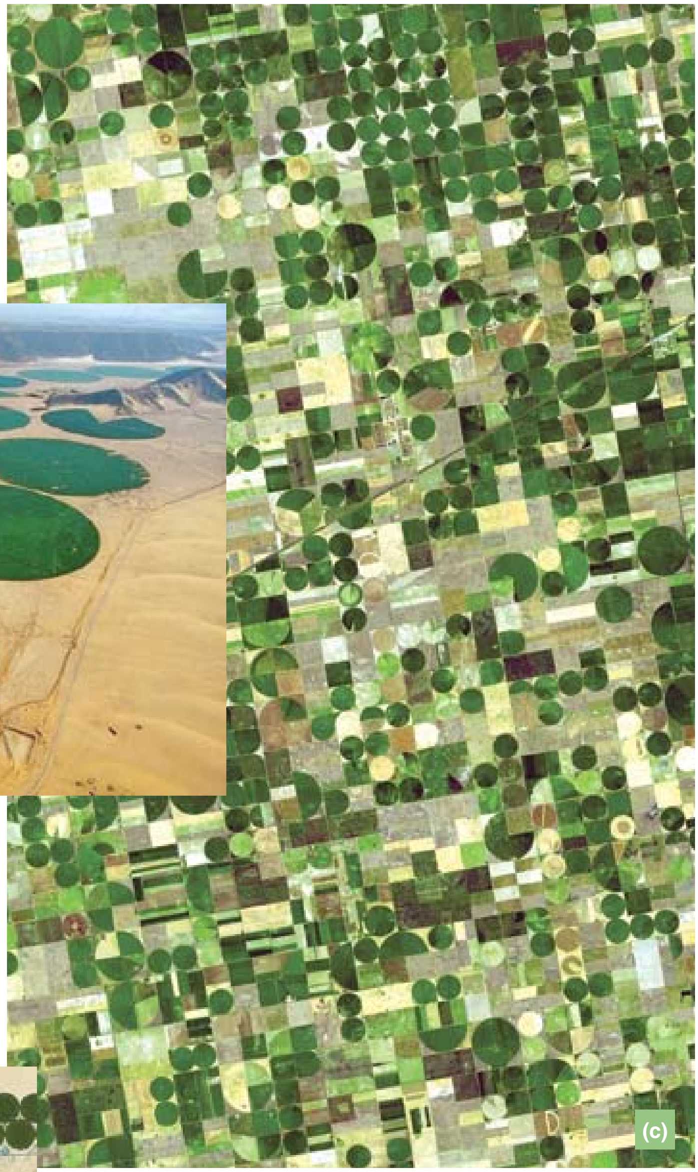
How Developing Countries Can Produce Emergency Food And Gain Self-Sufficiency

by Mohd Peter Davis and N. Yogendran

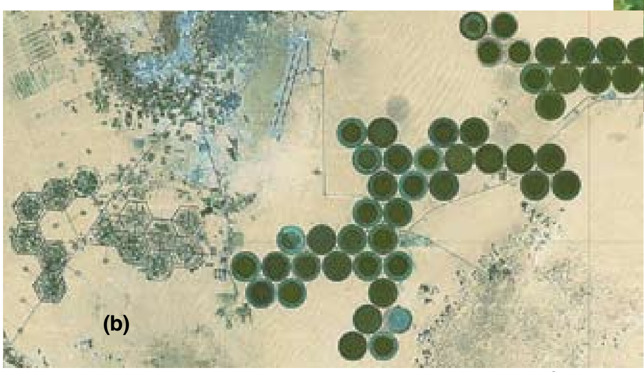
Malaysia's revolutionary Deep Tropical agricultural system is a model for feeding the world—fast—and bringing the developing nations out of feudal poverty.

Google Maps



Earth Observatory/NASA

Although Malaysia has developed fairly well since independence from the British in 1957, it still only produces one-half of its food.[1] What the rather complacent and well-fed Malaysian population unfortunately does not know is that the country, caught up in the midst of an orchestrated collapse in world food production and the global



Google Earth

Crop circles, in (a) Libya, (b) Jordan, and (c) Kansas, using center pivot irrigation systems. Today these crop circles use underground water for irrigation. But with cheap and abundant electricity and desalinated water produced by fourth-generation modular nuclear reactors, irrigated crop circles can spread throughout the vast tropical zone, solving the world food crisis and improving the nutrition of a much larger world population.

Courtesy of Mohd Peter Davis

Fast-growing grass is key to the Deep Tropical agriculture system. Here, co-author N. Yogendran (who is 6-feet tall) stands in 3-foot grass, which took only 38 days to grow on his Malaysian grass farm. Grass cut at this age is perfect for feeding ruminants. The grass can be cut 10 times per year for three years before re-plowing and re-seeding.

meltdown of the economy, is now in a precarious situation and faces a repeat of the starvation which occurred in the wartime naval blockade during the Japanese occupation of Malaya. The danger is that the British Empire is now poised to re-colonize and bring to heel its former colony, which has become an inspiring role model for downtrodden developing nations.

The need for food self-sufficiency and the threat to national survival has driven us to find a fast solution for producing emergency food for Malaysia. We believe that our Deep Tropical agricultural system, which has blossomed only in the last year or so, after 20 years of rather lonely research and entrepreneurship, can also be adopted immediately by those developing tropical countries that have sufficient rainfall or underground water, and later by the rest of the tropical nations as nuclear-powered desalinated water comes on stream.

Ministry of Tourism, Malaysia

Bukit Malawati, a former British fort in Malaysia. The cannon stands as a reminder of British colonialism, which remains today in the form of Malaysia's vast plantations. These plantation lands will be perfect for establishing Deep Tropical animal husbandry, sustained by fast-growing grass farms.

Malaysia is now making great advances with its Deep Tropical agricultural system that "double leapfrogs" both the backyard farming in developing countries and the grazing systems in more advanced temperate countries.[2] A Deep Tropical intensive dairy farm in Malaysia, based on grass plantation and climate-controlled-housed cows, which started from scratch in September 2007, is today selling commercial quantities of top quality milk and by December 2009 will be well on target to produce 15,000 liters of milk per day, from a 150-hectare grass plantation employing just 25 staff. (See box for milestones in the Deep Tropical system.)

