



The Vital Earth News

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Mega-Agriculture — Is It Doomed? Will History Repeat Itself On the Farm?

by Paul W. Syltie, Ph.D.

It has been said by some that those who do not learn the lessons of history are doomed to repeat them. History, of course, metes out many lessons, and they do not all deal with wars and conquests.

Take farming, for instance. Relatively few people living today realize that not too many decades ago in the Red River Valley of the North there was a movement in farming much like there is today. Farms grew big ... tremendously big. In fact, in 1880 there were 82 farms in the Red River Valley of over 1,000 acres, and most of those contained four to six sections of land (2,560 to 3,840 acres).¹ These farms were called “bonanza farms”, those which exceeded 1,280 acres. There were most likely many more than these 82 bonanza farms that formed during the decades following, since in 1880 the movement was just getting started.

John L. Gardin in 1912 was credited with owning 72,000 acres in North

Dakota alone, not considering his Minnesota holdings.²

Such huge land holdings have little resemblance to the objectives of America’s founding fathers or the Homestead Act. Thomas Jefferson envi-



Bonanza farms introduced huge machinery, such as this sod-breaking plow and steam tractor, to operate thousands of acres on the Great Plains.

sioned that every citizen of the country should own at least a little plot of land, for he considered “Cultivators of the earth ... the most valuable citizens. They

are the most vigorous, the most independent, the most virtuous, and they are tied to their country, and wedded to its liberty and interests by the most lasting bonds.”³ George Washington echoed these words when he stated, “Agriculture is the most healthful, most useful, and most noble employment of man”.⁴ Our very first parents -- Adam and Eve -- were given land and life-sustaining plants by their Creator in a pristine Edenic environment (Genesis 2:8).

Man was truly meant to live on the land, tending and keeping the plants and animals that grow thereon for his optimum health and enjoyment, to realize the optimum potential in life. The Homestead Act insured an allotment of 80 to 160 acres in the Great Plains, Corn Belt, and other areas for families to conquer and build. At least that was the intention of many legislators who voted for the Act until big business stepped in and began exploiting the fruits of the homesteaders’ labors.

See *Communal Life*, page 3

Vitazyme Launched in Trinidad!

by Robert Hudak, President
Ag Biotech, Lakeville, New York

As we start the new millennium we in agriculture are faced with challenges never before seen in our industry. Just a few months ago the six billionth person was born into the world. In just a little over four days there will be a million more people on planet earth, and every 4.5 days will bring a million more mouths to feed. Most of these people live in areas of the world least able to produce enough food to feed

them. There is ever-increasing pressure for more farmland, with the consequent loss of primary forest and endemic species, many of which are being recognized for their potential contributions to medicine. More and more is being demanded of the farmland currently in production, the cost being paid in soil erosion and declining soil fertility.

We in agriculture must face the challenge to produce more food on fewer acres and find solutions to the most basic problems that face mankind. How do we



Notice the excellent response to Vitazyme for these tomatoes grown in a Trinidad test. Three applications were spaced two to three weeks apart.

See *Some Superb Caribbean*, page 2

Some Superb Caribbean Test Results!

provide adequate nourishment for planet earth's burgeoning population without depleting our natural resources and robbing our most precious commodity -- soil fertility -- from the next generation?

Vitazyme is a vital part of the solution to the food quantity and quality dilemma. By working with natural processes to increase soil fertility in a sustainable way, this unusual material increases both yield and quality without taxing the environment in the process. In fact, studies have shown that soil properties are often upgraded at the same time yields are improved, an almost unheard-of effect. Also, because it is concentrated, Vitazyme can be taken into remote areas that prohibit the transportation of bulky fertilizers.

In June of 1998 Vitazyme was first brought to Trinidad and Tobago for testing by CARDI (Caribbean Agricultural Research and Development Institute) in cooperation with Caribbean Chemicals International. The first tests were with tomatoes, peppers, and cabbage. Preliminary results were very encouraging, although all but the cabbage trial were severely damaged by excessive rain so that results could not be recorded. The cabbage trial showed significant

total head weight increases, and two subsequent cabbage trials showed head weight increases of 94% and 55%.

