

# Sustainable Development And The Vulnerable

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Global Research, May 04, 2008

4 May 2008

Region: [Asia](#)

Theme: [Environment](#), [Global Economy](#)

Isha vasyam idam sarvamam, Yat kinch jagatyam jagat!

Teyn tyakten bhunjithah, Magridhah kasya sweed dhanam!!

The cosmos is the abode of God; consume but with sacrifice!

(First verse, Isha Vasyam Upanishad)

## 1. Who is vulnerable?

Nature gave us good life. It gave us food, fibre, fodder, fuel, clean air, fresh water and seeds. Corporations defiled these basic survival goods; global pollution will make them scarce.

The peasants are increasingly finding it difficult to ensure a square meal for their households and sell surplus to feed the 'non-vulnerable'. The pollution generated by industry and the consuming rich is posing problems of survival for all; the rich are equally vulnerable because they don't know what it takes to grow food.

Our blind faith in economic development through industrialization and urbanization has violated Nature's Law. Industrial farming is destroying biodiversity that protects ecosystems. Destruction of ecosystems is affecting the supply of basic survival goods. The muck of modernity has pushed the world to a point from where Mankind may just slip into the proverbial Olduvai Gorge. (1)

The options are limited now: either 'consume with disregard' to achieve the unsustainable GDP driven macro-targets or 'consume with sacrifice' that leaves greater survival options for the future generations. The model of development thrust upon the world by short-sighted economists, profit-driven Frankenstein globalists and blinkered politicians has ensured that the majority will be cremated by their parents and the survivors will cremate their children. Nature's wrath expresses itself in many ways.

## 2. Settled societies

From around 12,000 BC (about 14,000 years ago) indications are that some sort of primitive horticulture, not field agriculture, started in at least four regions namely South Asia, Southeast Asia, West Asia (including Egypt) and Central America. The last Ice-age was receding and, after centuries of food shortage due to climate change, people could grow

food. The domestication of plants and animals ushered in relative food security. There is also a belief that in these societies there was equality of sex. (2)

Transition from horticulture to settled agriculture perhaps took place over four to five thousand years. Whilst not much is known about how settled agriculture developed, there are indications that settled agriculture dates from about 8000-7000 BC. (3) People could live in clusters, till land and grow food. The transition led to division of labour: tillers, granary-guards, fortification of villages and towns, soldiers to protect food, contributions from households towards security and accountants. Dhaulavira excavations, near Bhuj, perhaps a classic example, show that people lived in well organized cities and their economy depended on farming, mining, metal work, textile etc. (4) As specialization grew, so was the society vertically stratified. As some say women lost their economic status and found themselves relegated to tasks inside the house. The economic success caused large states to emerge and soon of imperial ambition. When fewer people were available to tend to land and maintain irrigation channels, food production collapsed.

The ruins of Mesopotamia, Nile valley, the Jordan valley, the City of Jorash, of ancient towns of Tyre and Sidon are all testimony to the fact that these civilizations declined and eventually were wiped out when people stopped caring for soil and water. "In a larger sense a nation writes its record on the land, and a civilization writes its record on the land — a record that is easy to read by those who understand the simple language of the land."(5)

### **Tribulations of the peasants**

India suffered agriculture collapse on a regular basis only because of the British occupation. Seizure and conversion of best [farmland](#) to [plantations](#), restrictions on internal [trade](#), excessive [taxation](#) to support imperial ambition elsewhere, exports of [staple crops](#) from India to Britain exacerbated food shortage. Shortage increased the price of food and decreased availability. The first Bengal famine (1770s) killed about ten million, and during 1770-1947 in all about 79 million people lost their lives because of colonial control over land. (6)

Economic historians, like Dharampal, have calculated that, for example, in Madras presidency [present day Tamil Nadu state], from 1830 onward, around one-third of the most fertile land, went out of cultivation because, even with 100% produce sold for cash, land tax demand could not be met.' (7) For the Indian peasants this was a new experience.

Attempts were made by the colonial administration to help peasants increase productivity. Notable among these were the efforts of Dr Albert Howard who did pioneering work at Pusa and Indore but these scientific advances did not reach the peasants. (8)

While on the one hand, the British destroyed the age old method of sustainable agriculture by over-taxing farmers, on the other, despite attempts to understand what went wrong, commercial interests prevented science effectively helping them maintain what had historically proven to be a near perfect system of stewardship for their lands and a means of adequately feeding themselves and the rest of the population.