Courtesy of Mohd Peter Davis

Goats from an experimental herd on one of the Malaysian grass farms feed on the farm's fast-growing grass.

The time to clear the land, establish a plantation, build a modern dairy, and achieve full-scale milk production from 1,200 cows is therefore expected to be only 27 months. The anticipated return on investment is 3-4 years, better than many modern factories, and government circles and investors are getting interested.

Malaysia's first large-scale Deep Tropical dairy farm is well on target to produce 5.7 million liters milk per year from 150 hectares grass plantation, or 38,000 liters per hectare per year. A team of 5 management staff and 20 workers will run the farm. The productivity per person is expected to be 625 liters of milk per day, a tremendous leap in productivity compared to backyard farming. For instance, South African researchers have reported, "In many situations the household has to milk several cows to get only a few liters of milk."

We are now able to report the milestones and current and targetted performance of this Deep Tropical dairy farm in Malaysia, and the Vernadsky-inspired Biosphere thinking behind it, as an exemplary model for other developing countries to consider.

Comparison with New Zealand Grazing System

While Malaysia in on target by the end of 2009 to produce 38,000 liters of milk per year per hectare of grass plantation (supplemented with concentrate feeding), New Zealand produces on average 8,880 liters milk per year per hectare of grazing land (albeit with minimal concentrate feeding). This leap in milk production for Malaysia demonstrates a world agricultural break-

Courtesy of N. Yogendran

The Deep Tropical grass farm maximizes plant use for feed, by harvesting fast-growing grass before it becomes more fibrous and indigestible. The cut grass on the Deep Tropical plantation, shown here, will grow again and be ready for feeding cows in about 35 days.

through. Newcomer Malaysia, with little expertise in modern dairy farming, is producing around four times more milk per hectare compared to New Zealand, with its 200 years of dairy skills.

New Zealand operates the world's most efficient grazing systems and its 3.5 million cows supply 2 percent of the world's milk, exporting 95 percent as milk, butter, and cheese. This temperate region grazing system is already near its peak of perfection, and there is little more land for agriculture. Producing more milk in New Zealand to satisfy export demand means converting long established sheep farms to dairy farms and sacrificing prime lamb production.

The much more productive and profitable Deep Tropical animal production system can spread fast, but should not be seen as a commercial threat to New Zealand; instead, it is a golden opportunity. The rate-limiting step for the mass production of ruminants in Malaysia and Indonesia is not land, which is plentiful, but the high-quality breeding animals that New Zealand and Australia can supply in very large numbers, surplus to their own requirements. The export of breeding animals with top genetics will provide profitable new markets to supplement New Zealand and Australia's established exports of milk, meat, and wool. This could be a happy union between former colonial countries to greatly boost high quality food production in Southeast Asia.

The Secret of Grass Plantations

The Deep Tropical grass plantation invention permits the mass production of really young grass that grows super fast to 1 meter high in 5 weeks, but remains highly nutritious for ruminant livestock. This invention, although stunningly simple, has profound implications for world livestock and crop production throughout the entire tropical zone, from the Tropic of Cancer to the Tropic of Capricorn.

Milestones in Malaysia's Deep Tropical System

September-December 2007

Establishing Grass plantation

Land clearing of neglected grazing land with scattered 10-year old trees and bushes, plowing, fertilizing, and sowing with an African species of grass.

December 2007-March 2008

Farm buildings and infrastructure

Building roads, free-standing climate barns for cows, 50-bale rotary milking system, milk storage vats, feed store, rain water tank, and houses for workers.

April-June 2008

Arrival and adaptation of 284 pregnant cows

Cows were air-freighted from Australian temperate region breeding farms, adapted to fully enclosed Malaysian climate barns, and fed freshly cut chopped grass from grass plantation mixed with concentrates. Over one year, every hectare of grass plantation, cut every 35 days, will feed 8 cows, each 350 kilograms. One-meter high grass is harvested 10 times per year for an expected 3 years, before the grass plantation is re-plowed and re-seeded.

July-September 2008

First calving—5 percent pre-weaning losses

September arrival of second batch of 300 pregnant cows from Australia.

September 2008: First commercial milk production

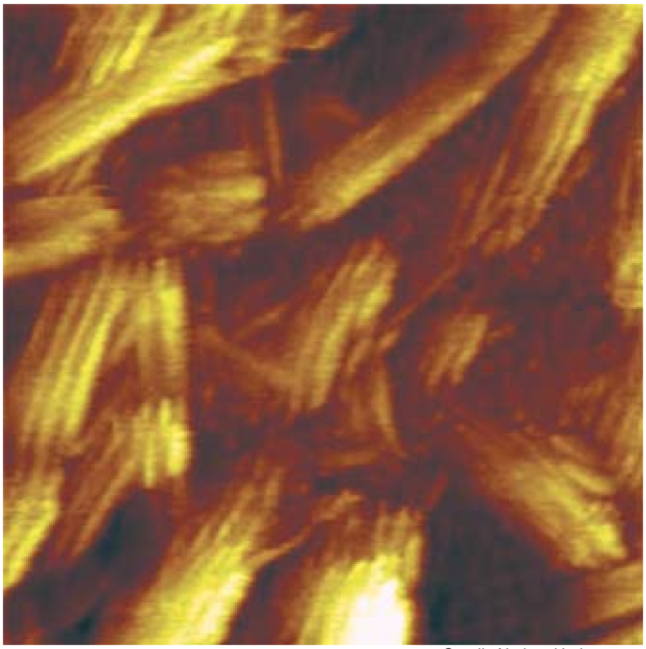
Cows milked twice per day, milk chilled to 8 degrees C in 1 minute and to 4 degrees in 60 minutes, and delivered daily to the factory for processing. The milk achieves top international standards for milk solids.

Scheduled January and May 2009

Arrival of third and fourth batch of 300-plus pregnant cows

Scheduled December 2009

Steady-state milk production from 1,200-cow dairy



Sandia National Laboratory

As plants age, they become more fibrous and indigestible, with a lignocellulose structure like reinforced concrete. Here an atomic microscopy image of lignocellulose.