Trials in 1999 on tomatoes, peppers, lettuce, and cabbage showed significant yield increases on all of these crops, including an over three ton per acre increase in tomato production and a 38% increase in sweet pepper yield.

The year 2000 trials are showing even greater yield increases on tomatoes, pep-

pers, and cabbages. An eggplant trial is also in progress, and should do well.

Vitazyme will be launched on the 9th and 10th of May, 2000, in Trinidad. The

See Caribbean, page 7

Vitazyme on Tomatoes

Caribbean Chemicals International

Agronomist: Fayaz Shah *Location:* Aranguez, Trinidad, West Indies

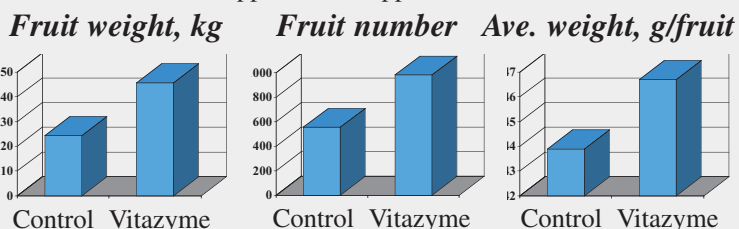
Variety: Gempride *Transplanting date:* November 3, 1999

Harvest date: January 19, 2000, and thereafter

Experimental design: An area of a field comprising 50 "banks", each with about 10 plants each (about 500 plants), was treated with Vitazyme. Plot size was 10x150 ft. An untreated area alongside was the control.

Fertility treatments: equal for all plots

Vitazyme treatments: Vitazyme was applied at 30 ml/gallon (about 1%) on the following dates: November 10, November 25, December 9, and December 29, 1999. These dates were 7, 22, 36, and 56 days after transplanting. Each plant received about 2 tbsp. of the Vitazyme solution when it was applied. The application was 3.27 liters/hectare.



Yield increase: 88%

Vitazyme on Peppers

Caribbean Chemicals International

Agronomist: Fayaz Shah *Location:* Aranguez, Trinidad, West Indies

Variety: King Henry Sweet Pepper *Planting date:* August 12, 1999

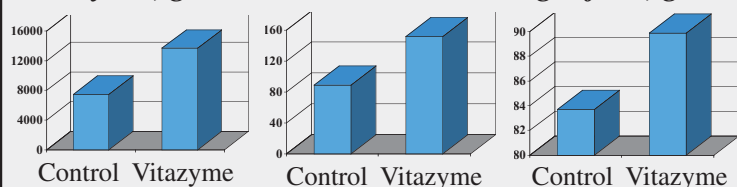
Harvest date: January 25, February 7, 12, 16, and 24, and March 8 and 20, 2000

Experimental design: A plot of a pepper field was treated with Vitazyme, and an adjoining portion of the field served as a control. The treated plot had 245 pepper plants in an area 10x70 feet.

Fertility treatments: equal for all plots

Vitazyme treatments: Vitazyme was applied three times at 30 ml/gallon (about 1%, or 3.29 liters/ha) each time on December 16 and December 29, 2000, and January 16, 2000.

Total yield, grams Fruit number Weight/fruit, grams



Yield increase: 83%

Vitazyme on Cucumbers

Caribbean Chemicals International

Agronomist: Fayaz Shah *Location:* Trinidad, West Indies

Variety: Atlantis *Planting date:* February 15, 2000

Harvest date: March 21, 2000

Experimental design: Two plots were prepared for this study, each 100 x 20 feet, one untreated and the other Vitazyme treated.

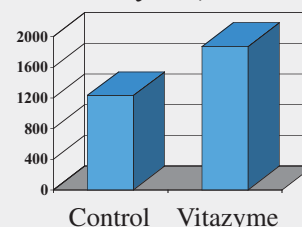
Fertility treatments: equal for all plots

Vitazyme treatments: Three treatments were applied, at 30 ml/gallon (1%, or 3.22 liters/ha), spaced 2 to 3 weeks. The treated cucumbers ...

