Seed Yatra
Agriculture in India

- 'Sur' in Agriculture
- Masanobu Fukuoka
- Markets of Change
- Can Life be Made?
The Apatani House
Arunachal Pradesh, North East India

The Apatani Valley in Arunachal Pradesh is where this Apatani house belongs. The valley at approximately 6000 ft. is cold, wet and fertile, the home of bamboo, the building material for this house. It is difficult to find a perfectly flat piece of land, so the floor is built over stilts which also serves as flood protection. At the street level, the façade of the stilted house assumes a tall, vertical appearance. The living space inside, however, is to human scale. It is 3mts. high, 3mts. across and 15-20mts in length. No partitions are made in the living space, stressing the cultural belief of a unified family. In order to ventilate this house, a single door is placed at each end of the cuboid. There are no other openings to prevent loss of heat. Storage areas are placed under the roof as lofts or along side walls as insulation. The sloping roof is characteristic of wet areas and the overhangs protect the side walls from getting wet. Each door opens out into a verandah space where the roof and the floor extend out of the living space. This acts as a transitional area from the inside to the outside.

Every single element of the building envelope, from roofing sheets, wall claddings, posts, rafters, purins, floorboards, shelves, doors and tying ropes is made of bamboo. Bamboo is an excellent insulator in a cold climate. A new house lasts from 8-16 yrs with very little maintenance. What is important here is not the permanence of the structure (as it is easy enough to build) but its consonance with the ecology of the region. None of the joints of construction are nailed, or clamped. In fact, they are tied together with bamboo. This gives it the elasticity required in an earthquake prone zone.

By habit alone, the skill to select and shape bamboo to the required purpose is imbied in every villager, perhaps in the truest sense of the vernacular spirit. A typical house takes 4-5 days to construct, during which every member of a particular clan participates. Rice beer and food for every participant is ‘on the house’!

Ripm Kaira
Final Year Student of Architecture, T.V.B. School of Habitat Studies, New Delhi.
Photographs: Robin Galati
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Dear Editor,

Your issue Vol. II No. 6 was wonderful, translating works from other languages. I like the idea of giving titles in their own scripts. Each story differs from the other in form and matter and this was very pleasing. More than that, the little piece on Mohwa was excellent. There is a proverb in Tamil, ‘Ilathu nattukku illupa poo char karal’ meaning where there is no sugar, the iluppal is sugar.

Dr. Indrani Manian
Dept. of Tamil
Lady Shri Ram College
New Delhi.

Errata: In our last issue, Tales of Survival (Vol. II No. 6), Binapani Mohanty’s story, Lata, is translated from the Oriya by Shri Jayanta Mahapatra and not from Assamese as was wrongly printed in the Contents page. Also, on page 50 of the same story, the ‘notes’ mention ‘Jatra: street theatre from Bengal’. However, the word ‘Jatra’ in Oriya has a different meaning. It means a village fair.

The errors are deeply regretted.

K. Damodaran
Sangeeta Charitable Trust
B 992, Palam Vihar
Gurgaon
Haryana.

Dear Editor,

An Eye-catcher magnetizes you
An Eye-opener enlightens you
An Eye-wash deceives you
An Eye-liner decorates you

It’s difficult to be all eyes to what’s happening around you.

But, you can do more than what you think
with THE EYE
Just find out why....

Anonymous.

Dear Editor,

This is with reference to your issue Vol. II No. 6. I wish to make certain comments. Gandhi’s famous definition of a village as reflecting dirt and darkness and villagers as people living as animals (in his words) is unique. I feel that we have reached a time when we must reassess the village and the villager, even the tribal. I think many of your readers would like to read Teddy Goldsmith’s book, The Great U-Turn, to understand what one of the foremost ecologists of our time considers the ideal social pattern - the tribal village.

Again M.N. Buch’s statement in the same issue echoes illiteracy of what a village constitutes as a community and what a villager means to such a community when he says, “By and large, massive city growth represents a transference of rural poverty to an urban environment and is reflective of the economic stagnation of rural areas”.

Both Gandhi and M.N. Buch see the village as a burden. I suggest that you now devote an issue of THE EYE to expressing the real wealth of the village and the real ideal of our society, which is the villager who carries the traditions of our race. Finally, while complimenting you on the excellent reproduction and note on the Tree of The Issue, the Mohwa (Bassia Latisifolia), you will perhaps find time to feel sad that hundreds and even thousands of these village food trees are being dynamited (along with the villages) for coalmines in our Hazaribagh region to supply urban residents of Delhi electricity via the thermal power stations.

Bulu Imam
Hazaribagh.

ATTENTION!

THIS IS AN IMPORTANT ANNOUNCEMENT!

THE EYE has a new home bordering one of Delhi’s seven urban villages. It is quiet but also has the ambience of a traditional bazaar.

We have settled in here and feel quite at home. We invite our readers to visit us here.

PLEASE NOTE OUR NEW ADDRESS:

THE EYE
59 A, DDA FLATS, SHAHPUR JAT
NEW DELHI 110049, INDIA
TEL: 6429107.
The word 'agriculture' is born from the Greek word agros (field) and the Latin word culturare (to nurture). Cultus also means 'worship' in Latin. The word 'culture' as we know it today has its origins from these and means a refined understanding or manifestation of human intellectual achievement. It is insightful to observe that the word 'cultivate' is used both for growing from the soil and growth of the human mind. What therefore emerges is that 'agriculture' is an activity of refinement. The process of growing food and the produce itself are part of the cultural package of a nation.

Food itself has lost most of its mystery and along with it that of the life force that sparks the seed to life. The journey of the seed is a cultural journey that culminates in the swaying head of crop, the song of gratitude sung in the fields, the pliant basket that carries the grain and rituals of colour and creativity. Growth and nurture are intense and individual, as in the family unit. Agriculture, likewise, is a human scale activity. Impersonal care brings about impersonal results.

In this issue we have attempted to look at concepts of growth and fertility of the ancient Indians and how these concepts evolved and changed over time. We see the way in which food, a fundamental human need was understood: its potential for abundant varieties which the lush tropics could provide, its relationship to the welfare and health of the human being and its qualities of taste and pleasure. Food was rarely taken for granted and could never be grown without the co-operation of the cosmos. Many centuries pass and many things change. Like shutting off the commons (forests), growing food with organic ingredients and recycling crop wastes. The way of modern farming with its baggage of chemical inputs, miracle crops, processed foods and genetic engineering have come to stay. What we need to ask here is who benefits from all this and is it sustainable? And is there a nemesis that awaits us for torturing life?

Obviously, we do not address many issues because there is only that much that a magazine can publish. But I do hope that the focus of the issue conveys itself to our readers. May I take the liberty of saying that the small seed yatra undertaken by THE EYE and its current destination may well have very great impacts on the larger yatra of mankind. Let us, while marvelling at the frontiers of science in agriculture, not forget to say a national (and perhaps unscientific) prayer from the Rigveda:

'Auspicious Furrow, we venerate you.  
We pray you, come near us to prosper and bless 
And bring us abundant harvests'.

Note:  
yatra - journey.
Guest Editorial

When putting together this issue on Indian agriculture we wanted to challenge popular notions of what agriculture encompasses. Typically, media reports focus narrowly on the production targets, yields, fertilizer subsidies and the direction of global market oriented agricultural development. A bit like trying to visualize a tree by looking only at a fallen fruit. We have tried to give a view of this tree and its roots, trunk, flowers, fruits and the biotic community around it. Only then is there a clearer look at the breadth of agriculture's cultural, social and economic aspects possible. The debate on the pros and cons of commercial vs self-sufficient agriculture in India as a political entity is not new. As early as 1901 William Digby, C.I.E. wrote a book 'Prosperous' British India that used government records to show 'the great, the dismal, the awful, retrogression, not only in material prosperity but also in other important respects, of the country'. Since then several other authors have put forth similar thoughts, several have been prominent Indian figures. Among them Gandhi's name stands out. The debate has recently gained prominence following the GATT and biodiversity issues. Our attempt is to expose readers to some of the issues that would contribute towards a more holistic debate.

We have started the issue looking at the ancient wisdom and knowledge which shaped Indian agriculture, its roots in a sense. Madhu Karna reveals how a reverence for the earth and all her cycles of fertility and rejuvenation was a salient feature in Indian texts, writings which undoubtedly were incorporated into farming practices. These strong, well spread roots have given rise to a wide girth and spreading crown, abundant with fruits and flowers. This is brought out in the poetry section and in the articles by Wm Pereira and Vijayaralakshmi. They sketch out the grandeur of the trunk and the fruits and flowers it helps support by describing the myriad age old practices adopted to suit the environmental conditions and plant diversity.