As nuclear-powered desalinated water becomes plentiful with the welcomed nuclear renaissance, this vast tropical region of the Earth's biosphere, with year-round warmth and sunlight, will become a far better place to produce food than the seasonal temperate regions. Indeed, in complete defiance to the Malthusians who falsely claim that population growth exceeds food production, we are beginning to envisage how grass plantations developed in the humid tropics, and spreading to the dry tropics, will soon be able to support many times the present world population.

The production of cellulose (long structural polymers of glucose molecules), which forms the cell wall in photosynthetic microorganisms and living plants, is the primary source of food in the biosphere. Cellulose is the start of the biosphere's food chain and the meal of choice of an enormous range of microorganisms and insects, which get eaten by animal species higher in the food chain. Indeed, every species is breakfast for another species; hence the expression "all flesh is grass."

The biosphere currently produces around 10^{13} metric tonnes of cellulose per year (Colvin 1980), but even after 10,000 years of agriculture and several hundred years of intensive scientific farming, only 1 percent at most is available as feed for mankind's livestock (Davis 1988). Understanding how to make more cellulose available for livestock production, therefore, is a key step first in solving the current world food shortage, and then in supplying food for an expanding world population.

To avoid getting eaten, germinating grasses, plants, and trees that soon start producing cellulose from carbon dioxide and water by photosynthesis must grow up fast, but exceptionally fast in the humid tropics where the variety and density of rainforest species is intense. As plants grow, the cellulose they produce in their cell walls gets locked up in a complex chemical form known as lignocelluose (fiber) and becomes less and less digestible to its predators, including the cellulose-digesting bacteria that inhabit the rumen and large intestines of mankind's livestock—cows, cattle, buffalo, sheep, goats, and rabbits.

Grasses and plants become more fibrous and indigestible as they age, and more and more useless to domestic animals. An agricultural scientist (Boyce 1984) has likened the structure of lignocellulose to reinforced concrete:

> . . . where the microfibrils of cellulose, a rigid glucose polymer, are similar to steel rods. The hemicellulose pectins and other gums surrounding the cellulose are similar to the concrete. In addition, this matrix is impregnated with lignin which might be visualized as a coating of plastic resin.

Cellulose, therefore, serves a double role in the biosphere; it is the primary food resource and also the main component of the biological structural support that allows plant life to go "high rise." The multi-tiered canopy of a tree is a magnificently efficient collector of the weak solar radiation that reaches Earth and powers the mass production of cellulose. For every living plant, from germination to death, there is a continual contest between cellulose digestion by predators, and cellulose lignification by the plant. Most plants do not make it beyond a juvenile stage and even for those that do survive, some for tens and hundreds of years as majestic trees, their young shoots and leaves full of digestible cellulose are being continuously eaten alive by hungry predators.

Such is life. Such is the unstoppable driving force of living matter. What we see in the natural landscape is what escapes digestion, the lignified cellulose. So there is a superabundance of cellulose in the biosphere but, like the water in the oceans, it is waiting to be unlocked by mankind's technology.

In the 1980s, a large commercial-scale high-pressure steam boiler was invented (StakeTec, Minnesota) that crudely busted up the lignocellulose into more digestible cellulose and sugars for animal feed. Chopped wood or agricultural waste was fed continuously into the 250°C high-pressure boiler, resembling a giant kitchen meat grinder, which exploded the fiber, making it palatable and useful as cattle and dairy feed. The technology was adopted by various countries, but its use as a potentially gigantic new source of animal feed has fallen by the wayside, probably because of its high production costs compared to conventional fodder.

This steam-explosion technology, if refined, can today play a big role in overcoming food shortage, especially in temperate countries where the growing season is short. However, the Deep Tropical grass plantations are much more promising for tropical regions, requiring minimal machinery: a tractor and trailer for harvesting, for example. Basically, it is just a matter of watching grass grow.

The secret of the Malaysian grass plantation is that digestible cellulose is captured while the grass is still juvenile, around one-month old, just before it lignifies, and it is immediately fed to animals that love it and grow and produce splendidly, much to the delight of the farmer. By using his brain, man gets the digestible cellulose for his exclusive use before the armies of hungry predators have gotten out of bed.


Valley Irrigation

An irrigated crop circle in an arid area of Kenya. Now, underground water is used for irrigation. In the future, nuclear power-produced desalination will make it possible for the dryer tropical regions to be transformed into lush grass farms.

Transcontinental Species

By planting tropical grasses from different continents, such as Africa or South America, the imported species enjoy a honeymoon period before the native grass-eating species adapt or evolve to attack them. Historically, transcontinental species that temporarily escape being eaten in a different ecosystem have played a key role in world agriculture. Spanish Merino sheep allowed colonial Australia to become the world's outstanding wool producer, all within a 50-year period from 1850 to 1900. Likewise, colonial Malaya was able to become the world's largest producer of rubber by importing seeds from Brazilian rubber trees. And by importing oil palm seeds from West Africa, independent Malaysia, from 1960, soon became the world's number one supplier of palm oil.

These plantations still produce cheap raw materials under the British colonial poverty-producing plantation system, at prices manipulated by European futures markets. However, Malaysia and now the humid tropical regions of Indonesia, Thailand, and the Philippines, as well as the rainforest territories in West Africa and the Amazon, can better use their plantation land to grow transcontinental grass species to dramatically increase the supply of young nutritious grasses for their own livestock industries.

Vernadsky's Biosphere

Precisely because the grass production in a properly managed grass plantation is sustainable, it can be immediately scaled up anywhere in the humid tropics where rainwater is plentiful and also in the dryer tropical regions wherever underground water is still available. The world's reserves of underground water, derived not from rain but previous ice ages, are fast depleting, but as nuclear-desalinated water becomes available, even barren deserts can be transformed into lush grass plantations.

Greening the deserts and nuclear-powered agro-industrial nuplexes were the grand vision of President Eisenhower's 1953 Atoms for Peace program. This was anticipated, well before the splitting of the atom, by the Russian biogeochemist V.I. Vernadsky (1863-1945) when he opened the Radium Institute in Petersburg in 1922, stating:

> Soon man will have atomic power in his hands. This is a power source which will give him a possibility to build his life just as he wishes.