- (a) were more uniform than the untreated ones.
- (b) had less rejected fruit than the untreated plot.

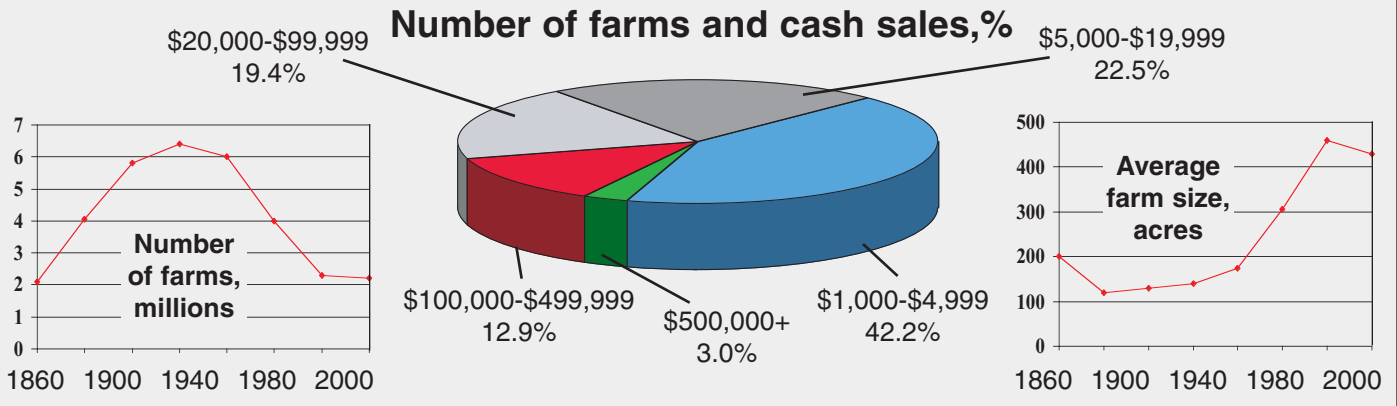
Fruit yield, lb

Yield increase: 52%



Communal Life On the Bonanzas

The number of farms of their size has dramatically changed over the decades of America's history. Farm numbers skyrocketed during the mass immigration to the Great Plains following the Homestead Act of 1862 and farm size was stable at about 130 acres. Farmers comprised about 30% of the U.S. population at that time. Farm numbers dropped dramatically during the 20th Century, from 6.4 million to only 2.2 million today, on farms averaging 430 acres... while the population multiplied. The percent of farmers in the year 2000 is only about 1.8% of the entire U.S. population, and many of those are small operators producing less than \$1,000/year in gross receipts.⁵



History teaches that the way for the bonanza farms was paved by a six-step process as settlers moved west:

Such a scenario has been responsible

1. Frontier fur traders blazed the way into the wilderness.
2. Cattlemen followed after.
3. Miners arrived.
4. Pioneer farmers came, broke the prairie, and cleared forests; nature was challenged and conquered.
5. Equipped farmers purchased partially improved land from pioneer farmers and continued its development.
6. City dwellers followed to provide farm services; the frontier disappeared.

for the exploitation of most new lands that are wild and untamed. The problem was not with the pioneer farmer, for his goals were usually limited to establishing a permanent homestead for his family and children, a God-given legacy and oftentimes a way out of poverty in strife-torn and opportunity-short Europe. Some became equipped farmers and enlarged their holdings, or received financing from other sources to buy out their neighbors. Many were the schemes practiced by farmers and speculators to gain control of more than their fair share of America's breadbasket.