Just as a tree can more successfully thrive with a healthy and diverse community of plants and animals, the same can be seen in agriculture when there is a vibrant link between farmers and craftspersons. Jaya Jaitly describes this mutual dependency and the consequences when it is disrupted by outside, contemporary forces impinging on this community. Her piece introduces our next series of articles which look at the effects of modern factors, such as the growth of commercialization and biotechnology which effect an increasing number of farmers. These changes are akin to fundamentally altering the holistic and intimate relationship among the components of the tree and its forest community to separately manipulated, artificially constructed parts. In the process, farmers and their traditions, knowledge, and resources become isolated from each other as an artificially maintained monoculture plantation is from a naturally rejuvenating tropical forest. The authors in this set of articles describe how the growth of agro-industries and concomitant changes in agriculture have been rapid and far reaching. For instance, scientists have accelerated the rate of seed breeding and selection that had been routinely done by farmers; they have experimented with mixing and matching genes among and between crop plants; and have concocted a witches brew of chemicals.

The much debated international
agreements such as the Biodiversity Convention and GATT will have more consequences for Indian agriculture as Ashish Kothari discusses. While some of these changes may give the appearance of a prosperous agriculture, we question whether this bounty is provided by parasitic roots.

We should be cautious of romanticising all that is traditional and throwing out all that is modern. Talking about the changes in agriculture under the British Raj, Omkar Goswami presents just this opinion and some of his points set up other points which many of our other authors and readers may want to contend or debate. Devinder Sharma, too, in his article finds much to criticise about the entry of multinationals into agriculture, but allows for the possibility of making use of some of their research and products.

Our own article attempts to look at what interaction exists between us city dwellers and agriculture. Food is as integral to our lives as waking and sleeping, sometimes even defining our activities throughout the day. However, as urban dwellers we are rarely presented with the ambition to think about from where our sustenance originates, namely, from farmers and their agriculture. We attempt to focus on the many connections and dynamics between urban areas, consumers and farming and how certain choices may help or hinder more sustainable farming and equitable agricultural policies.

The loss of control over markets and choices the Indian farmer has suffered during the last century have given rural society in many parts a deprived resource base, akin to degraded and diversity-poor forests. These forests given the chance, will regenerate into something resembling their former stature and biological richness, so too many aspects of Indian agriculture lost or replaced over the past century can be revived. This comes out best in the interviews with Nanjundaswamy and Masanobu Fukuoka. The writing of T.S. Ananthi takes it a step further describing his personal experiences with alternative farming and gives a look into the range of feelings and inspirations, other than profit motives, that can be created and thrive when one is at peace with the land.

We have only gone so far in addressing aspects of Indian agriculture - our tree and its forest community are yet incomplete. The topics not covered are due to physical constraints of time and space and not because of a hierarchical importance we attached to the different topics. The short list of such topics - the role of women, effects of chemical farming, irrigation practices past and present, the role of livestock and lastly the many protest movements put forth by peasants in India to claim their rights. Readers will probably find other topics or aspects that are just as important, and need to be discussed.

Rajpreet Singh and Sharon LaPalme

ABOUT OUR GUEST EDITORS

When Rajpreet Singh and Sharon LaPalme walked into our office one day, we didn't know that their fate over the next few months would be linked up with THE EYE. We had known Rajpreet earlier when he was a student and worked with SPIC MACAY. Now he had returned to India for a year with Sharon, his wife. Given both their backgrounds with agriculture, food and forestry, they were the ideal people to guest edit an issue on agriculture. We asked, they agreed and we got down to work.

Sharon specialised in Environmental Studies in Duke University, North Carolina, USA. She has researched forestry issues and her special interest extends to forestry and agriculture in tropical areas. She has co-authored research papers for the US Forest Service. Sharon has worked as an ecologist at the Nature Conservancy in the US (they buy land and preserve it as a wild life area). She was involved with the Durham Food Co-op, which addressed issues such as organic food grown with community co-operation. Sharon is a certified scuba diver and runs for causes. When she returns to the US, she plans to continue working with related issues.

Rajpreet has a B.A in Botany from Delhi University and an M.A in Environment Management from Duke University. After his student days in India, he worked with the Centre for Science and Environment (C.S.E) in New Delhi in their NGO Support Unit. He did a survey in Sengruali on the socio-economic impact of the dam and thermal power plant, focusing on the displacement of people. During a year which he took off while doing his Masters, he worked as a Research Assistant at the Peoples Science Institute (PSI) in Dehradun, looking into the issues of water in Rajasthan and Gujarat. On his return from the States, he spent a year on a study of hydro carbon emissions from trees. Both Sharon and Rajpreet travelled extensively in India.

THE EYE is grateful to both of them for donating us their holiday time and working so hard. It was fun having them in our office, just like one of us! We wish them plenty of good luck in the future.
SUR IN AGRICULTURE

The Essence of Natural Farming

T.S. Ananthu

If the first step towards understanding natural farming is to get away from the habit of linking farming to nothing but profit, then what would one link it to? Surely not classical music or cricket? Yes, says the author in this bold article that draws some subtle links between the activities of SPIC-MACAY, natural farming and THE EYE!

Having been a city-dweller brought up in the western mode of education, it took me quite a while to understand the nature farming stands for. My exposure and attraction towards the science-spirituality connection, Gandhi's critique of modern civilization and, finally, Fukuzuka's book One Straw Revolution brought me close to a set of friends who were joined together in a small experiment in alternative ways of thinking and living. This group, which goes by the name of Navadarshanan, is slowly trying out a few natural farming ideas on the land they have acquired near Bangalore. Recently, while thinking about how this work has been progressing, it dawned on me that classical music and natural farming are governed by similar goals and ideas.

This 'dawning' took place at dusk time in the open air theatre of the Valley School, where I had gone to listen to a performance by Sanjeev Abhyankar. The audience was a mixed bag - a few really knowledgeable in classical music, but many (mainly students) who were new to its nuances. When Abhyankar and his team were adjusting their instruments, I could see many in the audience get ruffled, especially after the process crossed the 16-minute mark. But later, they all - including the young students - listened to Abhyankar in rapt attention for hours. As the audience quietened down, one could feel the peace they were beginning to enjoy.

As I reflected on this phenomenon in the vast forest-like expanse of the Valley School campus, it suddenly struck me that there is a parallel between what was happening at that concert and what has been happening at Navadarshanan. In 1991, when this experiment started on 105 acres of land we had jointly acquired, we realized that we could not straight away plant crops of grains or vegetables the 'natural' way, for the land had become very degraded due to the wrong agricultural practices adopted hitherto on it. So, the first step needed was eco-restoration of the land. With this in view, we decided that the land should be 'left to itself', least interference from our side, nature should be allowed to regenerate the land, we should confine ourselves to preventing grazing, logging and fires, and maybe planting some ecologically desirable seeds and saplings but with no tilling, fertilizing, irrigation etc. In 1991, 1992 and 1993, those who visited the land would often report to their friends in disappointment. "Nothing is happening at Navadarshanan". But by 1994, the effect of this policy of 'doing nothing' was beginning to show: thousands of trees were making their appearance, the land was turning from red brown to fresh green, and the soil became rich. Through the years 1991-93, when it had appeared to us as if 'nothing is happening', actually a lot was: only at a level too subtle for us to comprehend. Nature was 'tuning its strings', its invisible forces were hard at work regenerating the degraded land, but it took three years for the effects to be apparent to untrained eyes.

At a music concert too, while the instruments are being tuned, those with untrained ears often feel impatient and think: "this is boring, nothing worthwhile is happening, why can't he get down to music?" The fact that this initial period of 'tuning in' is an absolute must for the ecologists that follows is lost on those whose sensibilities in this regard have not been aroused. The purpose of SPIC-MACAY is, if I have understood correctly, to attune our youngsters to this sensibility. Therefore, it seems to me that the best way of explaining natural farming to readers of SPIC-MACAY's publication is to say that natural farming involves making us sensitive to the subtle, creative forces of nature - the sur that governs life on earth - in much the same way as appreciation of classical music involves making us sensitive to the sur that governs our hearing faculties.

Therefore, the first step towards understanding natural farming is to get away from the habit of linking farming to production and productivity, and instead to link it with creation, creativity...
Natural farming involves making us sensitive to the subter, creative forces of nature - the sur that governs life on earth - in much the same way as appreciation of classical music involves making us sensitive to the sur that governs our hearing faculties.

Sanjeev Abhyankar at the Valley School campus
Navadarshanam with the upcoming plants in the foreground.

The mystery contained in the seed becoming a tree that gives rise to the fruit is beyond the ken of our intellect. To grasp it, we have to awaken our finer faculties. Our traditional farmers have not entirely lost these faculties, but the educated class has come close to doing so.

running catch, the nail-biting finish in the 50th over, or even the efforts to ‘psyche’ the umpire into giving the batsman out when he actually isn’t? Similar tendencies can be seen in our fast food centres, in disco joints, in ‘deadline’ journalism, in the rat race of everyday existence.