Today as the nuclear renaissance unfolds, we can think big again and mentally transform the otherwise biologically non-productive Sahara Desert into grass plantations. No doubt the Greenies will want to preserve this pristine desert environment. But let the Greenies try living there in desert outposts and discover for themselves that their alternative energy windmills and solar panels are next to useless for desalinating water for their crops!

Meanwhile, the digestible cellulose produced in a Sahara Desert dotted with nuplexes would be sufficient to support perhaps 5 billion cattle, compared to the present world population of 1.3 billion cattle. The Sahara Desert is certainly large, but is only a small percentage of the total tropical land mass that could support grass plantations. This is good news, because mankind must prepare for the approaching ice age as the Earth's perfectly natural 10,000-year global warming period draws to an end, by around the year 2050. During the Earth's fairly regular 100,000-year-long ice ages, the evaporation of water from the oceans and hence world rainfall is greatly reduced and much of the tropical region turns into extreme deserts, except the equatorial rainforests, which survive ice ages and serve as the Earth's Noah's Ark, maintaining and guarding the biosphere's 50 million livings species for warmer times.

Meanwhile, the polar ice caps expand and the temperate regions become buried in a kilometer or more of ice. The combined effect of glaciers and desertification causes a mass extermination of living matter in the biosphere. The carrying capacity of the Earth's land mass for all species is greatly reduced, and only starts to increase as the Earth warms up again in the next interglacial, the 10,000-year period of global warming.

Man's creative ability (Vernadsky's Noösphere) to discover the principles of the universe and develop new technologies based on these principles is able to transform the biosphere.

Agricultural Research Service, USDA

New Zealand sheep. Prime quality lamb for meat can be produced in 5 months in Malaysia, compared to 8 months in New Zealand. One hectare of grass in Malaysia's new grass farms can support 82 sheep throughout the year, compared the best sheep farms in New Zealand, which can carry only up to 25 sheep per hectare throughout the year.

Vernadsky was the first to recognize that man's unique ability above all the animal species for creative thinking had become, by the 20th Century, a planetary force greater than nature itself to change the biosphere. Now we have the beginnings of a survival strategy to feed mankind throughout the next ice age, and avoid the population crash that every other species will suffer, apart from chosen species like domestic food animals protected by man.

From Vernadsky's planetary perspective, each developing nation, instead of panicking in the world financial crisis, can confidently work out how to rapidly produce its own food. This calm, thoughtful, and cooperative process between nations can outflank the British Empire's brutish globalization plan to outdo the approaching ice age by depopulating the world by 80 percent, primarily through starvation and accompanying diseases.

Suitable Domestic Animals

Goats, although good for extensive grazing systems, are not the best animal in our opinion for intensive production systems. Sheep are far superior, for they are a timid grass-eating herd animal and adapt splendidly to close confinement and good husbandry. Second only to rabbits, sheep are the easiest domestic animals to look after, even by young teenagers. In contrast, goats make resentful prisoners. With a larger brain, their instinct is to escape captivity so they can browse plants and shubs and low lying branches as solitary animals.

Compared to sheep, which have undergone extensive genetic selection, indigenous goats are almost an unimproved wild animal and therefore have a low genetic potential for growth and a bony carcass. The African Boer goat has been selected for better growth and meat content, but demands plenty of outdoor space, increasing the cost of production and the chance of infection. An African breed of sheep confined to a Deep Tropical shelter is achieving average growth rates of 250 grams per day. This compares with 45g per day with the indigenous Malaysian sheep on grazing, or 90g per day when housed intensively.

The same is true of local versus foreign improved breeds of goats, cows, and cattle. Developing countries are therefore well advised to consider looking for high growth rate breeds from a different continent. With Deep Tropical husbandry to minimize diseases, these genetically superior breeds could be the fastest way to improve livestock production and make farming profitable.

Mass-Producing Prime Lamb

Small scale pioneer Deep Tropical sheep farms in Malaysia support 82 sheep per hectare of grass plantation, compared to 25 sheep per hectare on New Zealand's best grazing farms. Negotiations are under way to establish a group of commercial farms for 25,000 sheep, as a model that can be replicated around

Courtesy of N. Yogendran

Jersey cows on their way to the automatic milking turntable at a Deep Tropical farm in Malaysia. Their climate-controlled shed is in the background.

Malaysia. Intensive sheep farming the Deep Tropical way is much easier than intensive dairy farming, and very suitable for new farmers and youth with no previous experience.

In Malaysia, evaporatively cooled housing is not necessary for imported sheep (or cattle), which soon turn night into day by resting and ruminating during the hot part of the day and eating during the cooler night. Sheep are housed in lots of 100 in low-cost, open-sided sheds, and fed daily with chopped grass and concentrates from outside the shed.

Good health is maintained by vaccinating the animals and good hygiene. Metal grid flooring raised 20 centimeters above the ground allows daily removal of the air-dried sheep dung, thereby preventing flies. The dung fertilizes the grass plantation minimizing the use of costly chemical fertilizer. With this simple low-labor system, novice farm workers can be easily trained to look after two sheds, and the best among them can be further trained in colleges and universities to become entrepreneur animal farmers.

Courtesy of Mohd Peter Davis

Happy pigs at a Deep Tropical farm in Malaysia. Hygienic, disease-free pig farming yields improved productivity and reduced mortality, savings which pay for the climate-controlled enclosed GIFT Shelter. Similar shelters can also be used for high-value stud sheep and goats.

Prime quality lambs for meat can be produced in Malaysia in 5 months, compared to 8 months in New Zealand. In much the same way, cattle can be fattened in open-sided feedlots. However, in a food emergency there is a biological problem with sheep, cows, and beef cattle. The twinning percentage is low, and their reproductive rate is rather slow: 5 months for sheep and 9 months for cows, which cannot be speeded up.

Mass-Producing Rabbits

Improved breeds of rabbit, fed from a grass plantation, can produce 50 offspring per year reaching slaughter weight in 3 months, although supplementing the rabbit's grass diet with protein will probably be necessary to achieve these growth rates. A crash program has been developed to the concept stage to rapidly mass-produce rabbits throughout the villages of Malaysia, 95 percent of which have adequate housing, shops, schools, sealed roads, electricity, and piped water—but not enough jobs. A rabbit animal production unit (APU) will consist of 10 low-cost single-story terrace rabbit houses, each a small breeding farm containing 1,000 or more rabbits in different stages of production. The unit is intended to be operated part-time on a contract basis by 10 families, and is especially suitable for those families with school-going children to help with the labor.