In the Red River Valley a number of

factors combined to make ideal conditions for the establishment of bonanza farms. The largest-ever land grant in American history -- that of the Northern Pacific Railway -- with the failure of that railway made large amounts of land available to stockholders that easily competed with government lands under the Homestead Act. Some of the land from this railway foreclosure lay in the treeless, stoneless, flat, highly productive Red River Valley, which made the use of large-scale machinery plausible. Eastern investors, who carried large railroad holdings, to recover some of their investment secured some of the railroad's land.

"They applied business practices to agriculture and with finances secured large blocks of land, professional management, and large-scale machinery to create the bonanza farms of the 1870's, 1880's, and 1890's".⁶

Europe demanded high quality American wheat, and innovations in milling and transportation -- both rail and ship -- in Minneapolis and the Great Lakes enabled the wheat and flour to reach new markets at a big profit. The tremendous lure of land and opportunity upon the fertile Northwest soils brought an unheard-of population explosion to the farmlands of North Dakota from 1870 to 1910. From

Germany, Norway, Sweden, Russia, Poland, and from other states they flocked. During those 40 years the state's population multiplied 40 times!⁷

Life on these bonanza farms was truly communal and factory-like. Wheat was the most profitable, so most bonanzas grew only the one crop. As fertility levels dropped over time or weeds increased, other crops were introduced like flax and barley. Crops such as corn and oats were used to feed the huge horse herds needed for powering the machinery, or to feed the workers. Diversification into cattle production and several crops tended to reduce efficiency of the operations. Steam powered tractors came on the scene to perform heavy plowing operations.

Farm managers formed the core of bonanza operations. Bonanza owners paid their managers well, most with a



At harvest time on the bonanzas the amount of manpower, horsepower, and machinery was monumental, as depicted in this photo.

See "Big Is Better", page 6

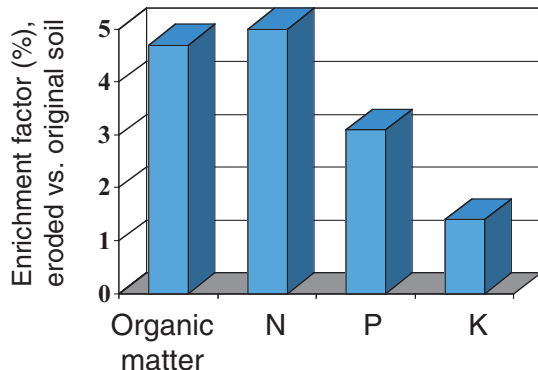
15-Minute Soils Course

Lesson 11:

Soil Water Erosion

Among the most insidious and costly plagues for farmers and civilization is soil water erosion. (Wind erosion will be covered in a future lesson.) Soil carried away by water runoff is highly enriched in plant nutrients, since water transports the most nutrient-rich fractions of the soil: clay and organic matter.

Enrichment of Nutrients in Eroded Soil Compared to Original Soil



Clearly, soil erosion should be reduced and eliminated, since valuable soil fertility is lost that cannot easily or cheaply be replaced.

Hugh H. Bennett of the U.S. Soil Conservation Service in the 1930's compiled frightening statistics on the severity of soil water erosion in the U.S. The map to the lower right depicts in a general way the extent of soil losses to erosion, which in 1935 Dr. Bennett stated had already ruined nearly 50 million acres of cropland. The carnage continues today at a serious rate.

Crop losses from such erosion are staggering, both long-term and short-term. Erosion of the topsoil has greatly contributed to the downfall of ancient Greece, Italy, Syria, Persia, North Africa, and other civilizations.

Other costs of soil erosion include the siltation of reservoirs, loss of habitat for fish, fouling of water sources, and floods. Erosion is usually

associated with excessive and rapid water runoff and associated flooding of streams.

Causes and Prevention of Water Erosion

The major cause of water erosion is raindrop splash action on exposed soil. Notice the violent explosion of water and soil particles with direct impact on the soil surface.



Thus, it is clear that protection of the soil surface with plants (especially sod) and organic residues is extremely important in preventing erosion. Leaves and trash absorb the impact of raindrops falling at terminal velocity, and eliminate dislodging of soil particles.