All this is the result of our deliberately turning our attention away from the infinite towards the finite, from the spiritual towards the material, from the subtler to the grosser, from the long-term view to immediate gains, from contentment to that which excites. The most important step towards reversing this tendency and thereby grasping the Science of Life in its true form is to recognize that all life is a reaching out, however unsuccessful, to the infinite that creates and pervades all. It is this creativity rather than materialistic productivity which is at the root of all procreation - whether of plants, animals or human beings. Not only that, but all our efforts, goals and dreams - even of a materialistic nature - are unconscious and vain quests for that infinite entity resident within our finite bodies. Once we recognize this, our perception of this world undergoes a revolutionary transformation. Translated into farming, this means: even if the plant dies in its struggle to sustain itself, there is no need for us to feel sorry, for the important thing is the struggle, which should not be curbed under any circumstances.

I am reminded of an innings by Collie Smith in the West Indies Vs. India Test at Calcutta 35 years back. He was in devastating form, and many in the vast crowd at Eden Gardens were praying he would be out; some were even shining mirrors in the sun with the hope the reflection would reach his eyes and disturb his concentration. But Collie Smith went merrily along, and soon reached the ‘danger point’ of 90 runs when every batsman, however settled, is supposed to feel nervous about the possibility of reaching the coveted century. The crowd now expected some respite from his shots. But he sent the next ball whizzing to the boundary, and before the crowd could recover from that shock, had hoisted the very next delivery for a massive six. The very next ball he was clean bowled. The crowd, which had reserved all its energies for the bowler who could throw this dangerous adversary out, instead gave him a standing ovation. It was a recognition that Collie Smith had batted in the spirit of true sportsmanship - his aim was to play good cricket, rather than stay at the wicket.

Similarly, the aim of plants in natural farming is not just to survive or even produce and reproduce, but to be creative. In that process, if they give good fruits or yields (like Collie Smith’s four and sixes), well and good; but if they die (like his being
bowled), equally well and good.

As I was musing over all this, Sanjeev
Abhyankar had completed his first gaga and
shifted to the second: puriya
dhaanashri (pandhuvaraali to the
Southerners). He had chosen a fantastic
bhajan by Meerabai, whose bol was:

मोहे तापे तपन

गुरु चरन के कँड़े हो नहीं भावे,

जग माया सब सपन्न के

अकसागर नहीं सुते गयी है,

फिकर नहीं मोहे तरन के

मीरा के प्रमुख गिरिर नागर,

उत्तर भई मेरे नैन के

I could see that, by then, many
persons in the audience had their eyes
closed, absorbing the bliss of the
music. At that point, another thought
struck me with enormous force: that
Indian classical music, dance and
culture has its origins in the spiritual
experiences of mystics and saints, and the
feeling of 'infinity' generated by
being absorbed in them is only a tame
reflection of the real spiritual
experiences from which these art forms
were derived. This is important, for it
leads us to the concept of different
levels of infinity. Just as in
mathematics, it is recognized that the
infinity which constitutes the number
of points in a line is infinitely greater
than the number of numbers in an
arithmetic series (such as 1, 3, 5, 7, so
on to infinity), similarly the bliss we
experience by attuning ourselves to
music (which is, after all, confined to
the physical senses), translates into
insignificance when compared to the
infinity that Meerabai was referring to
in the above composition. Often, our
appreciation of music, dance or other
forms of culture traps us into ignoring
the higher and truer forms of infinity:
that which is beyond Space and Time,
beyond bhavasagar or the world of
phenomena, which can be attained only
when we transcend the physical senses,
the intellect and our very mind itself,
the path to which lies through extraordi-
narily difficult levels of purification
of the mind wherein the 'I-ness' is
overcome, a stupendous revolution
within us brought about by hard, dedi-
cated inner work.

The same holds true of natural
farming. What is of prime importance
is the moral and spiritual development
accompanying our efforts on the land.
At every step, we need to keep reminding
ourselves of this goal. Therefore,
Mannobw Pukuna has stressed:

"The ultimate goal of farming is not
the growing of crops but the cultivation
and perfection of human beings. Natu-
ral farming is a combination of science
and philosophy. For the last 50 years, I
have called it the Gandhi method. The
inspiration for this I received from the
teachings of the Buddha."

At Navadarshaham, we have to con-
tantly remind ourselves and each other
that our real goal is 'cultivation and
perfection of human beings'. This is
what makes the struggle so very diffi-
cult, and so very important. For in-
stance, as I prepare this article for THE
EYE, news has just reached me that
a fire, probably started by some prank-
ster, has destroyed nearly half the land
at Navadarshaham, including several
hundred neem and cashew saplings we
had planted six months back. Fires in
the summer months are not a new phe-
nomenon to us. As we do not cut the
grass (so as to help the land regenerate
ecologically), in the summer months
when they are dry we have had several
cases of fires, probably lit by some
poor village kid looking for a
cheap source of fun. So far, every time
we have managed to contain the fires
with the help of the local villagers.
But this time, the winds were
exceptionally fierce, so the flames
spread very fast and finally became
uncontrollable.

My initial reaction is one of shock:
"So much of our good work reduced to
ashes." Then I remind myself: "No, our
real work was inner transformation.
Can that be reduced to ashes?" If the
fire spread so rapidly this time, it was
the Will of the Infinite Power, not just
the mischief of the prankster. Each
neem sapling and cashew seed you
planted were under the direct care and
protection of that infinite, all-wise
power whose level of compassion is infinitely greater than yours. You have done what you can for those life-forms that took on the shape of the saplings. If they had survived, maybe you would have taken credit for their life, ignoring the Biblical warning that 'except that the Lord keepeth the city, the watchman waketh but in vain.'

And then I read to myself the following story from that wonderful book, One Minute Wisdom by Father De Mello, which reminds me of my duty on such occasions:

'When the Master heard that a neighbouring forest had been devastated by fire, he mobilized all his disciples.

'T.S. Ananthu is a scientist and eminent Gandhian worker, and has been associated with the Gandhi Peace Foundation, New Delhi, for several years. He has written extensively on Gandhi and his approach to various aspects of society and life, particularly to environment and farming. Ananthu is now lives near Bangalore and works the land, aiming to build a settlement of integrated living.'

AN INVITATION TO SRI AUROBINDO STUDY CAMPS, 1995 AT VAN NIWAS, NAINITAL

There will be five 10 day camps in the months of May and June. Van Niwas is an idyllic hill top retreat in the Himalayas. It has a library and reading room facilities.

The camps are based on the vision of Aurobindo. It includes lectures by well known savants, meditation, yoga, trekking and youth mobilisation.

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THE EYE is your magazine to peruse
For joy, wisdom and edification
So gather your friends
And set new trends
For the ultimate human inspiration.
Circle of the Earth Mother

A View of Fertility and Growth in the Ancient Texts of India

Madhu Khanna

In contrast to the individualistic, post-war rationalism which represents today's world-view, an alternative paradigm is well preserved in our ancient scriptures and oral heritage, which seeks to heal the split between man and nature. The concept of the Earth as goddess has received universal recognition in all ancient cultures and tribal communities of the world. The whole of the Rigveda, India's oldest scripture, compiled two millennia ago, reflects a religion of nature. It resonates with praise hymns to the deities of the sky, earth and atmosphere, thunder, rain, sun, and parents. Heaven as father represents the generative power of the sky symbolised by the bull, (a widely represented motif in the Vedas) which fructifies the far-spreading earth, the womb, with the warmth of the sun and moisture of 'fertilizing' rain. The rain falling from the clear skies impregnates the earth, so that she gives birth to plant and grains. This primal pair slowly lost its significance and gave way to a more formidable and holistic concept of the Earth goddess in the Atharvaveda, where she emerges as a self-contained autonomous deity. ItICT is this feature which marks the Atharvaveda as unique in the history of human ideas. The celebrated hymn referring to as Prithvi Sukta and Bhumisukta sums up the Vedic attitude towards Earth. In the sixty three verses of this hymn, the personification of the earth as goddess assimilates a wide range of 'ecological' concerns, relevant for the modern age.

The Vedic attitude towards the earth is the supreme, life-sustaining mother. She is beautiful, fertile, nurturing and generous. She is as close to humans as their own skin. As a person's entire existence depends upon her, man is of the earth, part of the earth. The earth is his home:

She carries in her lap the foolish and also the wise
She bears the death of the wicked and the wise. (Atharvaveda, 12.1.48)

She is the gracious leader and protector of the world (A V 12.1.57). Helpmate of human kind, she lives in friendly collaboration with all.

Man adores the earth, yet is smitten by her awe. Capricious and unpredictable is her rule over man. She is benevolent, but also wild, destructive, chaotic, disorderly, death-dealing. Earth is more than a material segment. Although man's relationship to the earth remains ambiguous and ambivalent, the inseparability of man and earth is affirmed in no uncertain terms.

