeds for industrial agriculture come from the Third World, are shipped to the First World, manipulated and then go to the whole system, as "miracle seeds." Even for the biotechnologist this is significant because they do not create genes, they

manipulate existing genes and they must get these genes from a wide variety of plants.

The Starvation that is Called Progress

To think that food is grown by the imperial agricultural system in order to feed hungry people is ridiculously naive. The industrial society and its agricultural system was not established as a charity enterprise, it is part of the power and profit organization of elite international groups. As Georg Borgstrom so effectively points out, high-grade protein flows to the rich and whatever low grade protein is left over after the First World livestock have been fed, flows to the poor of the Second World and Third World. It requires money to buy food and if hungry people do not have money they will get no food, no matter how much food their own country grows.

In Costa Rica, as the rainforests are destroyed to create pasture for cattle, the percentage of meat in the diet of Costa Ricans declines because the beef is sold to the U.S. fast food hamburger chains. There are few people in Costa Rica who can bid against the U.S. consumer for the meat. Empire culture is arranged to percolate value to the elite at the top of the pyramid. This percolation in the case of agriculture occurs through the concentration of protein by animals. We have seen that one-third of the ocean fish catch is used as fertilizer and fed to live stock to produce ham and eggs rather than fish cakes for the poor. In Peru where the industrial system sucked up the huge Peruvian anchovy stock in just a few years, Peruvians sat starving on the docks watching millions of tons of protein flow through, headed for the chickens and pigs of the First World. It is said that 90 per cent of the grain fed to livestock in the U.S. could eliminate human starvation. The shrimp, lobster, crab, pork chops and prime rib that flow to the elite of First World societies graphically represent the basis of the whole imperial system. Power, money, land ownership and life security also flow in the same direction as the food. The establishment of colonies, either by migration of masses from the mother country, domination by military power or domination by economic power, is done so that valuables may be derived from the colony for the mother country. Colonies are not established as acts of charity toward the colonized.

If everyone in the world suddenly began eating only grain that now goes to livestock and if the colonial elites of the world suddenly disbanded and distributed land to the landless; there would be a sudden flow of food to the hungry. These actions would momentarily halt world starvation. These actions would not solve the ecologically destructive basis of agriculture itself, only prolong the time in which the soil was destroyed. It would not answer the ten thousand year history of empire culture either (the culture would not be disbanded along with the colonial elite). Neither would it answer the population explosion. In some Third World societies the population doubling time is only twenty-five years! The exploding mass, based on dwindling survival systems would still be in motion. Vietnam gives a demonstration that there are many factors other than land reform.

Although land reform is an obvious and just need, the rulers of the empires have demonstrated that they will attempt to destroy a colony rather than see their puppets, the colonial elite, dissolve. Professor Vo Quy, Faculty of Biology, University of Hanoi calculates that the U.S. military destroyed over two million hectares [4.834 million acres] of tropical rainforest (not including other areas in SE Asia) during the

Vietnam War. Bombs, shells, napalm, bulldozers, and chemical warfare (especially "agent orange") destroyed these areas. They are now wastelands. He states that there are 25 million bomb craters, an area of 125,000 hectares [302,125 acres] which have the topsoil completely blown away. A direct result of the poisons dumped on the country is the destruction of over half of the biologically rich mangrove swamps on the coasts of Vietnam.

Professor Vo Quy says that in 1943, 44 per cent of the country was still covered by forests, even with the French colonialists stripping it. By 1975 it was down to 29 per cent and by 1983, 23.6 per cent. Because of deforestation the country is now experiencing the familiar "drought/flood syndrome." After the victory by the anti-colonialist forces, land reform was instituted, and the population continued to climb along with the deforestation. Farmland erosion is now rated at 100-200 tons topsoil per acre [per annum] and the forest is now shrinking at a rate of 200,000 hectares [483,400 acres] a year. The population doubled in the last forty years and the country now has 200 people per square mile. Professor Vo Quy says that by 2000, there will be one-half hectare of land per person- not all of it arable. One hundred thousand acres of tropical forest go down each year now for simple cooking and fuel needs and this need increases as industrial developments are attempted. The forests put on 10 million metres of new growth per year but the present annual demand for wood is 30 million cubic metres.