### **3. Cheap energy**

The issue of sustainable development is inextricably linked with problems created by cheap

energy. The convergence of technologies of internal combustion engine, oil extraction, electricity generation and mass production of appliances made many things possible that earlier could not even be imagined. Machines replaced muscle power. Productivity soared and thus the affluent society was born. Slowly, affluence came to be perceived in terms of number of cars and gadgets people owned and the places they flew to. Cheap energy could move things farther and faster.

The oil and machine era fundamentally transformed food production and distribution. More land could be farmed by fewer people; fertilizers and pesticides, introduced in the early twentieth century gave an artificial boost to productivity. Food could be stored, processed, refrigerated and moved over long distances. The modern world was now 'using soil to convert oil and gas energy into food energy,' a tectonic shift from earlier days of converting solar energy to food energy.

Cheap energy transformed the so-called western world. In less than fifty years North American *independent* farmers progressively disappeared to be replaced by large industrial farms where profit maximization was the driving mantra. More or less the same transformation occurred in West Europe. If Old MacDonald had a farm, he was now working as stock broker or forecourt attendant. For the children, the reality of MacDonald's farm slowly faded into a myth, for the new MacDonald produced food in the city centre. India stands now before the choices North America and Europe faced decades ago. There is a need to learn from what went wrong there and avoid making the same mistakes.

### **Corporatization of resources**

As industrialization progressed the human bond with Nature weakened and there was far less concern as to who controlled the natural resources. The earlier community ownership and control was slowly replaced by corporate control. Those who were part of the industrial society influenced policies; peasants became inconsequential in economic decisions. In India their role was discussed only when the 'business of poverty' was on the agenda.

While this transition was of far less consequence to the urban society, it was of profound significance to the peasants. Especially after 1947, the desire to take the big leap forward into the industrialized world, an inhuman and unbearable system of sequestration of land at will by the State was imposed on the peasants. A myth was institutionalized into economic theory and political philosophy that technology frees humanity from drudgery without realizing that these technologies functioned because of cheap energy. The severance with Nature was complete. The South Asian leaders, co-opted 'custodians of chaos,' replicated the western model and continued with disastrous policies in the name of poverty alleviation and development. **(9)**

The fetish with GDP, since the middle of the twentieth century, effectively trashed the very essence of human progress. **(10)** GDP neither explains distribution of income, nor quality of life, nor does it factor in social and environmental costs that are critical survival elements, especially if the era of cheap energy should come to an end as it seems destined to do.

As humanity chased GDP driven goals, so the ecological footprint expanded. Footprint is our demand on Nature. It uses land as a surrogate measure to estimate the sum total of demand to maintain existing quality of life measured in 'global hectare or Gha in short. The global mean per capita footprint, measured in global hectare is now two Gha; India's footprint is well below world average while that of the US second highest. (Figure 1) 'How

we can live well within the means of one planet? This is the main research question of the 21st century,' says Dr. Wackernagel. **(11)**

India's population is still rising at the rate of 1.6% per year and the economy is growing at over eight percent per year. As the consumption pattern becomes more sophisticated the demand on resources will increase and the footprint will increase proportionally. This expansion is only possible so long as others do not compete for those resources. Analyses of the vectors of the natural resource systems like land, biological diversity, forests, water and atmosphere show steady decline. Experts have estimated that if oil, gas and coal reserves are exhausted, the planet can't support more than 750 million people, i.e. the population of the earth in pre-industrial 1750AD. Therefore, the footprint must now contract or the people of the subcontinent must expropriate resources from elsewhere. That expropriation is not only unethical it is inhuman and contrary to natural justice.

## **6. Impact of cheap energy driven 'development'**

### **6.1 Global pollution**

The world is burning non-renewable fuel to generate energy for almost every activity which emits green-house gases (GHG), chiefly Carbon dioxide (CO<sub>2</sub>), Methane and Nitrous oxide, causing invisible pollution. Human activity also causes visible pollution in the form of suspended particulate matter (SPM), which is reducing solar radiation reaching the earth. While the GHGs trap heat and cause the earth to warm up, the SPMs cut down solar radiation reaching the earth and that is making the earth dimmer and cooler.