SACRED WOMB

'You (Earth) germinate the seed with quickening power' (Rigveda 5.84.1.). In her maternal womb, the Earth Mother nourishes the potent seed which completes its life cycle in the tree, the flower, the fruit and once again, the seed. One association of the earth is with food saplings that grow on Here vast body. The earth reveals her powers in the form of Mother of Grams. She is the continuous source of food and herbs invaluable for healing.
males. Durga is one such epithet who is an external virgin, 'the energy of all but consort of none'. In the mythological context, She has the superhuman ability to give birth to a number of goddesses who emanate from her body like sparks of fire. The image of the earth as a universal womb explains why vessels, hollows, grottos and caves were found to be the vulvic body of the Earth Mother.

If on the one hand, Earth Mother awakens the fertility of the soil from its potential state, it also encompasses the reality of death. For, she contains the eternal condition of life and death; death in life and life in death. The mythological destiny of earth is to stand at the beginning and end of every biological form and share in the history of human destiny. As said: 'You are the earth, I place you in the earth' (Atharvaveda 12.1.11; 12.1.14).

An overwhelming concept of the earth goddess is found in the characterisation of Goddess Viraj. Viraj is the Resplendent One who is associated with the process of creation. Her most important feature is that she is imperishable and never dies. All the gods and powers of Nature fear her origin for they know, 'She will become this All'. She spews forth the vital energy that quickens the sap of the seed and enters the sacrificial household fires, the plants, trees, villages and pastoral sites. She rises. She is above, below, around, everywhere. Then rebirthing herself as the creator for her very propitiation by man, to make abundant the earth, She arises, She stands, She strides fourfold and comes to the trees, to the manes, to the gods and to humans. They all slay Her one after another. She vanishes into the atmosphere, then returns into existence. Even when slain, She remains invincible and indestructible like the patient earth, who endures but never dies (AV 8.10.3.33).

IN THE CRADLE OF RTA

The entire earth, by virtue of its animation is sustained by a harmonious cosmic principle. In Vedic code, this principle is known as Rta or cosmic order. It is the impersonal power, the underlying regulator of all life on earth at the natural and human level. The two functions of the earth—birth and death, are embodied in the fundamental ecological principle of interdependence. The fundamental intuition of the cyclic order of the seasons is celebrated by the seers.

Your circling seasons, nights succeeding days
Your summer, O Earth, your splashing rains.

KRISHISAMGRAHA

**Prediction from wind directions**

The rainfall will be good if in these months of Pausha (Jan-Feb) wind blows from the North or from the West; and the rainfall will be scanty if the wind blows from the East or the South. It does not rain at all if the wind blows unidirectionally or strongly.

**Forecasting of rainfall**

The year in which clouds are seen, or rain falls on the seventh day of the full moon in the month of Magha (Dec-Jan), is a blessed one and yields plenty of crops.

**Prediction of immediate rainfall**

There will be immediate rainfall if water spots are seen at or near water, or if ants suddenly line upwards after collecting their food, or if frogs croak suddenly.

Your winter and frosty season yielding to spring
May each and all produce for us milk!

(Atharvaveda 12.1.36)

Earth is held by a regularity of cosmic order: the rising and setting of the sun, cycle of seasons, spring time and harvest. Rta is the intrinsic justice and order that sustains the eco-balance of nature. It is said in the Atharvaveda (12.1.60) that the earth was
revealed to mankind for joy. In the light of this concrete attitude, the seer had evolved a strategy to preserve the integrity and stability of the biotic community. Earth is invoked with a feeling of great humility:

Whatever I dig of you, O Earth
May that grow quickly upon you,
O Pure One, may my thrust never pierce thy
Vital points, thy heart.
(Atharvaveda 12.35).

What is it that holds earth together? The unequivocal claim of the Vedas is that the eternal bond between man and nature is nourished by the law of universal harmony (ra, truth (satya) and prayer:
Truth, unyielding cosmic order, consecration,
Arduous prayer and holy ritual
Upkeep the earth, may she be the ruling mistress of what has been and what will come to be.
For we spread wide a limitless domain.
(Atharvaveda 12.1.1).

CULTURAL ROOTS OF AGRICULTURE

The inheritors of this ancient ethos of geopietry were the farmers of this land. In ancient times, agriculture was the principle industry of the people of India. Prithu, the son of Vena, a legendary hero mentioned in the Vedas, is known to have brought the earth into cultivation. The earliest reference to agriculture is found in the hymns of the Rigveda (1500 BC):

Fasten the plough, spread out the yokes, and sow the seed on the field which has been prepared. Let the corn grow with our sacred chants. Let them fall on the neighbouring fields where the corn is ripe. (Rigveda X 101.3)

The body of extant literature codifies an era of efficient village agriculture. Texts such as *Krishi Samgrahā* and *Krishi Parasharā* give detailed expositions on soil and its classifications. Also, meteorological observations for forecasting rainfall, preparation and application of manure, collection and treatment of seeds, ploughing, sowing, planting, treatment of plants, reaping, storing, rotation of crops etc. were some of the topics that are discussed in the

treatment picture of profound significance is the all-pervasive metaphor of the tree as one organism. In Indian tradition, the cosmic Aśvattha (*Ficus Religiosa*) is described in great detail - its roots, leaves, branches, stem, fruits, sap and

Durga, the energy of all but consort of none.

A farmer would perceive the field of cultivation as a sacred precinct where each entity, while contributing to the biotic web, is of equal importance, thread.

WEB OF INTERDEPENDENCE

The message of the belief that the earth is a holon or a whole organism made of water, fire, wind and space, is cast in metaphorical language and symbols. Vedic and Upanishad texts speak of the image of the loom to explain the inter-related web of life. The universe is imaged as a woven fabric, the warp and woof of which form intricate inter-related patterns (*Rigveda* 10.130). The *Bhādaranyaka Upanishad* (12.1.19) employs the metaphor of a spider sitting at the centre of its web, issuing and reabsorbing its threads in concentric circles. Another organic
treatment, namely the body as a branch of the tree identified with food and energy. Just as the physical chemistry of the body converts food into energy, the branch draws its life-energising sap from the root.
A more pronounced symbol of the integral unity of life is reflected in the anthropomorphic metaphor of the cosmic man whose body contains all of nature. Nothing exists outside him. The hymn from the Rigveda (10.90) describes the emanation of the universe from the body of Purusha or the primeval person. In later literature, this composite, all-inclusive vision assumes the form of the Great Goddess in both Her immanent and transcendental aspects, where mountains, rivers, celestial bodies, vegetation and strata of space form various parts of Her body (Devibhagavata Purana).

In traditional perception, the sacred land of India is the manifestation of this interconnected web. How this metaprinciple gets translated at a day-to-day level is well illustrated by the way traditional farmers in rural areas preserve the fertility of the soil by renewable/local resources. It is common knowledge that the paddy fields and its surrounding contain algae, insects, weeds and trees, living in a web of interdependence. A farmer would perceive the field of cultivation as a sacred precinct where each entity, while contributing to the biotic web, is of equal importance. He would observe how the functional and the metaphysical get woven into one single thread.

The traditional farmer is guided by nature's open book of instructions. For instance, he is aware of the multifaceted blessings of a tree. Take the neem tree. For centuries, this tree has provided countless functions to the village, including being a traditional village pharmacy. Traditional farmers have made natural pesticides by adding neem leaves with grain or soaking storage sacks in neem water. Ground neem is used for making earthen containers for the efficacious which has given agrarian practices an indigenous signature is the Indian perception of sacred Time. In the Indian ethos, Time is regarded as cyclical. Whatever is born will perish and decay and will be reborn again, for time continuously renews itself. The settled rural communities in India have adopted two circular time models; one is determined by the course of the sun, the other by the moon's waxing and waning cycle. The solar rhythm reflects apolarity. In its northern course (daksinayana), the sun passes through the Tropic of Capricorn, the period marked for the winter solstice. This is a period when the cycle of abundance and fertility is set in motion. A harbinger of spring, it is conceived of as an auspicious period when the gods offer their grace to the world and the sun's golden light lifts at the terror of darkness.

In contrast, the sun's southern course (dakshinayana) in the Tropic of Cancer includes the summer solstice. This phase is marked by the descending energies of the earth, when nature's creativity is at its lowest ebb. It is a period of barrenness and unproductivity when the soil is desiccated of its sap, the gods lie still and demonic forces make their home in it.

The winter and summer solstices are vital to cultivators who organise their annual operation in unison with nature's rhythms. In India, the agrarian cycle and festive calendars are dictated by solar and lunar rhythms. Despite the great divergences of ecology in this country, fundamental agrarian activities such as sowing, germination, re-

Annapurna, Alaga

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planting, harvesting, winnowing and sorting of the seeds are dictated by these rhythms of time.