A number of animal production units, each producing 10,000 rabbits per year, and built in nearby villages will be supplied with grass daily from a central commercial grass farm serving also as the slaughter house and wholesale distribution centre. The very modest capital investment by the government for the APUs, combined with making better use of the well-established village infrastructure, means that rabbit meat production can be quickly scaled up to support a government-directed emergency food program. Meanwhile, the large-scale breeding farms to support commercial dairy farms and sheep farms will spread more slowly, in line with the much lower reproductive rates of these animals.

Bio-security Animal Housing

The Deep Tropical animal housing is another stunningly simple concept. For the last 500 years in Malaya/Malaysia, attempts have been made to adapt grazing temperate animals to the heat and diseases of the humid tropics. Cross-breeding with hardy but non-productive local breeds has not been successful, and Malaysia, with good infrastructure and modest industrialization, currently imports 95 percent of its milk, 92 percent of its mutton, and 77 percent of its beef.

Some of this importation is because of the demand by the World Trade Organization that developing countries import their food, but there is a deeper problem. The same mistakes were made year after year, century after century, trying to copy the European grazing system in the humid tropics.

Agricultural entrepreneur N. Yogendran decided to break with this pattern. Instead of trying to change the animal's biology, Yogendran ignored the "experts" in the universities and research organizations and changed the animal's environment. Low-cost climate sheds were invented and perfected to provide animals with a perfect year-round summer Mediterranean climate, kept cool with novel evaporative cooling at a fraction of the electricity cost of air-conditioning.

The well ventilated, cool and dry barns provide suitably vaccinated cows and pigs with near human levels of comfort and modern hygiene, where dung is efficiently removed without fouling the animals. Diseases and parasites simply disappear, without pumping the animals with medication. Now the most productive breeds of domestic animals in the world, perfected by advanced genetic selection, can be air-freighted, with all their health clearances, from the best farms in temperate countries.

Cows flown from Australia, barely touching the tarmac, are trucked immediately to their new hygienic climate sheds. Within two weeks, the animals are adapted to their new "Hilton Hotel" environment and eating well, protected from the heat and animal predators and especially the horrendous disease and parasite load of the humid tropics.

A similar hygienic shed has been designed for pigs, which transforms the dirty, smelly pig farming, characteristic of Asian backyard farming. A new enclosed pig shelter, kept cool and dry by high-ventilation evaporative cooling, is odorless and the pigs are easily trained to respect a toilet area, allowing them to be floor fed (see photo, previous page).

A small swimming pool in each pen enables two pigs at a time to wallow to stay cool and follow their natural behavior in the wild. When a pig gets out of the pool, the rest of the pigs engage in social grooming, licking the wet pig until it is pink and dry. The pig shed is kept as dry as possible and the dung is washed daily through the swimming pool with minimal water, allowing the dung to be treated in modern sewage plants instead of open oxidation ponds.

The happy pigs can replace the revolting conditions that pigs are generally subjected to in traditional pig sheds throughout Asia. Pigs in the wild are clean and sociable animals with large litters, and we have recreated a modern form of their natural conditions at modest cost, compared to expensive modern pig farms in developed countries, which are beyond the reach of farmers in developing countries. The capital cost for climate buildings is more than recovered by lower animal losses and improved productivity.

Again, agricultural science and engineering has improved animal welfare to near human conditions while the environmentalists preach animal rights and want to ban meat altogether from the human diet. Most important, the climate-controlled buildings protect domestic animals from virus diseases such as Bird Flu, Nipah virus, and Sars, which respect no borders and can devastate world animal production, at the same time passing on mutated animal viruses to the human population, threatening viral pandemics.

Deep Tropical bio-security ruminant farms, similar to modern enclosed chicken farms, can provide a practical, affordable alternative to European grazing and Asian backyard farming. The Deep Tropical agricultural system, developed in Malaysia to cope with the highest disease load in the world, therefore marks a new standard of hygiene for animal production for the rest of the world to follow, at a cost that developing countries can afford.

The 'Carrying Capacity' of Land

What the diehard Malthusians and brainwashed environmentalists refuse to understand is that the "carrying capacity" of the land is not a fixed biological constant for each species of animal or human being, but can be increased by man's creativity. The grass plantation in Malaysia, producing 10 crops of young grass per year, dramatically increases the carrying capacity of the land. We are demonstrating this in the most practical way. One hectare of a Malaysian grass plantation can support 82 African sheep in climate sheds, growing at 250 grams per day compared to 2 indigenous Malaysian sheep growing at 45 grams per day, grazing on one hectare of a rubber plantation or one hectare of village land.

The 2 Malaysian sheep, grazing "naturally," as recommended by the less fanatical green environmentalists worldwide for livestock, will produce about 40 grams of carcass meat per day. Compare this to the nearby 82 African sheep, hygienically housed and supported by 1 hectare of grass plantation, which will produce around 11,300 grams of carcass meat per day. This represents a 282-fold increase in carcass meat supply per hectare of land!

By providing so much more food have we not increased the potential carrying capacity of human beings per hectare of land? Have we not done this in a completely sustainable way, requiring only regular fertilization to replenish the soil nitrogen and minerals consumed by the grass?