Soil will not erode unless water falls at a rate in excess of the rate of "insoak", or the speed at which rainwater infiltrates and percolates



- 1 -- Severe sheet and gully erosion
- 2 -- Moderate to severe erosion of mesas and mountains
- 3 -- Moderate to severe wind erosion with some gullying
- 4 -- Moderate sheet and gully erosion, some wind action
- 5 -- Moderate sheet and gully erosion serious locally
- 6 -- Erosion rather unimportant

15-Minute Soils Course

Continued from the previous page

through the soil profile. If the rainfall rate is very heavy, runoff from any surface will occur, but if the soil structure is strong and porous due to a high organic matter content and plenty of biological activity, then more water will soak into the soil quickly and reduce or eliminate runoff. Such reduction in runoff and increased insoak is extremely valuable for storing moisture for the crop, since water is often limiting to high yields. Since good soil structure is so important for high infiltration rates -- and structure is determined so much by soil microbial activity -- the need to insure regular organic additions to the soil as microbial food is readily understood.

Modern agronomists have developed what is known as the “**universal soil loss equation**” that evaluates a soil’s erodability.

A = RKLSCP

R = *rainfall* (total, intensity, and seasonal distribution)

K = *soil erodability*

L = *slope length*

S = *slope gradient*

C = *crop management*

P = *erosion control practice*

Acting together, these factors determine how much water enters the soil, how much runs off, and the manner and rate of its removal. Of course, the goal should be zero removal.

Types of erosion include **sheet**, **rill**, and **gully** erosion. Sheet erosion is a uniform removal of the soil surface, rill erosion is soil removal in small channels, and gully erosion is removal creating cuts that are uncrossable by farm machinery. See rill erosion below.

Preventing Water Erosion

1. The soil surface should always remain covered by vege-



tation. The best cover is grass sod with its massive root system.

2. Build a strong soil structure through organic additions and balanced fertility.

3. Use the land according to its capability. Grow row crops on only the most level, non-erodible soils; leave slopes to grass and trees.

4. Use erosion control practices to minimize water erosion in susceptible areas, such as contour tillage., strip cropping, terracing, and grassed waterways.

We must do everything in our power to save the soil that feeds us ... that top six inches of the earth’s crust that holds famine at bay.



See How Much You Learned

- To prevent soil erosion it is imperative to keep the soil covered ...
 - Some of the time
 - All of the time
 - None of the time
- The main means of dislodging soil is through the splash action of _____.
- Which of the following factors are involved in soil erodability?
 - Slope length
 - Crop management
 - Rainfall seasonability
 - Slope gradient
- The portions of the soil removed by water erosion are more concentrated in fertility than the main mass of the soil. T or F
- Rainfall runoff occurs when the rainfall rate exceeds the _____ rate.
- Soil water erosion continues to be a serious problem even today. T or F
- Challenge question:** The renowned U.S. Soil Conservation Service advocate in the 1930’s was _____.

1. b; 2. raindrops; 3. a, b, c, d; 4. T; 5. infiltration or insoak; 6. T; 7. Hugh H. Bennett.

“Big is Better” is Temporary

Continued from page 3

salary plus a commission on grain sales. Laborers employed year-long received about \$0.61 per day in 1896 and \$0.82 per day in 1902, while shockers and bundle loaders at harvest time received \$1.50 to \$2.50 per day.⁸ The manpower to operate these bonanzas was immense, especially at harvest. In 1884 the Dalrymple farm had an army of 1,000 men in the fields operating 200 self-binding reapers pulled by 800 horses. When the harvest was completed, threshing began on the 30,000 acres of wheat with 30 steam-operated separators which produced 600,000 bushels.⁹ Many women staffed the mess halls of communal eating quarters and served massive meals.