Professor Vo Quy recounts the story similar to the recent history of all industrial societies:

"Looming big as a major concern is water pollution. Wastewater from industries is discharged into containers and used for agriculture or for daily use.... In Hanoi, tens of thousands of cubic metres of dirty, untreated water containing inorganic and organic toxins, bacteria and parasites are drained into lakes, ponds and canals within the city and its outskirts. Population increase will accelerate industrial growth and result in 6 billion cubic metres of wastewater per year by AD 2000.

" 'To clear the wastewater, 6,000 cubic meters of water per second would be needed. This is more than the combined flow rate of all major rivers in Vietnam during the dry season. The dangerous effects of pesticides are becoming widespread, in 1959 only 100 tons were used. Twenty years later the figures rose to an astonishing 22,000 tons, applied to 50% of the farmland.' "²⁵

The centralizing tendencies and the mass production techniques of industrial agriculture are the same wherever they are applied. Stalin allegedly murdered 20,000 Kulaks in order to install industrial mass production agriculture on the Kulaks' former land in Russia. The U.S. historically, murdered millions of native people to make way for agriculture and the imperial system in the U.S. Its agricultural system still continues to concentrate into fewer elite hands. The system must have large areas of land on which some one is now living. As the remaining natural tribes are being murdered, the cry is that the land is "unused" and "undeveloped" therefore the imperialist is justified in stealing it and either enslaving or murdering the people that live there. Now, there are more Chinese in Tibet than there are Tibetans, as the imperial surge comes into that country to colonize and "develop" Tibet. As the tens of millions invade out of China into Tibet, the Mongolias and Sinkiang; the wheat,

vegetables and meat flow to the imperial center of China. As the Chinese Empire has invaded their neighbors they have instituted all of the mass industrial agriculture techniques that they could afford. These lands are going the same route as the former soils of China itself.

In the "Western Countries," agriculture is dominated by the elite who control the transnational corporations which produce the inputs of financing, fertilizer, machinery, technical assistance, seed, marketing and agricultural poisons. Five corporations control the basic flow of grain in the western world, the majority of them privately held family companies. The petroleum supply is controlled by five giant world-wide companies and they in turn dominate the pesticide, fertilizer and designer seed industries, as well as provide the fuel to ship all of the factors of production. It requires a large share of the industrial production of an industrial society to raise food. When the Green Revolution invades a Third World society it means that huge new markets are created for the factors of industrial agricultural production such as tractors, seed, and etc. It means that the colonial elite will need access to credit. It becomes a bonanza for the international financial system.

As the international financiers have come to control world agriculture, they, as a group, are also continually centralizing. The oil companies control the energy supply (oil, uranium, and coal); they are heavily invested in fertilizer production and in pesticides. Now, with the Green Revolution the matter of plant seeds has become a high profit item and one of the unsustainable aspects of the system. As has been discussed, the flow of new seed must be constant in order to outmaneuver the pests. Recently, hybrid seeds have entered the system. The farmer cannot even keep these seeds for the next year's planting because they do not breed true. This requires the farmer to return to the seed company year after year. Recently Monsanto Corporation has developed a "terminator" line of seeds that will not reproduce, making the food growers enslavement complete.

As the "New Seed" has become important in the Green Revolution, the financiers began to move toward control of the seed system and its profits. In the past fifteen years "mergers" in the seed industry have become notorious as the transnational elite moves to control the international food supply. The Royal Dutch Shell oil company for example, now owns over 30 seed companies. The large oil companies, pharmaceutical companies and chemical companies have moved to solidify their control of the world's seeds.

Because of the large variety of people that came to colonize North America and because many of these people, being subsistence/peasant stock, brought the seed of their native lands, the U.S. had one of the largest and most varied inventories of "heirloom" seed in the world. Because people saved seed from their gardens and because there were many regional seed companies, this condition continued until the financiers moved in. As the seed companies have disappeared into the elite class, the human family is now losing its seed heritage.