Moringa: A Green 'Superfood'

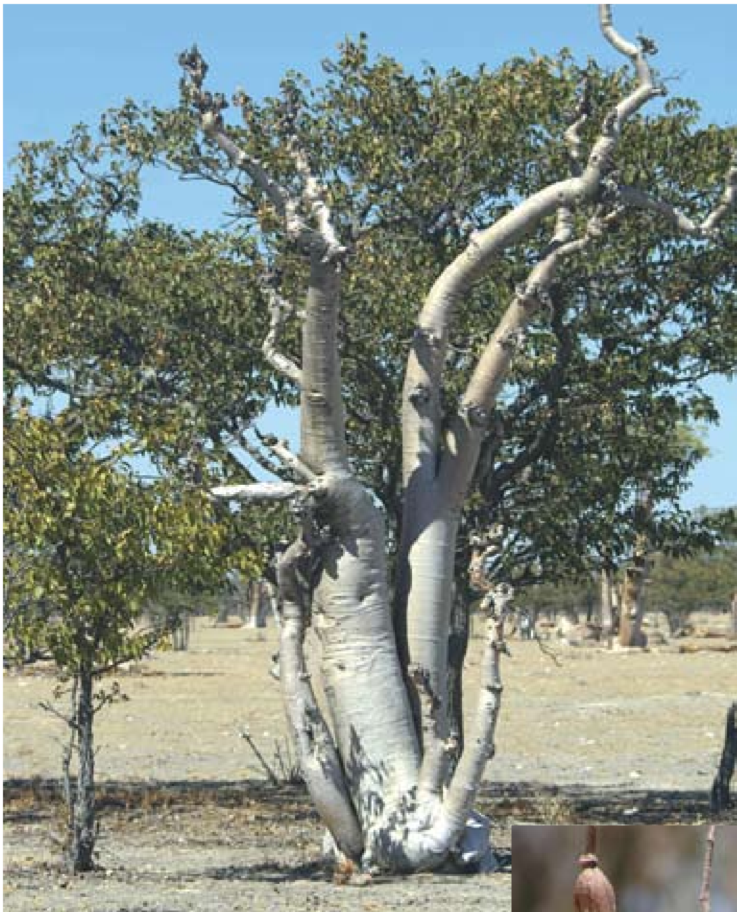
The moringanews.org website described moringa as follows in a June 18, 2008 press release:

Moringa: a small, fast-growing tree found in all tropical regions. Its leaves are among the world's richest vegetables. It is a plant food of high nutritional value, ecologically and economically beneficial and readily available in the countries hardest hit by the food crisis. It is therefore urgent that the barriers preventing the development of this green superfood be removed. . . .

The leaves of moringa . . . were recently identified by the World Vegetable Center (Taiwan) as the vegetable with the highest nutritional value among 120 types of food species studied. Easy to cultivate and resistant to drought, this tree produces abundant leaves with a high concentration of proteins, vitamins, and minerals: 100 grams of fresh moringa leaves provide the same amount of protein as an egg, as much iron as a steak, as much Vitamin C as an orange, and as much calcium as a glass of milk.

Moringa grows throughout the developing world and has already been used by programs to reduce child malnutrition in India. Its dried leaves, in powder form, can be easily preserved and used. Eating 30 grams a day, a child can satisfy all his daily requirement of Vitamin A, 80 percent of daily calcium needs, 60 percent of daily iron needs, and nearly 40 percent of protein needs.

Given the world food crisis, the use of local resources like Moringa is critical to reduce the dependence of developing countries on imported goods, and to improve nutrition among poor households.



Hans Hillewaert

A "miracle" moringa tree growing in Namibia. Moringa plantations, harvesting leaves when they are young, could supply nutrients for the world's hungry.

Seeds from the moringa tree produce edible oil.

Yet again, science disproves the 200-year-old lie of Malthus and his co-thinkers today in the green environmental movement who chant incessantly that mankind is outstripping the Earth's ability to produce food, and therefore deserves to be exterminated to save the environment.

Moringa: The 'Miracle Tree'

As Henry Kissinger, a self-confessed British agent of influence, was busy back in 1974 as U.S. National Security Advisor, enacting the National Security Study Memorandum 200 to destroy Africa's ability to grow food,[3] and as environmental groups worldwide, led by the likes of Prince Philip, joined this depopulation bandwagon, others worked to develop technologies that would fight against the killer malnutrition.[4] New strains of rice or wheat and other crops that could withstand ultra-dry, ultra-wet, and ultra-salty soil; plants that are pest resistant or with higher vitamin levels are some of the developments to increase man's capability of feeding the world.

One such technology that we have investigated is the production of the moringa "miracle tree" to provide a bounteous vegetarian food source of protein and vitamins (see box). The moringa is known throughout developing countries for its edible leaves and pods, oil from its seeds, wide medicinal uses, and water filtration and purification (see http://www.moringanews.org). Because it contains 27 percent protein and 8 essential amino acids, it is suitable as an ingredient in baby formula, as well as hard biscuits for survival rations. For countries with emergency food needs, moringa can provide a fast remedy.

Although many non-governmental organizations and missionary groups have been involved in research and promotion of moringa, the question is, why hasn't the Food and Agriculture Organization (FAO) taken up its development on a crash basis as a weapon against hunger and starvation?

The moringa tree can be grown as a bush which can be harvested every few months by cutting the trunk 20 centimeters above ground to yield its nutritious leaves in high tonnages per hectare per year. This means that moringa can be mass produced on plantation scale.

Malaysia and Indonesia are ideal as a testbed for such mass production.

Recycling Colonial Plantations for Food Production

The 10 million hectares of oil palm and rubber plantations in the rainforest regions of Malaysia and Indonesia are a vast land resource that could be put to much higher benefit for emergency and long-term food production. Rubber and palm oil along with cotton, tea, coffee, and wool are cheap colonial raw materials, based on the lowest possible labor cost, that have long served the interests of the British Empire. Developing countries although independent, are still at the mercy of the world price for these commodities, which is manipulated by so-called free trade.

Export earnings of rubber and palm oil expressed as a percentage of Malaysia's total exports have declined steadily, from 41 percent in the 1960s to only 4 percent in 2005. Given the

Farmers in Senegal harvesting moringa leaves by hand. Keeping the tree as a bush, allows farmers to harvest juvenile trees every two months for its edible leaves. The dried and ground leaves contain 28 percent of high quality protein, which can be formulated into baby food and used as an ingredient in many dishes. Malaysian entrepreneurs are thinking: Why not grow moringa on plantation scale and mechanically harvest the leaves?

collapsing world prices of palm oil, it is now barely worthwhile to pick the fresh fruit bunches from the trees, which in November 2008 fetched only RM280 per metric tonne ($80.00), less than half the price of the previous four months. If the price on the international stock markets gets any lower, Malaysia and Indonesia can save money by not producing rubber and palm oil!

Looking at the bright side of the situation, the insanity of the free market has, in effect, liberated vast areas of land for local food production. What a golden opportunity!