Industrial activity is responsible for CO<sub>2</sub> emission. At the global level transporting fuels account for 11.3%, industrialized agriculture for 12.5%, transportation 14%, industrial processes 16.8%, power stations (to generate secondary energy, i.e. electricity) 21.3%, waste disposal and treatment 3.4% and residential, commercial uses 10.3%. Land use change and biomass burning account for just 10%, chiefly from less developed countries. **(12)**

The trend in CO<sub>2</sub> concentration and temperature changes shows that while temperatures remained below the long term average while CO<sub>2</sub> concentration was increasing, the point of inflexion occurred in 1975 when both CO<sub>2</sub> concentration and the global temperature began to rise.

According to one group of scientists increases in CO<sub>2</sub> concentration have occurred many times in the past mainly because of **demineralization of soils** triggering the onset of the ice age. The ice age, they say, is one way for Nature to restore the soil mineral balance. **(13)** Another group of scientists comprising IPCC say that CO<sub>2</sub> concentration will cause global warming because GHGs trap solar radiation. **(14)** The third view, according to the group of scientists (let us call them Global Dimmists) is that the atmospheric brown clouds (ABCs, chiefly pollutants) 'intercept sunlight by absorbing as well as reflecting it, both of which lead to reduction in solar radiation reaching the surface of the earth. The surface cooling from visible pollutants has slowed down the warming due to GHGs' says Dr Ramnathan, one of the world's leading climatologist. **(15)**

It is possible that together GHGs and SPMs have caused a different equilibrium the earth had never experienced before; the danger is that if one part of the complex equation is changed, ignoring the other, it just might make global climate more unpredictable.

The seriousness of **industrial pollution** can be gauged from the fact that while rainfall is increasing, much of it is falling into the oceans, known as the rainfall anomaly. (Figure 4) It will alter the normal weather pattern and upset the normal temperature range in densely populated regions.

Despite overwhelming evidence of the adverse impact on climate, particularly on the peasants in Asia, Africa and increasingly in Latin America, world's greatest polluters are paying no heed as was evidenced at the recent conference of climate change held at Bali. One writer even went to the extent of saying,

'the US and its climate racist, climate terrorist, climate criminal allies Australia and Canada are seriously threatening India, the developing world and indeed the World as a whole (16)

Pollution and lop-sided development is going to affect ecosystem services and food production everywhere. That makes not just the poor, but entire human specie vulnerable.

## **6.2 Impact on ecosystems**

### Chart 1 ECOSYSTEM GOOD & SERVICES

GOODS

CULTURAL SERVICES

Food, fodder, fibre and fuel

Spiritual & religious values

Genetic resource

Knowledge systems

Biochemicals

Education

Fresh water

Recreation & aesthetics

## REGULATING SERVICES

## SUPPORTING SERVICES

Invasion resistance

Primary production

Herbivory

Habitat provisioning

Pollination

Nutrient cycling

Seed dispersal

Soil formation & retention

Climate regulation

Production of atmospheric oxygen

Pest regulation

Water cycling

Disease regulation

Natural hazard protection

Erosion regulation

Water purification

Source: 'Global Biodiversity Outlook 2'; CBD; 2007; [www.biodiv.org/GBO2](http://www.biodiv.org/GBO2); page 14.

The peasants live off Nature. Mostly illiterate or barely literate, engaged in farming and gardening, their livelihoods are inextricably linked with ecosystem goods and services that Nature provides. Their way of life hasn't changed in the last four or five thousand years. They had evolved a symbiotic relationship with nature and I can't think of a single example where exploitation was unsustainable unless they were driven by some extraneous factors.

Ecosystems provide twenty-four essential goods and services classified under material goods, regulating services, cultural services and provisioning services. (Chart 1) Material goods include food, fodder, fibre, fuel, genetic resources (wild, hardy genes), medicinal plants (biochemicals), and fresh water. Of immense cash value, in many parts these resources are being corporatized. Regulating services are equally critical for survival and include pest resistance, plant material for wild animals (herbivory), pollination from birds, bees and wind, seed dispersal, micro climate regulation, etc. Green cover prevents soil erosion and also protects communities from hazards like flood and storms. Key supporting services like nutrient recycling, soil formation and retention and production of oxygen actually allow people to live a normal life. Finally, ecosystems help evolve the cultural diversity, knowledge systems and aesthetics, of great service to local people.