The needs of the mass production system are to have a few seeds of each species that are appropriate to many climates and conditions because their emphasis is on mass marketing. Because of this, seeds that are regionally adapted and hardy are dropped. Seeds of unusual plants are also dropped in favor of the standard supermarket items.

For ten thousand years the peasants and planters have selected and husbanded the seed that now exists. This human family heritage is destined to be wiped out in one generation by the transnational elite.

As the seed banks in the Vavilov centers are eliminated and the heirloom seeds eliminated from seed companies' inventories worldwide, the control of the seeds remaining is centralized with the elite. Plant patenting legislation is being instituted throughout the non-socialist world, at the direction of the elite. This means the elite will own the seed variety and will get royalties from its use. In Europe now, a person can be arrested for planting the seed of any plant whose original patented seed they have purchased. The elite have not yet achieved their full plan. They also own the biotechnology firms that are working on producing "miracle" plants. When these patented plants are created they will then be in full control of the western world energy and food system. Kent Whealy of the backyard gardeners group, Seed Savers Exchange⁽²⁶⁾ states that already by the early nineteen eighties:

"Seed company takeovers in the United States have reached epidemic proportions: ARCO took over Desert Seed Co; ITT now owns the W. Atlee Burpee Co.; Sandoz (of Switzerland) purchased Northrup King Co.; Upjohn bought out Asgrow Seed Co.; and Monsanto purchased DeKalb Hybrid Wheat. These are just a few of the more than 60 recent North American seed company takeovers.

"Multinational agrochemical conglomerates... are already manufacturing pesticides, fungicides and chemical fertilizers. With their newly purchased seed companies, they are now able to give commercial growers a package deal —seeds that will grow well with their chemicals. Some agrochemical firms have even started selling pelleted seeds, which wrap each individual seed in a small capsule of pesticides and fertilizers. It is doubtful that such corporations whose very existence depends on selling pesticides and chemical fertilizers, will spend any time or money to develop disease- or pest-resistant crops."²⁷

Just as it takes more energy to smelt a lower concentrate ore body in a mine, energy use will actually increase as the society disintegrates. The energy intensive industrial societies will last about as long as the agricultural system that feeds them. As we have seen, the characteristics of the agricultural system, like all the other systems of the empire, make no real provision for their continuance beyond the short-term profit. There are no positive feedback loops, nothing to feed the system itself- the soil, the seed production system; the social body of empire is simply a drain, an extortion system that is unraveling into incoherence. Soon the world supply of petroleum will be exhausted and the world population will be out on the proverbial limb. By that point they will have little seed that can grow without its industrial aids. By that point much of the world's irrigated acreage will be salinized, many of the dams silted up and the underground aquifers drained. As these pressures are in motion, acid rain will be increasing because of the inevitable increase in energy use and the climates will be beginning to change from the Greenhouse Effect, completely altering or eliminating the existing agricultural system. In the ten to twenty years that it will take for the world to reach that point, many hundreds of millions of people will be added to the world's population.

This is the reason that people who are capable of making a commitment must move swiftly to establish "seed" communities that can thrust a viable human culture into a future time beyond the inevitable crash of empire. These must be communities that have viable seed and biodiversity harboring strategies.

The Inventory

There is the persistent and socially encouraged tradition of viewing the "ecological crisis" as something that has to do with toxic chemicals, an oil spill or maybe acid rain. What our review demonstrates is that the fundamental basis of the culture of empire is an ecological crisis. History is written by the conquerors and the reality view of empire culture is generated from elites with a culture bound view. For the soils, for the forests, and for the native people worldwide, the ecological crisis began thousands of years ago with the growth of empire culture. What is called the "ecological crisis" is only the final and gross symptom of a social/organic form that is out of balance with the earth and cosmos.

The conclusion is inescapable. Civilization is a culture of suicide. It cannot be sustained indefinitely and its growth is only fueled by running a net deficit of the fertility of the earth. We look now to the ecological threats created by the technological/industrial society, which are presently serious. We are going to live through these conditions, so it is important that we understand the minefield through which we negotiate.

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