**AGRARIAN RITUALS AND ICONS**

Land was the main wealth of the people. Each agrarian act would be accompanied by prayer and invocation to the natural forces deities as earth, water, fire, wind and space. A farmer would offer oblations to the rain for soil fertility. During times of harvesting and at other times of the year, cows were worshipped, cattle decorated and a healthy bull led around to the accompaniment of dance and music. The cultivators would adorn themselves with flowers and bow to the gods of rain.

Productivity and festivity go together. We have to discern and compare the life-cycle of any one primary agricultural crop and its associate festivities. The most important day of the solar solstice is the first day which is celebrated on the 14th January as Makara Sankranti, which represents the northern movement of the sun through the Tropic of Capricorn. This day marks the beginning of the harvest season. The end of harvest is marked by the flowering of nature on the fifth day of the new moon of Phalgun, which is celebrated as the advent of early spring. This cycle completes itself in spring, which coincides with the end of one crop cycle. With the advent of the spring RamaNavami, the birthday of Rama and the spring Navratras, commences the beginning of a new crop cycle.

The settled village-based agrarian society evolved a distinct vocabulary of expressions and symbols expressed through their myths, legends, icons, gods and goddesses. These symbolic references constitute an autonomous form of cultural expression. Over centuries, the concept of Earth Mother split into numerous epithets. It is interesting to note that the major goddesses of the Hindu pantheon have a strong agrarian link.

**Over centuries, the concept of Earth Mother split into numerous epithets. It is interesting to note that the major goddesses of the Hindu pantheon have a strong agrarian link.**

In the Rigveda (1:57.6.7), Sita is portrayed as the fertility of the fields and mistress of plants. In similar vein, Goddess Shri or Lakhsmi, prior to her association with Vishnu, was the personification of the earth and fertility of the soil. The annual Durga celebrations recall the goddess’s primal identity as fecundator of the earth. The epithet of Durga as Shakambhari, the herb-nourishing one from whose body plants grow to nourish the world, is well known. Durga’s vegetational association is identified in her ritual of navapatrika, where nine plants are worshipped as her vegetation.

It is not surprising that the well-known autumn festival dedicated to Durga, coincides with the autumn harvest in North India. Although not easily apparent, Durga pooja is in essence, a harvest festival, as can be observed by the stages of her temple worship. The priest annually her with agricultural products like sugarcane juice, sesame oil and makes an offering of variety of soils. The goddess is invoked in a clay pot (ghata) filled with water which is placed on moist soil on which five types of grains are sown: rice, barley, wheat, beans and sesame. In private worship, Durga is invoked on barley sprouts which are sown especially for her worship in a small clay pot for nine days. The freshly sprouted barley is a symbolic microcosmic representation of the crop-field embodying the goddess. One popular myth relates that there occurred a great drought, causing dreadful famine over the whole earth. In desperation, the Brahmans approached the goddess for relief. Overtaken by compassion, the goddess assumed a body with hundred eyes and began to weep. She cried for nine successive days and nights. As the tears rolled down her cheeks from all the eyes on her body, they were transformed into the fertile waters of life and filled the rivers, lakes and ponds. Once again the earth was abundant with nourishment.

Another image of significance linked to the agricultural cycle is the figure of goddess Annapurna or ‘She of Plentiful Food’, who holds a pot filled with food and a spoon. Annapurna is the sustainer of food and two celebrations in her honour, take place in Varanasi. Her holy feast day falls after the fall harvest, when mountains of sweet meats, mounds
of rice, lentils and staples are arranged in her temple compound. Later, all this is distributed as prasada. Her second major festival falls in the month of January-February when she is venerated in sprouted rice grains. Her image is adorned with green sprouts or rice-paddy and again distributed as prasada.7

I hope that this article has been able, to some extent, link through examples, the intimate links between the earth, seasonal rhythms, crop cycles, divinities associated with them and their worship.

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The bearing of the fruits of agriculture upon the sustenance of cattle; Kurmi tribal woman artist at work on Sohrae wall decoration ritual; Bholwar; district Hazaribag.

It increasingly appears that the role of woman in ritual connected with agriculture is far more profound than so far understood, for it is linked to two basic concepts; fertility and the seasonal cycle.

Bulu Imam
AN AGENDA FOR CHANGE
RAJIV GANDHI MISSIONS

- Rajiv Gandhi Shiksha Mission: Total adult literacy and universal primary education by 1998
- Rajiv Gandhi Watershed Development Mission: 12 lakh hectares of land in the state to be developed on watershed basis in 5 years
- Rajiv Gandhi Gramodyog Mission: Generate 200,000 jobs in rural industry by 1996
- Rajiv Gandhi Fisheries Development Mission: Double income and jobs for the fishermen in the State
- Rajiv Gandhi Mission for Control of Diarrhoeal Diseases: Reduce diarrhoeal deaths through health education
- Rajiv Gandhi Mission for Elimination of Iodine Deficiency Disorders: Reduce iodine deficiency disorders by ensuring use of iodised salt by 1995
- Rajiv Gandhi Mission for Advanced Technology: Mobilise advanced technology for rural development

To achieve these tasks we need a miracle. The miracle is all of us.

Rajiv Gandhi Missions
Madhya Pradesh
VRKSHAYURVEDA
THE INDIAN PLANT SCIENCE

K. Vijayalakshmi

&

K.M. Shyam Sundar

Throughout the ancient literature on plant life, we find theories about the evolution of the plant, the nature of plant life, and the position of plants in the whole scheme of nature. Plants formed a distinct component of the immediate environment of the Vedic Indians. They developed agriculture, arboriculture and silviculture. The utilitarian side of plants probably gave the first stimulus to the scientific study of plants.

VRKSHAYURVEDA is of great relevance in Ayurveda, the classical study of Indian Medicine as well as Agriculture, Horticulture and Life Sciences. This plant science enabled ancient Indians to gain knowledge of plants and plant life and the act of application of this knowledge for improvements in the general conditions of life-insights for solutions to several current-day problems.

There has been a great resurgence of interest in recent times towards traditional methods of agriculture. Studies in these areas have become extremely important in the light of world-wide efforts to seek alternatives to modern agriculture and evolve sustainable, eco-friendly strategies for development. However, in most countries, these studies are labelled 'Ethno-Science' implying that as against 'Mainstream Science', these technologies are only empirical data which need to be further analyzed and understood in the light of modern scientific methodology. India, however, has a long standing tradition of theoretical enterprise in VRKSHAYURVEDA.

In 1925, G.P. Majumdar made an effort in his article, 'Vanaspata' to study Indian plant life as depicted in ancient texts. Recently, some books dealing with aspects of VRKSHAYURVEDA like the Brihat Samhita, Upavana Vinoda, Krishiparashara, and Krishisukti have been translated into English. We have made a preliminary survey of the material on VRKSHAYURVEDA and we have been able to get references to over one hundred manuscripts which talk about Indian Plant Science. Subjects it dealt with were: collection and selection of seeds, germination, grafting, cutting, sowing, planting, nursing, selection of

SOME RESOURCE BOOKS

Upavana Vinoda
This is a chapter in Sarangadhara's encyclopedic work Sarangadhara Paddhati. Deals with a variety of subjects like asceticism, medicine, politics, economics, botany, and philosophy. Covers the whole of human life in its most general as well as its deeper aspects. The author was a courtier of King Hammira (Bundelkhand) and lived in the 13th Cent. A.D. (1283 - 1301).

Brihat Samhita
This is a treatise in Sanskrit compiled by Varahamihira in 600 A.D. His patron King was Harsha Vikramaditya of Ujjain. Deals mainly with astrology but also discusses botany and plant sciences.

VRKSHAYURVEDA of Surapala
This is a manuscript on horticulture and botany.

Krishi Sukti
This is a Sanskrit work on agriculture which is narrated by the Sage Kashyapa. The date of this work is uncertain, but there is good reason to date the core of this work to the 8th - 9th Century AD. The text most probably belongs to the
soil, manuring, cultivation of soil under favourable meteorological conditions, pest and disease management, nomenclature and taxonomy, botanical novelties and plant protection.

Given on the right is a brief table of ancient texts and the subjects of plant life with which they dealt. It is by no means comprehensive, but it will give us some idea of the fact that the spirit of scientific inquiry was intrinsic to traditional cultures as opposed to the common perception of this query being a phenomenon of the modern west. The following article, called "choices of choices," highlights a traditional farmer's wisdom based on his knowledge of Vrksayurveda. His wisdom is, however, not always itself to contemporary farming practices. The article also shows that farmers have always innovated and still continue to innovate despite several national and international interventions.

**ON VRKSHAYURVEDA**

Vasishtha tradition of South India. Kashyapa as an authority on agriculture is mentioned by Bhatotpala in his commentary on Brhat Samhita.