These bonanza farms were instrumental in introducing large-scale machinery into American agriculture. One “small” 4,000 acre wheat operation used 80 horses, 30 wagons, 26 breaking plows, 40 cross plows, 21 seeders, 30 self-binding harvesters, 60 harrows, and 5 steam-powered threshing machines.¹⁰

Buildings constituted a tremendous investment as well. One farm alone was documented as having two grain elevators

the big farm:¹²

The moral issue of point 5 seems

1. Diversification arrived.
2. Outside capital often lacked good management for profitable farming.
3. Crop failures in the late 1880’s.
4. Labor problems increased.
5. Many farm owners felt that it would benefit everyone to have smaller units.

rather surprising to have emerged from the pages of history, but at the dispersal of the Dalrymple estate in 1917 William Dalrymple had this to say:

“My brother and I have decided to give up operating the farm and divide it into small farms.... It is better that this be done for many reasons, and we think it better for North Dakota. Big farms were good for publicity. But economic conditions in North Dakota have changed. The state is rich and prosperous, methods of agricultural operations have changed, everything is different. It will be better for the state, for the towns and cities of the state ... to have a great many small farms in place of the one big farm.”¹³



Immense field operations, like this preparation for seeding on the Dalrymple farm, were standard for the immense bonanza farms of the Red River Valley of the North.

of 40,000 and 60,000 bushel capacity, a central office and supply building, dining halls and dormitories, machine sheds, stables, and houses for the managers and bookkeepers.¹¹

The Downfall of the Bonanzas

The chief architects of the bonanza farm recognized that their reign on the Plains would be short-lived. Ironically, James B. Power, the most noted bonanza manager, was a champion of diversified farming even though he managed one of the biggest monocultures on earth. He listed five reasons for the breakdown of

A combination of rising tax rates, increasing land prices, poor cropping years, and other factors led corporate stockholders to sell out and invest their money in higher yielding assets. Profits dropped and estates disintegrated. One

writer in 1900 stated, “The impression has been circulated far and wide that in agriculture as in manufacturing, the big fish are eating up the little ones and that the independent small farm is a thing of the past”. After visiting the Red River Valley he reversed himself: “The great estates of that region are doomed to disintegration. The great wheat ranch cannot compete with the small diversified farm.”¹⁴

Moreover social pressures against the bonanzas became greater as the years

passed. There was essentially no social life around the huge grain farms, whose owners and laborers left during the winter. Where 100 families and 500 people could live and have schools and a proper social life, the bonanza farms would have only, for example, seven families and 35 people on 28 sections of land. Guests to the big farms were often from big Eastern cities. Immigrants would not move to such a social vacuum, and a giant rift developed between the bonanzas and family farms.¹⁵

Farms today have reached a very large size, on average, with some corporate operations covering thousands of acres, sometimes across several states. The latest projections for 2000 show a 430-acre average size as farm numbers have bottomed out at only 1.8% of the U.S. population. A large share of those farmers are very small producers of less than \$5,000 in annual receipts, having only a few acres of land. The farms that produce the bulk of the crops are much larger, however.¹⁶ (See the graph on page 3.)

The reasons for today’s huge spreads are several: low commodity prices, corporate mindsets, investment by the wealthy, and age-old greed. The “big is better” philosophy is rooted deeply within today’s increasingly socialistic paradigms. Communal farms of Russia and Ukraine are massive, similar to the bonanza farms of the Red River Valley of yesteryear. Are today’s large farms a product of corporate enterprises intent upon vertical integration within the food industry to control production from field to table? Many analysts think so.

The results of the flight to bigness are manifold: mega-farms, an empty countryside, social upheavals, burgeoning cities, and increased crime, drug abuse, and immorality, especially in cities. Big government tends to thrive in response to the loss of personal responsibility and morality ... principles emphasized in farming.

Not many years ago E.F. Schumacker in *Small Is Beautiful* lamented the rise of bigness throughout our civilization, in farms, corporations, buildings, and cities ... in most everything.¹⁷ What he was really doing was pointing the finger at mankind’s abrogation of natural, God-given laws. People find more peace and

See The Future: Smaller Farms, page 7

Caribbean

Continued from page 2

two-day event will include a field day when demonstration plots will be toured, and there will be meetings with local farmers, extension agents, government officials, and research scientists, as well as with the dealers who will distribute the product in Trinidad and Tobago. Vitazyme will be available to the farmers of Trinidad and Tobago immediately following the launching. Vitazyme has also been tested on cowpeas and peanuts with excellent results in Guyana. Further testing is scheduled with rice in Guyana and Suriname in June of this year.