## **Chart 2 Variable impact due to changes in local ecosystems**

**Sl. No.**

**Ecosystem goods and services**

## Degree of Impacts

**Hul**

**Sahoo**

**Janghi**

**Suradi**

### Provisioning services

**Stalled**

**Actual**

**Actual**

**Actual**

1

Fodder & grazing land

Severe

Severe

Severe

Severe

2

Fuel

Moderate

Severe

Moderate

Moderate

3

Fresh water

Severe

Severe

Severe

Severe

4

Food [Honey, fruits, etc]

Moderate

Moderate

Moderate

Nil

5

Biochemicals [herbs]

Severe

Severe

Moderate

Nil

6



Timber  
Moderate  
Moderate  
Moderate  
Nil

7  
Fiber  
Nil  
Nil  
Nil  
Nil

## **Regulating Services**

8  
Climate regulation  
Severe  
Severe  
Severe  
Severe

9  
Natural hazard protection  
Severe  
Severe  
Severe  
Severe

10  
Erosion regulation  
Severe  
Moderate  
Moderate  
Severe

11  
Herbivory [fauna]  
Severe  
Moderate  
Nil  
Nil

12  
Disease regulation  
Nil  
Moderate  
Nil  
Not known

## Supporting Services

13

Water recycling

Severe

Severe

Severe

Severe

## Cultural Services

14

Spiritual & religious values

Severe

Severe

Severe

Not known

15

Knowledge systems [IK]

Not known

Not known

Not known

Not known

16

Education

Not known

Not known

Not known

Not known

17

Recreation & aesthetics

Severe

Severe

Severe

Not known

Whilst the degree of dependence of peasants on ecosystem goods and services may differ according to location, their lives and livelihoods are significantly affected when ecosystems decline. For instance herbs collection alone generates about Rs 20-30,000 per year of cash income for villagers in the Himalayan region. In the Chhotanagpur region until nineteen nineties many tribal communities derived an equivalent of 40-50% of cash income and about 45% of nutrition from ecosystem provisioning services.

In a small pilot study in four villages of Himachal Pradesh it was observed that people value many ecosystem goods and services. Janghi, Hul and Sahoo are remote rural villages in Chamba district while Suradi is located in Kangra district. Because of various projects (like

road construction, hydro-electric power projects, etc) eleven are severely affected. In all these villages the impact of developmental activities was moderate to severe on six of the seven factors essential for survival. It can further be seen that regulating and supporting services were also severely affected in nearly all villages. (Chart 2)

The study conclusively proves the importance of ecosystem goods and services in the economic, social and cultural lives of rural communities, especially peasants, whose livelihoods are inextricably linked to natural systems.

Ecosystems are declining for various reasons: destruction of biodiversity, shortage of water because of diversion, fragmentation of contiguous systems, local activities like industrialization and urbanization, expansion of farmlands into forested area and deforestation. Much of the decline can be traced to lop-sided policies, which have led some environmentalists to coin the term 'policy-led-poverty.' One of the key policy thrusts, privatization of ecosystem goods and services, especially water (for energy, drinking water and irrigation), land (for SEZ), herbs collection (nearly all pharmaceutical and cosmetic industry depend upon these), recreation areas and aesthetics (key locations in the mountains, coastal areas and pristine forested areas for tourism) has done the greatest damage. Pitted against commercial interest, when local communities lose access to these resources and benefit sharing they have no further stake in sustainable exploitation; they compete to extract as much as quickly as they can. And when driven to desperation they do it with full realization that what is being done goes against Nature.

### **6.3 Impact on food security and nutrition**

Whilst cheap energy caused immense environmental pollution, corporatization of ecosystem goods and services had a far more insidious influence on food security and nutrition.

Peasants had developed the best seeds and the best farming techniques within the constraints imposed by Nature. That valuable knowledge, the millennia old wisdom, was trashed; corporations expropriated the seeds while the agriculture scientists wisdom.

**Seeds:** Industrialization of agriculture destroyed seeds' diversity. India had more than 200,000 varieties of rice; today seeds for no more than fifty are available for commercial growing. Seeds' diversity ensured that if one crop was blighted, others saved peasants from starvation. These were the 'crops of truth' given by Mother Nature who never short-changes its children. (17)

**Destruction of soil fertility:** Soil fertility is the function of minerals and soil biota, the billions of life forms that maintain fertility. A cup of soil may contain 200 billion bacteria, 100,000 metres of fungi, 20 million protozoa, 100,000 nematodes, and 50,000 anthropods. These micro, meso and macro flora and fauna recycle waste, create and aerate soil and provide plant food. (18) Use of chemicals upset the natural balance of minerals and soil biota. Supplementation by N, P and/or K (Nitrogen, Phosphorus and Kalium) caused the decline in the proportion of other minerals such as zinc, sulfur, selenium, boron, etc.