**Krishnayayurveda**

This is a Sanskrit work attributed to Sage Parashara devoted exclusively to different agricultural operations. Its date is attributed to the period between 650-1100 AD. Dhanaavanti Nighantu

This is a work in Sanskrit - a materia medica compiled in the 11th Century AD. No clear mention exists of the author of this work. It is mentioned in this work that for the better understanding of plants, the physician should get the help of people living in the forest, local folk and tribes.

**Raja Nighantu**

Work in Sanskrit - a materia medica compiled in the 11th Century AD. The author is Pardit Naraaham of Kashmir.

Amarakasha (6th Century AD) compiled by Pandit Amarakasha. Several chapters gives a comprehensive glimpse of the art of classification of soil, land, implements, etc.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Name of Text(s)</th>
<th>Author</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production of musical instruments</td>
<td>Sanggata</td>
<td>Kashiyanam</td>
<td>Spicious the type of tree to be used, its use, etc.</td>
</tr>
<tr>
<td>Vrksa Chindu</td>
<td>The Samhitas</td>
<td></td>
<td>Treatment of trees.</td>
</tr>
<tr>
<td>Nomenclature</td>
<td>Raja Nighantu</td>
<td></td>
<td>Plant names are coined according to a morphological characteristic, specific use and mythology.</td>
</tr>
<tr>
<td></td>
<td>Ayurvedic treatises</td>
<td>Charaka, Sushruta, Vagbhata</td>
<td>1,900 plant names representing about 750 plants are mentioned.</td>
</tr>
<tr>
<td>Disease control</td>
<td>Ayurveda (sarrams)</td>
<td></td>
<td>107 applications of plants for treatment of health conditions.</td>
</tr>
<tr>
<td>Medicinal properties</td>
<td>Atharva veda (sarrams)</td>
<td></td>
<td>Diverse herbs and plants are named, classified and praised.</td>
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<tr>
<td>Gulma (Menn)</td>
<td>Vrksayurveda</td>
<td></td>
<td>Lists the functions of the office in charge of agriculture and his assistants.</td>
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<td></td>
<td></td>
<td></td>
<td>Compared to human anatomy like the body external (bone), flesh as saages (soft tissue and skin), nerves to kasha (fibrous tissues as in jute, both being strong), bones to wood (sari).</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Descriptions of external features (root, medicinal parts, leaves, flowers, etc.)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Activity of roots, leaves, flowers, fruit, and bark.</td>
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<td></td>
<td>Comparision to elvation, heat, and thundar.</td>
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<td>Sensitivity of plants</td>
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<td></td>
<td>Sensitivity to touch, heat, and heat.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Phenomenon of sleep and waking. Responsive to touch. Lotus (opening at sunset), Suryamukhi (sunflower) facing the sun, Lilium blooming with the rise of the moon.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Solar coldness, (Holothurias amans) moves with the sun, Larvae (flying) being the thunder, Bajjisapraca (Phusica granitum) fruits on smelling the muscle live of animals, mango fruit when tasting the leaf of fish, Ashok tree flowers if touched by the feet of a beautiful girl.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Essentially based on the type of plants grown for specific purposes - medicinal or economic. Considered the efficacy of vegetable things depending on the nature of the soil.</td>
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<td></td>
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<td></td>
<td>115 sitches for detecting water in a dry region.</td>
</tr>
<tr>
<td>Plant propagation</td>
<td>Ayurvedic texts</td>
<td>Charaka and Susruta</td>
<td>Propogation by roots, seeds (bijpa), shoot (manja), cutting (kashadha). A globule (contains of plants are used for propogation; Parvaneeyan (leaves used for multiplication).</td>
</tr>
<tr>
<td>Plant nutrition</td>
<td></td>
<td></td>
<td>Effect of temperature on grain germination, usefulness of cow-dung and bones as manure.</td>
</tr>
<tr>
<td>Artificial liquid manure</td>
<td>Assorted texts</td>
<td></td>
<td>Called kusaprashan.</td>
</tr>
<tr>
<td>Pest and disease management</td>
<td>Brhat Samhita</td>
<td></td>
<td>Treatment of plant diseases. How unnatural growth, destruction, wounds, fractures can be cured.</td>
</tr>
</tbody>
</table>

THE EYE VOL. II NO. 1
BASKET OF CHOICES

K. Vijayalakshmi

CONSERVING PEOPLES’ AGRICULTURAL KNOWLEDGE

What our farmers need today is not a standard package of practices but, ‘rather’, a basket of choices

Today, worldwide, indigenous technical knowledge in most spheres is getting more and more recognition. Social and biological scientists are increasingly going to farmers, and farmers are increasingly being recognised as innovators and experimenters. Several ways are being evolved to identify priorities and to develop and test technologies besides conventional agricultural research programmes. Slogans such as ‘Farmers back to farmers’, ‘Farmers first and last!’ are getting popular everywhere.

Farmers’ Wisdom

Farmers all over the world have developed their own systems of farming and this has come about within the framework of local possibilities and limitations of ecology within the social, economic and political structure of their countries. If we want to bring about major development in the area of agriculture, it is logical that we first ground ourselves in the knowledge and experience that we already have. While it is a cliche to say that ‘India is the land of agriculture,’ it is indeed true that Indians have paid great attention to agricultural technologies and agronomic practices and achieved great so-

phicitation in these areas over the centuries. Many of these practices continue to prevail in large parts of India even today. There have been hardly any modern technological inputs in large areas of India that practise dryland agriculture - what has come to be known as ‘Survival Agriculture’. Even in those areas where modern agriculture has replaced traditional agriculture, it is largely in the nature of additional inputs in an essentially traditional agriculture system. A few examples will amply illustrate what I mean by a ‘farmer’s wisdom’.

Biodiversity of Rice

In Asia alone about 96% of the rice crop of the world is produced and eaten. According to Dr. Richaria, the well known rice scientist, four lakh varieties of rice existed in India during the Vedic period. His estimate is that even today two lakh varieties of rice still exist in India, a truly phenomenal number! This means that even if a person were to eat a new rice variety every day of the year, he would live for over five hundred years without repeating a variety!

Farmers in every part of the country have deep knowledge of their own varieties of rice, of their environmental and nutritional requirements, properties and peculiarities. This enabled them to harvest a crop even under the most severe stress situation. Farmers also possess high yielding varieties of their own which are not recognised in
agricultural extension programmes. Let us take a look at the striking example of the paddy variety *Mahsuri*.

Properties of few of the rice varieties mentioned in *Bhojana Kuthuhala*

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Rasa</th>
<th>Effect on Dosh</th>
<th>Specific Properties</th>
<th>General Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rajanam</td>
<td>Sweet</td>
<td>Reduces kapha, pitta, and vaatha</td>
<td>Enhances the digestive fire</td>
<td>Increases appetite and strength</td>
</tr>
<tr>
<td>Red Sambha</td>
<td>Sweet</td>
<td>Increases kapha, reduces pitta</td>
<td>Purifies blood, improves vision, reduces fever</td>
<td>Increases strength, decreases thirst</td>
</tr>
<tr>
<td>Mundashali</td>
<td>Sweet, sour</td>
<td>Reduces kapha, pitta, and vaatha</td>
<td>Pacifies poison and respiratory disorders</td>
<td>Helps in conditions like boils and burning sensations</td>
</tr>
<tr>
<td>White Samba</td>
<td>Sweet</td>
<td>Increases vaatha and kapha, reduces pitta</td>
<td>anti-helminthic (worms)</td>
<td>Decreases tiredness, increases body strength</td>
</tr>
</tbody>
</table>

This was introduced into India from Malaysia for tests during 1968-67. This particular variety was rejected by rice scientists of India after two years of work because of its lodging behaviour. Somehow this seed reached Andhra Pradesh through some farm labourers. The farmers who used it found out that it performed extremely well. Because of this, it spread from Andhra Pradesh to Orissa, then to West Bengal and Bihar, but because of its popularity and the demand for quality seeds and pressure from farmers, the government of India was forced to notify the variety under the seeds act.

What has been said about rice is also true for other crops such as pulses. However, this genetic diversity of our traditional varieties has been totally ignored and modern agricultural programmes have not taken into account this wealth of information. A look into our traditional varieties will open the door for discovering many varieties for pest and drought resistance. Various varieties of grains and their properties are also mentioned in texts of Ayurveda as well as *Paksha Sashtra* (Cookery). Nutritional properties of some rice varieties as described in *Bhojana Kuthuhala* are given in a table above.

![Traditional innovations by farmers](image-url)
Beusani System
There exists a traditional system of weed control in India. Many rice scientists are skeptical about this system. This is known as the 'Beusani System.' Under this system, fields in which twenty-five to thirty-five day old rice crops are grown, are ploughed very gently crosswise and with about 5 cm of standing water in the fields and they are planked. The triple purpose of weeding, thinning, inter culturing are served by this method. The Echinocochlea is a major weed of rice and this is very similar to the rice plant in its early stages. However, this develops internodes within thirty days. The only thing that happens to the rice plant during planking is they simply bend down and, after sometime, become erect; the weeds are broken. Farmers with their keen observation could identify this differential behaviour in the growth habit of rice and weed. This simple scientific technology, however, was not acknowledged by rice scientists for a very long time.