Existing plantations can be easily converted into grass plantations. Within six months, the whole process of cutting down the rubber or oil palm trees, and plowing, fertilizing, and seeding grass or moringa, the old plantation could be producing its first crop of nutritious grass or moringa.

Malaysian entrepreneurs are getting enthusiastic. Why not use some of the liberated 5 million hectares of rubber and palm oil plantations for grass plantations for animal production? Why not mass produce moringa leaf powder for baby formulations and survival biscuits for world markets?

Food technologists can modify the formulations to suit the appearance, taste, and texture required by different cultures. Distributed as emergency food by international agencies, the protein-rich biscuits will help prevent malnutrition and even starvation, while developing countries gear up their own food production.

Why not search for other high protein plants traditionally used as food in Africa and India, grow them in plantations, and process them for world markets? Developing countries have all the available resources, so let us collaborate and quickly find the best species to propagate for emergency food.

International Scientific Collaboration

While developed countries are paralyzed in the face of the world food crisis, it is important to understand that developing countries are taking the lead and making agricultural breakthroughs, such as the moringa propagation and the Deep Tropical system, to solve their own food production problems. Now that self-funded agricultural entrepreneurs have shown the way forward, it is time for the government agricultural institutions in developing countries like Malaysia to admit their shortcom-

There are 10 million hectares of oil palm (above) and rubber plantations in the rainforest regions of Malaysia and Indonesia, some of which could be converted into grass farms or moringa plantations. Instead of being dependent on the colonial method of raw material looting, these and other developing nations could quickly stop malnutrition and starvation and become self-sufficient in food.

ings, swallow their pride, and fully support their own farmers and inventors.

Adopting the New Zealand and Australian practice of mobilizing the nation's agricultural scientists and engineers in the universities and research institutions behind its agricultural entrepreneurs will allow humid tropical Malaysia to leapfrog the European grazing system and serve as an exemplary example for other developing countries to rapidly increase their local food production.

Japan, which has long given agricultural aid to developing countries, has made a generous proposal. In June 2008, Yusuo Fukuda, then Japanese Prime Minister, announced to the 4th Tokyo International Conference on African Development:

> With a wealth of agricultural experience, Japan is willing to cooperate with countries and international organizations to develop irrigation systems, improve the varieties of crops raised, and foster workers in the field of agriculture.

IRRI

International scientific research and collaboration with local entrepreneur farmers is key in raising the yields of major food crops, allowing developing nations to become food self-sufficient. The International Rice Research Institute (IRRI), one of major Green Revolution research institutes, has developed new rice strains and growing methods to greatly improve crop yields. Here, a Malaysian researcher with IRRI investigates weedy rice, which causes crop losses.

A "Rice Action Plan" has been put forward by Robert Zeigler, director-general of the Philippines-based International Rice Research Institute (IRRI), whose plan won support in Hanoi in October 2008 from the 10-nation Association of South East Asian Nations (ASEAN). Rather than opening up new lands for rice cultivation, IRRI advocates a much faster approach by using its modern techniques to increase the yield on existing rice land by 2 metric tonnes per hectare. The current average yield in Asia is 3.8 metric tonnes per hectare, a miserable 1.5 metric tonnes in Africa compared with more than 10 metric tonnes per hectare, which was recently achieved on research farms in South China using super-hybrid rice.

This approach of improving crop yields was adopted for the 1960s-1970s Green Revolution, using science and technology developed at international research institutes, each specializing in a particular crop. It is the fastest way to achieve world food security, as India has proved. The best way by far to ensure the correct implementation of these scientific advances is for the scientific institutions to collaborate with proven entrepreneur farmers.

The role of government agencies is not to produce food, but to unlock the land for entrepreneurial farming and provide low-interest long term credit and incentives to make this happen. The government must also ensure that fertilizer and agricultural extension services are available, along with fair marketing of farm produce without the middlemen stealing the farmers' profit.

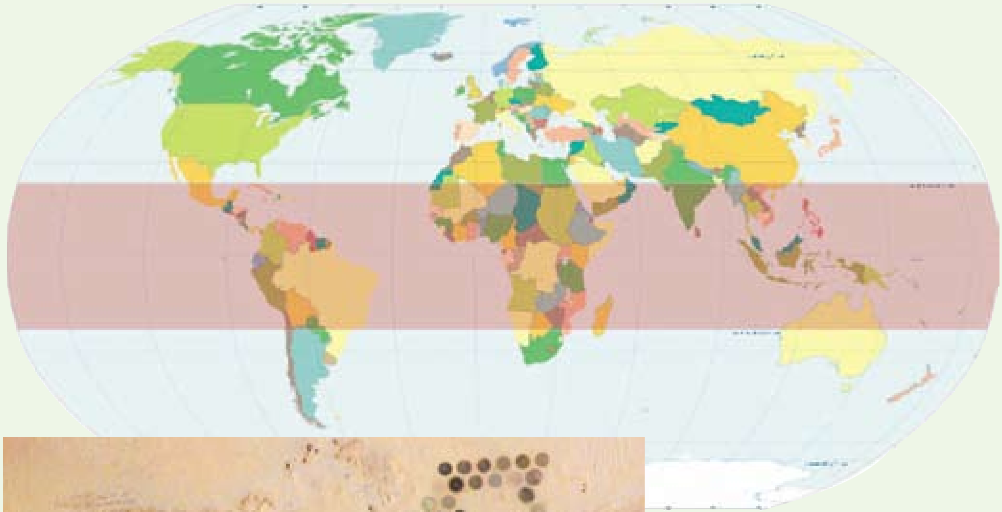
As farming becomes more efficient, much of the 40-80 percent of the population in developing countries who are currently employed in agriculture can be gradually replaced. This transition from feudal farming to scientific farming, which took several centuries in Europe, can now be greatly accelerated in developing countries, given good farming systems. Rural youth with certificates, diplomas, and degrees in modern agriculture and agricultural sciences can take over from the poverty farming practiced by their fathers and become highly productive and prosperous entrepreneurial farmers.

The overall concept is a Franklin Roosevelt-type crash science program for emergency food production.