Pesticides kill living organisms. Pesticide residue remains in the soil for years. Together, fertilizers and pesticides played havoc with nature's way of maintaining soil fertility and that directly affected the quality of food people ate.

**Food without nutrition:** Chemical based food production significantly reduced the

nutritive content of foods. Modern foods are deficient in critical vitamins and minerals.

Table 1 Major losses in vitamins and minerals of four vegetables

Common vegetables

Vitamin C

Vitamin A

Calcium

Potassium

Magnesium

Spinach

-45%

-17%

+6.45%

+18.72%

-10%

Corn

-41%

-29%

-33%

-3.5%

-22%

Beets

-50%

+90%

No change

-10%

-8%

Collard greens

-61%

-41%

-28%

-51%

-84%

Source: Life Extension Magazine, 2001, cover story; Researched by Alex Jack and findings discussed with USDA subsequently.

Vitamin C declined 41 to 61%, and magnesium was down 8 to 84%; so were calcium, potassium and Vitamin A (Table 1). But plants do not only contain those. There are a great number of trace minerals that are important for human health although not officially acknowledged to be so. Regulators do not analyze for these, but there is a strong likelihood that these trace minerals are greatly lacking in soils that have been artificially dosed with only three major minerals, and in consequence must also be lacking in the vegetables and other foods that are grown in those soils. But the key point is that nutrition decline caused an explosive growth in degenerative and many unknown diseases. (19)

**Engineering Nature:** Not satisfied with global havoc caused by pollution, destruction of ecosystems, seeds diversity, soil fertility and nutrition, the corporations driven by insatiable greed are now engineering Nature itself at the genetic level by engineering genes of seeds.

This will destroy India's food and nutrition security. The technology is imperfect. Its long term consequences on human and animal health and the environment remain undocumented. Proper biosafety assessment has never been carried out. Independent scientists who did and found adverse effects in animal studies were harassed, dismissed, and their findings denounced. And yet, the last four governments in India have actively promoted this technology. Engineered seeds will permanently destroy the farming wisdom gained for us by peasants over the last 8-10,000 years. (20)

To put the whole story in perspective: cheap oil led industrialization has affected the earth, destroyed ecosystem goods and services, destroyed natural biodiversity, soil fertility and nutrition. Whilst undernourished peasants are committing suicide and over-nourished 'rich' are living on borrowed time, the multi-national corporations are printing money.

## **7. End of cheap oil**

The end of cheap oil is now a reality. It will be difficult to produce cheap fertilizers and pesticides in sufficient quantity. Farmers will find it increasingly uneconomical to run their farming machines. Fewer still would be able to pull water up using cheap diesel oil to irrigate farms and gardens earlier provided free of cost by ecosystems.

The end of cheap oil era will not immediately reduce pollution levels or the vulnerability of the peasants but the ensuing social chaos will cause hunger, malnutrition and massive depopulation. The renewable sources of energy, yet to be scaled up, can't replace non-renewable sources in terms of quality, quantity, ease of handling and storage. The situation demands that peasants are restored to their traditional role. Their vulnerability means that the rest of the population is vulnerable too. (21)

## **8. The way forward**

The following issues need to be immediately addressed:

### **A. Restoration of peasantry**

The peasantry must be restored to their pre-eminent position. If people can't get adequate nutrition, development will remain the prostitute of large corporations and co-opted governments. The corporations' agenda of controlling food supply must be fought at all levels, beginning with restoring a central role to the peasantry. Sequestration of land must stop immediately, followed by a guaranteed payment of equitable wage and transfer of best practice and low-energy technology for food production. Food output must be measured in nutrition terms; measuring output by weight is the greatest fraud perpetrated on mankind by a handful of corporations. Peasants must be compensated for growing nutrition, because that alone can reduce the disease burden on the society. All this implies that a peasant must be projected as a skilled, respectable and an important member of the society. People in turn need to believe that farming and gardening is an intelligent activity. (22)

Farming activity has been deliberately undervalued to pave the way for large corporations. As Gabrielle Howard said, **'The agriculturalist is the servant of the planet.'** (23) An

intelligent farmer can feed himself 80% of the recommended daily allowance (RDA) of nutrition from just one hundred square metres of land. Many are already doing it. If Richard Heinberg, the greatest living 'peak oilist' believes that fifty million farmers are required for the United States of America, a country of 300 million people, then India, a country of 1150 million people requires over 190 million farmers, peasants who can lean on their hoes!