The Case of Milk and The Virus
Andhra Pradesh in south India grows tobacco extensively. One of the major diseases of tobacco is the attack by the tobacco mosaic virus. Tobacco growers of Andhra Pradesh dip their hands in a pot of fresh milk every time after they transplant a few seedlings. This has been an old practice which was considered unscientific by scientists for a very long time. Recently, some open minded scientists have looked at this practice with a different perspective and have found reasons for its utility in many research papers. All point to the efficacy of milk as an inhibitor of the virus, most likely due to the action of the protein casein and milk globulins.

The use of milk for seed preservation, for treatment of seeds before sowing is however, when growing this same variety, a farmer from Bikaner, Rajasthan selected an early-maturing plant and multiplied the seeds. These plants fit quite well with the cropping system and had good yield and quality. Within a very short period, this new variety became quite popular and was named Bikaneri. It has now occupied the cotton belt completely in Rajasthan, Punjab and Haryana. Professional cotton breeders have been seriously engaged in finding out defects in this variety for many years since they wanted to pull it down. Its popularity, however, prevailed and the voices of the farmers forced its official recognition. This is a fine example of a farmer working as a breeder without school or college training in genetics or plant breeding.

Oil Cake from the Village Ghan serves as a better manure
Mechanised oil presses in cities have significantly contributed to forcing the village ghan into oblivion. Oil cakes from the village ghan is better for manure. Oil cakes used as manure are applied in a fine powder. Generally, in India, pounding is done with a stick, but a more effective method is to crush the cake under the stone of any ordinary chunnam mill. The powder from the country ghan cake is much finer than that from cakes from hydraulic presses and this probably explains why the former is a more effective manure.

Farmers' knowledge of Soil
A.O. Hume, who was involved with agricultural reform in India, mentions that an enormous number of names were applied by native agriculturists to

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Rice Varieties at the Temple of Lord Jagannath
At the Puri temple in Orissa, Lord Jagannath is worshipped with food prepared from freshly harvested rice every day. This traditional system has been propagated based on the intimate knowledge of the rice varieties then prevalent in ancient India, followed by varietal choice. (Such a system may guide us to a possibility to harvest rice every day and everywhere.) Such a system might have been common practice in the past.
soil. Each district has at least a dozen purely local names. Native cultivators keenly appreciate the smallest differences in the relative qualities of different soils. Names have references to external conditions, frequency or recency of cultivation, its situation as regards inhabited sites etc., its position as upland or recently farmed alluvium, its occupation for pastures, field or gardens, its external features etc.

Tank Irrigation

The 18th century old Mysore state with an area of 29,500 sq miles had more than 38,000 tanks. The main method employed was to construct a chain of tanks by embanking hillside streams etc., such that the outflow of a higher tank supplied the next lower tank and so on, all the way down the course of the stream. To quote Major Sankey, one of the first British engineers of the erstwhile Mysore State, 'To such an extent has the principle of storage been followed that it would now require some ingenuity to discover a site within this great area suitable for a new tank'.

Innovations with Farm Equipments

Introduced with dwarf wheat during the Green Revolution were wheat threshers, pumps etc., and comb planters. This equipment underwent various modifications in the hands of local artisans to suit the smaller and medium farmers. Variations in the machine type and size were made and perfected and have been used widely by small farmers.

Conclusion

India today has a population of eight hundred million people and nearly one third of the world's cattle population. History shows that India has never before been so dependent upon external inputs. This is mostly due to the scant disregard and abject apathy that we have today for anything indigenous.

The ability of our farmers to classify, choose, adapt, and test is illustrated in this article. However, this is only a minuscule fraction of the knowledge of our farmers. When farmers are seen as experimenters and innovators, our views on various things also change. What our farmers need today is not a standard package of practices, but rather a basket of choices. The role of extension should not be to transfer technology. It should be to help farmers adapt. The local experts are not so much researchers as farmers themselves. Farmers are professional scientists, but their skills and knowledge are yet to be fully recognised. 

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TENDING THE EARTH

Winin Pereira

‘If you cut a blade of grass, you shake the universe’
(Old Chinese saying)

The saga of the journey from axes to chainsaws, dibble sticks to 200 horsepower tractors, from gathering wild food to ‘creating’ new plants through bio-technology, from bows and arrows to nuclear weapons, is acclaimed as the Ascent of Man. But from a holistic point of view, it has actually been a free fall to early oblivion. From the point of view of traditional cultures, it has been a descent from freedom to domination.

It is argued by some in the West that Eastern philosophies cannot handle today’s situations, since it was Western ecologists who first blew the whistle on recent environmental problems. Western scientists may have discovered these crises, but the crises resulted from their own science. They should not take credit for a rather belated perception of the dangers of their own system. Minimal interference would have prevented such a degradation in the first place. A simple lifestyle has been preached and practised for thousands of years, and is still being practised, voluntarily or not, by the majority of the population of traditional cultures.

The debate on sustainable agriculture has arisen because there is considerable uneasiness and disquiet about what modern (read western) agriculture is doing to the planet’s environment. On the other hand, agriculture is itself affected by other aspects of society, including its cultural and economic values. A particular culture can be considered as a whole system of knowledge. Culture determines what sort of knowledge is transmitted from generation to generation, which innovations are to be encouraged, to whom, and how the accumulated knowledge has to be spread and what restraints have to be put on its use.

Because the term ‘sustainability’ has now come to mean ‘sustainable growth’, there is need to use another word.

J.C. Kumarappa, Mahatma Gandhi’s ‘economist’ several decades ago coined the term ‘Economy of Permanence’. Unfortunately, this gives the impression of something static and eternal, whereas a truly sustainable system would have to adapt to natural and human-made changes. The term ‘sustainable’ will therefore be used but in the sense defined here, which includes social justice. The definition used here for social justice is that of intragenerational and intergenerational equity - people, in the short and long term, have a right to a reasonably secure and comfortable life. The necessities include material needs like food, clothing and shelter, as well as nonmaterial ones like self-respect, dignity, creativity, health and education. Any improvement in one group of peoples’ development in one region should not produce more harm or injustice to other people in the same location or elsewhere.

Finally, a sustainable system should be resilient, able to withstand shocks and failures of parts of its systems.
without the whole collapsing or without small shocks leading to a spiral of unsustainability. Sustainable agriculture, then, is more than a set of agronomic principles or packages of practices which merely have to be utilised.

The question is "Can an alternative system provide all that the Western agricultural system provides today?" or "What can an efficient, just agricultural system sustainably provide?"

**Traditional Agriculture**

While the above concepts may or may not have been consciously applied, they were incorporated in the agricultural practices that were developed traditionally. Vedic literature shows that farming was advanced at that time (see Madhu Khanna and Vijayalakshmi, this issue). There appeared to have been an understanding that, although the earth was large, they had to obtain most of their resources from within small closed ecosystems.

The farm provided the necessities for the home, with individual farmers interested primarily in attempting to produce most of the food required for their family's consumption. The farm also produced some of the raw materials for industry, and what was unusable for one became the raw materials for another. The pastures and forests also provided numerous raw materials for village industry. The forest's dead timber provided fuel and its surplus vegetation gave food and fodder. Only basic requirements which could not be met locally within the village and its environs were imported and bartered with what was in surplus.

With cultivable land limited, increasing production had to be obtained by devising complex systems which simultaneously preserved the natural resources of soil, water and genetic resources locally available. It required the preservation of the natural cycles of growth, decay and regrowth. The resulting systems kept the crops healthy by providing nutrients and an immediate environment that controlled pests and weeds.

Farmers obtained all their inputs from their own farmland or from the neighbouring commons. This required the recycling of the whole crop plant - grain, husk, stalk, leaves, roots. Nutrients were recycled by burning weeds and stubble in the fields. The "waste" remaining after the extraction of indigo dye from indigo plants, was used as manure for tobacco crops. Nightsoil was well mixed with rubbish and other manures, and used especially for sugar cane, tobacco, and other demanding crops. It was so highly prized as to be called sonkat, that is, manure as valuable as gold.

Such sophisticated systems required intensive study of the farm and its surroundings, a knowledge of all the hundreds of possible crops that could be grown, with their permutations and combinations as intercrops and rotations.