Vitazyme will soon be marketed throughout the Caribbean Basin to the benefit of the farmers and residents of the area. This program is destined to bring a major positive thrust in agricultural productivity to the entire region. □

If you want a thing bad enough to go out and fight for it, to work day and night for it, to give up your time, your peace, and your sleep for it ... if life seems useless and worthless without it ... if you gladly sweat about it and fret for it and plan for it and lose all your terror of the opposition for it ... if neither cold, poverty, famine, sickness, nor pain can keep you away from it ... if dogged and grim you beseech and beset it, with the help of God you will get it!

Les Brown, *Bits and Pieces* (15), 1998

Statement of Purpose

Vital Earth Resources is a for-profit private corporation dedicated to the development, production, and sale of top-quality, ecologically sound horticultural and agricultural products. *The Vital Earth News* is a periodic publication of Vital Earth Resources to inform customers and other interested parties about our products and programs, and to educate our readership on critical issues facing growers today and in the future. If you would like to receive future issues of this newsletter or product information, simply fill out the form on the right and mail it to us.

The Future: Smaller Farms

contentment when not crowded into cities. They thrive better with plenty of space, living on privately held land that is passed on through generations, improved and carefully tended. Clean water, fresh air, beautiful surroundings, and the support of a loving family and neighborhood lead to optimum health of body, mind, and spirit.

As society evolves over time, history has recorded and archaeology has revealed that cities disappear, and citizens once again reside for the most part on the land. Economic and political changes bring about dislocations in food supplies and populations. Some of the changes are slow and methodical while others, such as those caused by war, can be rapid.

Already the signs of natural laws intervening in the affairs of the farm can be seen. Average farm size and the number of farms have stabilized since about 1985, albeit at a low level.

Will the words and desires of Thomas Jefferson yet have their fulfillment in latter-day America, that every citizen own at least a small plot of land? Will natural forces within our world motivate citizens to return to the soil and its life-sustaining plants, and reverse the trend toward mega-agriculture which now holds sway in our culture? Perhaps it is more appro-

prate to ask, will today's stockholders and corporate directors of big agriculture divest themselves of their big holdings for the sake of small-scale community builders as did managers and owners of the bonanza farms once did? Perhaps the day will come when not only is the value of smaller holdings recognized for the sake of family and community health, but the economics of production will favor such holdings.

Events over time will answer all of these questions, but rest assured that the land and those who farm it will always provide the basis for the economic strength of any society. That truth will never change.

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16. See 5.
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Coming the next issue: *Biological Transmutations — Do They Occur?* and *The New Safe Bicarbonate Fungicides!*

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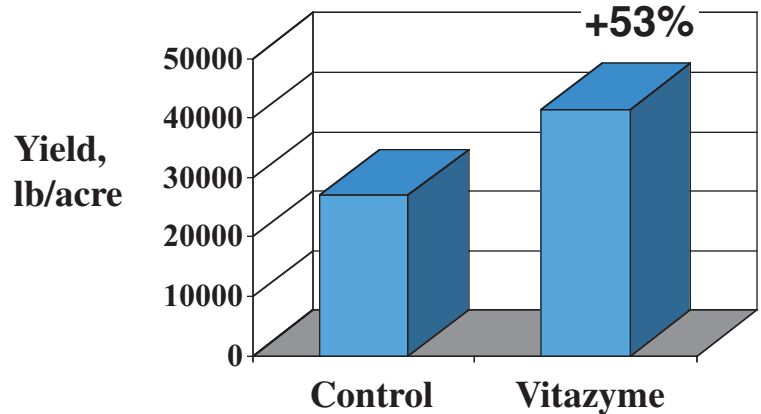
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