## 10.2 Restoring nutrition

This should be the top priority. Nutritious food can be produced from any land provided certain basic systems are worked up to peak health. Falling back on natural system of farming and gardening alone would help produce nutritious food that would reduce the social cost of health, malnutrition and at the same time give people the strength to transit to low-energy economy. (24)

We need to measure food production not in terms of tonnage but net natural nutrient gains that includes all the appropriate nutrients.

Farmers who have understood the science of soil biota and minerals and also learnt how to maintain peak soil health are consistently achieving 35 metric tonnes of food per year per hectare. It is possible to achieve this level of productivity for all farmers everywhere within about two years, even in difficult areas.

## 10.3 Soil, not oil!

In order to become self-sufficient and transit to low-energy society, we need soil, not oil. The way development has been mismanaged requires that every inch of defiled land is restored to peak health. If peasants need external inputs by way of financial assistance and technology, these should be made available without delay.

It should be noted that following a twenty-three year 'Farming Systems Trial at Rodale Farm, organic manuring system showed an average increase of soil carbon of about 454 kilograms per acre-foot of soil per year. Similar results have not been obtained by any other method. Thus, building up of soil 'as a living system' can be a major tool in carbon sequestration and mitigating the adverse impacts of industrialization. (25)

Only healthy soil can produce healthy food. Therefore, the twin benefits of healthy soil-carbon sequestration and health giving foods- need to be restored to eminence and relevant skills speedily transferred to peasants.

Wastelands are human creation; Nature does not create wasteland. Whenever a society or nation has ignored stewardship of land, it has been destroyed, as said earlier. We may enter an era of **even cheaper energy** in the future. In that case, it is crucial that agriculture is already on its way back to conserving the soil and increasing nutrient content, as discussed above; otherwise cheap energy could wreak great havoc by accelerating the current degradation of land.

We need healthy soil, not oil. We need our farmers, not Ag-scientists! Nor developmental economists who disregard environmental issues. The oil-rich countries are building economies and social structures on nonrenewable wealth. But the entire world is also doing so, particularly with regard to agriculture. The social, political, and economic ramifications of this fact will be huge as is evidenced by farmers' suicide and destruction of rural livelihoods.

Environmental considerations, especially global pollution, require a reevaluation of GDP-based political and economic goals. As resources deplete and environment degrades, it is the responsibility of our governments to come out of GDP-driven consensus trance. It will be difficult for them because the trance gives comfort to the rulers as well as the ruled.

#### **10.4 Restoring ecosystems**

This would be most difficult given the way industrialization and urbanization have fragmented or destroyed our ecosystems. But a beginning can be made.

First, all private activities must stop despoiling land, rivers, air and forests. It means refusing permission to corporations that fragment ecosystems. It also means that people, including peasants can't be allowed to do the same. Since land, a gift of Nature, is finite, we must assess the maximum sustainable footprint and curb population growth at local level as well.

Second, it must also be recognized that any ecosystem can be restored to peak health be they temperate or arid. Restoration must be taken up at village or cluster level as defined by the hydrology of the local ecosystem.

#### **10.5 Stop privatizing profits and socializing environmental costs**

As mentioned in the preceding paragraphs, as the society became intensive user of resources, the corporations increasingly expropriated those resources for private profit. The social cost of environmental destruction was externalized. This needs to be reversed.

There is now a compelling argument for community rights over natural resources as it was during the early nineteenth century, almost worldwide. Community rights as a class of rights must be acknowledged in common law and that right must take primacy over individual, corporate and state rights.

For far too long the world has been misled by the spurious free-market theory. Free markets work best when natural resources are under complete control of the community.

When that happens, no private entrepreneur would dare defile our rivers, forests, land, and air. The people can't afford to allow corporations write the terms of expropriation of natural resources because they did not create them in the first place.

#### **10.6 Relocalization (26)**

This is diametrically opposite to the current piranha-like feeding-frenzy of globalization. Every nation must relocalize to reduce energy consumption and ecological footprint. Policies and plans don't ensure conservation; they need to be grounded in local realities. Relocalization is an effective response to global problems with effective local action.

In essence the solution is close to what Mahatma Gandhi called Gram Swaraj or self governing villages. India needs Gram Swaraj. The Panchayati Raj system needs to be re-invigorated and implemented in earnest, not merely as a piece of additional paper in the Constitution.