Crop Circles for the Tropical Zone

Another great leap in world food production can take place as nuclear-power produced electricity and desalinated water comes on stream, especially from the small nuclear reactors under development by South Africa, India, China, Russia, and America. These 100- to 200-megawatt factory mass-produced modular power plants, rather than the current 1,000- to 1,500-MW reactors, which take a long time to construct on site, will be ideal for kick-starting modern agriculture.

Even before these fourth-generation nuclear plants come into production, irrigated crop circles are creating the market. Spectacular crop circles, one to two kilometers in diameter, are



NASA

Crop circles in the Libyan desert, as seen from space.

Center-pivot irrigation for crops, Deep Tropical animal production, and fourth-generation modular nuclear reactors will enable the greening (and food self-sufficiency) of all the Earth's tropical zone (see map), from the Tropic of Cancer to the Tropic of Capricorn.

A center-pivot irrigation arm, traversing the crop circle.

PBMR

Artist's illustration of the planned Pebble Bed Modular Reactor facility at Koeberg, South Africa.

greening the deserts of Jordan, Libya, and Saudi Arabia, as can be viewed on Google Earth. These crop circles, with their center-pivot irrigation, rely on fast-depleting underground water left over from ice ages. With cheap and abundant supplies of desalinated water and electricity from these town-sized modular nuclear reactors, the whole of the Earth's zone from the Tropic of Cancer to the Tropic of Capricorn can be transformed into productive agricultural land based on irrigated crop circles.

Different crops such as wheat, corn, soybean for humans, and also chicken, egg, and pig production and grasses for cattle, cows and sheep, can all be produced in dedicated agricultural zones to provide food for nearby population centers.

Crop circles rely on center pivot irrigation, an American invention dating from the 1950s and perfected over the decades. From a fixed center point, the huge irrigation arm slowly travels on wheels around in a circle while spraying the crops below. The sprinkler arm can be 1 kilometer in length, giving a crop circle area of 314 hectares, ideal for a grass plantation. In the few dry tropical regions where the supply of underground water is still plentiful, such as parts of Northern Africa and Northern Australia, there is no technical reason to prevent the Deep Tropical livestock system from being practiced immediately, feeding climate-controlled-housed cows, cattle, sheep, and rabbits from a grass crop circle.

Similar crop circles of corn and others of high protein legumes will support the production of nonruminant pig, chicken, and egg industries. Other crop circles will support wheat and barley and a wide range of vegetables and vegetable oil crops.

The land between the crop circles is not wasted land; it can serve as roads and a "scorched earth" barrier to other species, greatly minimizing the use of insecticides. Indeed, agricultural science can "out green" the greenies, especially that living fossil Prince Charles, who while waiting to become King of England retreats to medieval organic farming on his feudalistic royal estates.

Crop circles, combined with Deep Tropical animal production and small mass-produced nuclear reactors, are the key to ensuring world food security well into the future. The plentiful supply of electricity and desalinated water from small modular nuclear reactors, such as the General Atomics GT-MHR or the South African PBMR, or India's planned thorium reactor, or the Russian floating nuclear power plant, will allow these gigantic crop circle farms to be established almost anywhere in the Earth's tropical zone, from the Tropic of Cancer to the Topic of Capricorn.

This is the warm climate zone with plenty of sunlight, but not enough water, where much of the world's population presently struggles to survive using primitive agricultural techniques. Making use of nuclear power, these populations can quickly advance to the high quality milk, meat, egg, and wheat diet enjoyed in developed countries, which so dramatically improved health, stature, and lifespan during the 20th Century.

Nuclear power will replace the reserves of underground fresh water left over from previous ice ages that have now been largely exhausted by modern agriculture, particularly over the last 50 years. There is no shortage of water in the world. The nuclear desalination of the Earth's oceans will supply mankind with inexhaustible quantities of fresh water for agriculture, industry, and residential use. By the mid-21st Century, fusion reactors will be recreating the "Sun on Earth" by fusing together hydrogen isotopes, the most abundant in the universe, to gradually replace the energy obtained by splitting non-renewable uranium.

Bringing Hope to the Young Generations

Again and again, science and technology are proving Prince Philip's anti-science, anti-nuclear, and anti-human World Wildlife Fund insanely wrong. Although this international army of green environmental Malthusians has willingly chosen genocide as the "final solution" to the world food crisis, and must be defeated, their misguided young followers in schools and universities are worth salvaging. These youth passionately, but falsely, believe that the world is grossly overpopulated and cannot feed itself, and that man is depleting finite resources and "destroying" the environment with global warming.

Brainwashed by Prince Philip's aging gang, these young people can be ridiculed out of their no-future misery and encouraged to play their part in defending the human race. They have been conned into living mentally in the ignorance and brutality of the Middle Ages, stupidly rejecting the gains of the European scientific renaissance that succeeded in liberating mankind from hunger and poverty.

The last 40 years have been largely wasted. As the world economy disintegrates, we need a generation of clear-headed youth to take on the archaic British Empire and build a new world. The adoption of a New Bretton Woods financial reorganization, as proposed by economist Lyndon LaRouche,[4] will provide the needed opportunity for the world's agricultural scientists and engineers, cooperating fully with entrepreneur farmers in each nation, to deliver a plentiful and secure supply of good quality food for the entire world population for the first time in human history.

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Footnotes

1. See "National Food Self-Sufficiency Planning: The Case of Malaysia, *EIR*, July 29, 2002.
2. "Malaysia's Agricultural Breakthrough, and Nuclear Desalination, Can Feed the World" *21st Century*, Spring 2008, http://www.21stcenturysciencetech.com/Articles% 202008/Special_report-Sp2008.pdf
3. NSSM 200, the National Security Study Memorandum, prepared under Kissinger's direction, viewed population growth in the developing sector as a threat to the U.S. national security, because increased population and nationalism might limit Western access to raw materials. The text of this now declassified document can be found at http://wlym.com/text/NSSM200.htm .
4. Lyndon LaRouche's New Bretton Woods program can be found at www.larouchepac.com, along with many video and written presentations on the food crisis, its causes and solutions. In a short video titled "The Food Crisis," http://larouchepac.com/node/9207, LaRouche warns bluntly that the globalization of food has deliberately left developing countries dependent on other countries for much of their food, while the British Empire is dangerously positioned as middleman to determine who eats, and at what price, and who starves to death.