Relocalization, like Gram swaraj, means every village must produce enough to meet the basic needs of all the people living in that village. Extending the principles further, even urban area must adopt the basic principles of Gram Swaraj. The Cubans have demonstrated

how every city, every block within a city, can become low-energy society. They have also created a healthy society because every household grows its own food.

Is it possible to allocate just an hour a week to create a sustainable world? Assuming there are 700 million Indians over the age of 15, we can expend over 700 million hours per week, for the collective good. Please do think of the collective possibilities, for time is running out.

#### Endnotes:

(1) [http://en.wikipedia.org/wiki/Olduvai\\_Gorge](http://en.wikipedia.org/wiki/Olduvai_Gorge)

(2) Richard Heinberg; 'Fifty Million Farmers'; The [Energy Bulletin](#); 17 Nov 2006

<http://www.energybulletin.net/22584.html>

(3) <http://www.harappa.com/har/indus-saraswati.html>

(4) Arun Shrivastava; Notes on Dhaulavira from discussion with Dr RS Bisht, Head of Dhaulavira excavations, Archaeological Survey of India; New Delhi; 1998

(5) W. C. Lowdermilk; 'Conquest of the Land Through Seven Thousand Years'; Soil Conservation Service; US Department of Agriculture; February 1948; page 1.

(6) [http://en.wikipedia.org/wiki/Famine\\_in\\_India](http://en.wikipedia.org/wiki/Famine_in_India)

(7) Dharampal. India Before British Rule and the Basis for India's Resurgence. 1998. Gandhi Seva Sangh, Sevagram, Wardha, Maharashtra;

[http://www.swaraj.org/shikshantar/resources\\_dharampal.html](http://www.swaraj.org/shikshantar/resources_dharampal.html).

(8) See Dr. Louise Howard's 'Sir Albert Howard in India' for an exquisite account of what Sir Howard achieved. Readers might also wish to read Sir Howard's 'Waste Products of Agriculture,' written jointly with Mr Yashwant Wad, which is a classic. These out of print books can be accessed from Soil and health Library. The URL is: [www.soilandhealth.org](http://www.soilandhealth.org)

(9) The term 'custodian of chaos' was used by Late Kurt Vonnegut to describe the predatory policy of Bush administration in an article by the same name. It is a chapter in his book "A Man without a country," and was published by Information Clearing House on 17 June, 2006.

(10) Richard B Norgaard; 'Beyond growth and globalization'; 10th VT Krishnamachari Lecture delivered by the author at the Institute of Economic Growth, Delhi, September 25, 1998)

(11) Dr Mathias Wackerangel, Executive Director of Global Footprint Network See <http://www.footprintnetwork.org>

(12) the emission of three GHGs, Carbon dioxide contributes 72%, Methane 18%, and Nitrous oxide about 7%. The contribution of each class of human activity is shown in a simple pie chart. The larger pie chart shows that except biomass burning, nearly all emissions can be traced to the burning of oil, gas, and coal

Source: [http://www.globalwarmingart.com/wiki/Image:Greenhouse\\_Gas\\_by\\_Sector.png](http://www.globalwarmingart.com/wiki/Image:Greenhouse_Gas_by_Sector.png)



(13) **GT French; 'The Restoration of the Peasantries'; CW Daniels & Company; 1939**

(10) Arun Shrivastava; 'Farmers' suicides-shape of things to come'; [www.globalresearch.ca](http://www.globalresearch.ca); 2006)

(12) 'Custodians of chaos' by Late Kurt Vonnegut,

(13) John Hamaker and Donald Weaver; The Survival of Civilization; See Figure 1.1; pages 3-19; Earth Health Publication; 1982

(14) IPCC-FAR, 2007; for full discussion reader need to download the complete report which is about 1100 pages but summaries are available on the Internet

(15) Dr Veerbhadran Ramnathan; '**Global Dimming by Air Pollution and Global Warming by Greenhouse Gases: Global and Regional Perspectives**'; Extended Abstract of the Plenary lecture presented at the 17th International Conference on Nucleation and

Atmospheric Aerosols, Galway, Ireland, August 13th-17th, 2007

(16) Dr Gideon Polya; "Climate Criminals & Climate genocide. Anglo-Celtia threatens final Bengal Holocaust"; 30/3/07; <http://mwcnews.net/content/view/13576/26/>:

(17) Arun Shrivastava; 'Women of Zaheerabad take on Monsanto'; see this award winning essay by the author here: <http://globalresearch.ca/index.php?context=viewArticle&code=ARU20061009&articleId=3427>

(18) For detailed treatment on the subject see:

[http://soils.usda.gov/sqi/concepts/soil\\_biology/](http://soils.usda.gov/sqi/concepts/soil_biology/)

(19) For detailed references see my small collection donated to the Soil and Health Library here: <http://www.soilandhealth.org/01aglibrary/Arun/A%20case%20for%20organics.htm>

(20) For a full understanding of this complex subject, a good starting point is to view the two best known documentaries. The first is by Jeffrey Smith called 'The GMO Trilogy' released in 2006. The other is 'Heartless in the Heartland' that documents the way over 8,000 North American farmers were blackmailed into total submission by the most despicable amongst the troika.....Monsanto. The geo-politics of seeds is dealt with in great depth by F William Engdahl in his '**Seeds of Destruction**' and the health and environmental aspects have been dealt with by Jeffrey Smith in '**The Genetic Roulette.**' It should be noted that Europeans had mounted a campaign to declare Monsanto 'Public Enemy No 1.' Yet, the Government of India has approved Monsanto's seeds.

(21) End of cheap oil is again a huge subject. For basic understanding of energy crisis, it is worthwhile visiting ASPO website. For important database please see International Energy Agency database. For the latest summary please see World Energy Outlook 2007; China & India insights; International Energy Agency; November, 2007. The URL is: <http://www.iea.org/Textbase/npsum/WE02007SUM.pdf>

(22) For some reason, throughout post independence India, the Government has marginalized the peasants. All sorts of schemes have been devised yet peasants remain illiterate, most exploited, and driven to desperation all over India. To appreciate why peasantry should be restored to a respectable social status, please see 'The Restoration of the Peasantries' by G.T. French, published in 1938. The book is freely downloadable from [www.soilandhealth.org](http://www.soilandhealth.org)

For a review paper on the status of our peasants now see '**Farmers' suicides-shape of things to come**', published by [www.globalresearch.ca/](http://www.globalresearch.ca/) written by the author.

(23) This statement occurs in Dr Louise Howard's 'The Earth's Green Carpet'; the Rodale Press; 1947; Out of print now)

(24) Dr. Virginia Worthington, comparing foods grown by biodynamic, organic and conventional (aka, with chemical) methods, found that biodynamic method gives nutritionally dense food and that conventionally grown foods are nutrition-deficient as compared to the other two methods. She found that organic farming methods showed significantly higher percentage of key vitamins and minerals; in other words, naturally produced foods were qualitatively better. Her main findings are summarized below. All percentage data is variation from conventionally grown food.

**\*Biodynamic, non-biodynamic and all organic crops compared to similar conventional crops**

**Biodynamic Other organic All organic**

**Nutrient % difference % difference % difference**

Vitamin C +47.6% +11.9% +22.7%

Iron +33.9% +15.6% +17.2%

Calcium +07.4% +38.4% +30.8%

Phosphorus +06.6% +14.3% +12.5%

Sodium +20.3% +19.3% +19.6%

Potassium +07.9% +16.2% +14.1%

Magnesium +13.2% +28.3% +24.4%

Beta-carotene +14.0% -09.2% -00.3%

Nitrates -49.8% -30.9% -33.9%

Source: Virginia Worthington; "Nutrition and Biodynamics: Evidence for the Nutritional Superiority of Organic Crops; Biodynamics v.224, Jul/Aug 1999.

(25) Paul Hepperly, 'Organic Farming Sequesters Atmospheric Carbon and Nutrients in Soils'; The New Farm Research Manager; The Rodale Institute.

The Rodale findings were published in 2007. It conclusively demonstrates the suitability of

natural farming method as ecologically most beneficial. Together with Worthington's findings, there is absolutely no justification for conventional, energy and chemical intensive farming methods.

**(26) Relocalization** is a strategy to build societies based on the local production of [food](#), [energy](#) and [goods](#), and the local development of [currency](#), [governance](#) and [culture](#). The main goals of Relocalization are to increase community energy security, to strengthen local economies, and to dramatically improve environmental conditions and social equity. Any one can freely access the resources at: <http://relocalize.net/about/relocalization>. The author has been a member for over three years and has learnt much from their experience.

Text edited by: Sepp Haselberger

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