**A sustainable system should be resilient, able to withstand shocks and failures of parts of its systems without the whole collapsing or without small shocks leading to a spiral of unsustainability.**

Sustainable agriculture, then, is more than a set of agronomic principles or packages of practices which merely have to be utilised.
tions, and what would now be termed management skills. In Khandesh Valley in Maharashtra, the value of crop rotations was well known. In black soil, sesame (til) was followed by finger millet (ragi); in light soil, finger millet was followed by pearl millet (bajra), and then cotton. In irrigated land, rice was followed by sugarcane, and in the third year, two crops, sesame and chickpea (harbara), or wheat and peas. Legumes were often included in rotations and no crop was grown continuously in the same field, thus maintaining soil fertility and preventing the build up of pests. The crops were selected according to the local soil, climate, and other environmental conditions, with no attempt to ‘level’ the environment by bringing in external fertilizers, irrigation, and other synthetic inputs.

Traditional systems reduced interference to a minimum by keeping the systems complex, as natural systems are. Some very complex systems have been developed with overlapping and multi-tier crops. Fruit trees were intercropped with vegetables, legumes, and crops tolerant to shade. Climbers, such as some spiccs, were trained to grow on trees. Spaces were allowed to run wild so that medicinal and other herbs thrived in their natural surroundings. Each species was chosen to grow synergistically, not in competition.

Extra production was obtained only by developing technology which maximized the utility of the available resources: land areas, water, varieties of species and crops which allowed infinite experimentation in rotations and intercropping. The crops selected had to have meshing farm operations so as to maximize family labour efficiency. Where farmers were unable to cultivate their entire holdings, trees, which required less labour and that too in the non-peak seasons, improved their productivity. This has always been an important component of traditional agriculture.

The commons provided essential farm nutrients to supplement what was recycled, fixed by legumes and brought up by deep-rooted plants in farms. Production was increased, not by clearing more forests for crop cultivation, but by using a little of the forest production to raise farm fertility. The forests also provided food and hundreds of other products directly, relieving agriculture of the burden of supplying them. Although the majority of such farms were subsistence farms, farmers did not need a high cash income because cultivated as well as wild plants provided them with their other non-food requirements.

Vegetarianism is more sustainable than a food system based on a large quantity of meat products. Cow worship could have arisen from a realization that bulls were necessary for traction and that they played an essential role in recycling crop ‘wastes’ speedily.

Much of the agricultural produce was processed in the village itself. There was the husking, milling and grinding of cereals and pulses, and processing of sugar or other local crops. In every village there was a ghani (bullock-driven oil mill) for extracting oil from oilseeds. Residual oilcakes were considered a valuable cattle food. Sustainable agriculture also requires economic independence. In villages, highly perishable food was bartered or sold directly from farms, with purchasers often coming to the farm. In larger villages, farmers sat with baskets of produce in a central place. Not-so-perishable food was sold in weekly bazaars, which also served as meeting places and provided entertainment. There were middlemen who went around from village to village buying up the produce. Traders purchased fruits and vegetable by the headload to hawk around.

Breakdown and the Enclosure of the Knowledge Commons

The destruction of such systems began with the enclosure of the forests.

Today agribusiness controls agricultural policies of governments. Ultimately it will be the global demand for oil and natural gas for fuel that will determine the price and availability of fertilisers, pesticides and other agrochemicals.
and other commons. C.C. Wilson, Chief Conservator of Forests, described its consequences for the villagers:

'The dwellers in the countless villages all over the country had, from time immemorial, obtained a great part of their daily needs from the jungles. First and foremost was the question of fuel with which to cook their food. Without that they could not live. Then there were small timbers for building without which they would not have shelter, ploughs without which they could not cultivate the ground, grazing without which their cattle would die, green-leaf manure for their fields, tanning bark for the leather, bamboos for a dozen different purposes. And these were vital to their well-being... And then an authority came into being which denied them what they had always looked upon as their rights. They fought most bitterly and indeed understandably, against the new tyranny.'

Today, the government still claims the same proprietary rights over the forests.

When the commons are enclosed or destroyed, the nutrient supply drops and so does the crop output, perhaps below subsistence level for most farmers. There is further loss of food production by the reduction in fodder availability by a consequent lowering of the quantity of animal manure; by a reduction in fuelwood, forcing farmers to burn their remaining cowdung as fuel; by a lowering of the water table. The reduced productivity required the use of more crop land for self-reliance. To add insult to deprivation, the farmers are blamed for being inefficient, and are then forced to use synthetic fertilizers. Farmers are forced to encroach on what should by right be their free commons. Persecution by the forest department, not only impoverishes them but wastes their time and energy.

Enclosure also deprives the excluded of large amount of wild food, putting more pressure on agriculture to supply basic needs. Moreover, the minor forest products that were obtained free now had to be purchased, which usually meant more land had to be used to grow cash crops. With enclosure, agriculture and industry were simultaneously damaged, the continuing conversion of forest land to agricultural lands is mainly for subsistence food production by those who have been impoverished by forest enclosure itself as well as by other aspects of 'development'.

Why did the British destroy the traditional system? G.F. Keating, Director of Agriculture, Bombay Presidency, wrote in a 1913 article: 'The old self-sufficing agriculture by which each tract, each village and each holding supplied its own needs is now largely a thing of the past... The Bombay Presidency draws much of its food supply from outside, while it exports large quantities of cotton and oil seeds. Its agriculture has become commercialized.'

The British wanted raw materials for their industries. Rice was exported for starch, cotton and indigo for their textile industries and opium in order to balance their trade with China. New crops required the maligning of farmers' knowledge and its replacement by that of foreign academic 'experts', the enclosure of the knowledge commons.

Modern (Western) Agriculture

The displacement of indigenous peoples allowed the invading Europeans to possess huge farms. These farms required the use of machines which consumed large quantities of non-renewable fossil fuels. The machines required the cultivation of the same crop year after year, which reduced bio-diversity. Farm machinery reduced the need for farm labour, forcing those who did not own land to move to the cities.

The high cost of machines required a higher productivity which led to the selection of crop varieties which gave a high yield but were more susceptible to pest attack. This required the use of synthetic pesticides, which also killed predators. Besides, the insects developed resistance to most of the pesticides. The monocultures of high yielding seeds required external inputs of synthetic fertiliser (made from non-renewable materials like mineral oil.
and natural gas in place of recycled organic sources. This destroyed soil organisms and damaged the rhizobia that fix nitrogen and makes phosphates available to plants. The damaged soil was easily eroded by wind and water. This required increasing quantities of fertilisers, much of which was leached into surface or underground water sources.

The high use of fertilisers led to a proliferation of weeds. Those that could not be controlled by machines were treated with herbicides. These killed many of the wild relatives of crop plants that grew nearby, reducing biodiversity. Weeds are now getting herbicide-resistant.

The high yielding varieties of crops require heavy irrigation, because the new breeds cannot stand normal water stresses. This has caused extensive salinity and waterlogging. The high costs of inputs leads to the need for subsidies to make agriculture economical. The subsidies are set so that the price of farm produce is lower than world market levels, enabling profitable exports. This export led demand leads to the farming of arid regions, requiring more irrigation.

Today agriculture thrives on the manufacture and supply of all these inputs and controls agricultural policies of governments. Ultimately it will be the global demand for oil and natural gas for fuel that will determine the price and availability of fertilisers, pesticides and other agrochemicals.

The Green Revolution (GR), package promoted in India is a combination of the above practices. After nearly thirty years of its existence, the effect of the technology is tapering off. It is claimed that were it not for the GR, there would be massive starvation, farmers would try and cultivate marginal and steeper lands, speeding up the destruction of remaining forests. However, the large output and low price of the GR produce are possible only because fertilisers, pesticides, irrigation, tractors, energy etc. are highly subsidised, since non-renewable resource and
pollution costs are externalised.

The question to be asked here is, are the making of profits in agriculture and protection of the environment inherently compatible? If so, humanity needs a new blueprint for survival.

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Winna Poreira, an accomplished nuclear physicist, worked at the Tata Institute of Fundamental Research for ten years and also with the Department of Atomic Energy. He abandoned both assignments in 1959. He is the author of several books, having researched extensively on environmental and socially related issues. He has been published by Earthscan, London (Asking the Earth) and the Other India Press, Goa. From Western Science to Liberation Technology has been well received and translated into other languages.

The above article has been compiled from three articles in his book, Tending the Earth.

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EXTRACT FROM

RUBBER

A NOVEL BY

JAYAMOHAN

The following is an extract from Chapter 13 of a Tamil novel, Rubber, written by a bright young star in the vernacular firmament, Jayamohan. This novel unfolds the saga of three generations. It records the changing political, social, communal and caste landscapes of a given period. It also marks the changing farming patterns, from forest lands to plantations, rice to rubber which saw the sudden improvement of some and the sudden rise of some others.

'Something upset him which he couldn't identify... There was something in that huge house, something cold and frozen within - perhaps the brutality of power or perhaps the silent reign of sins - something that upset one. Were Grandfather to stay there, on the second day he would begin to suffocate... Lawrence felt himself go cold... Grandfather wouldn't be able to pinpoint what it was. But his very senses may explode merely feeling it... He remained an adivasi far above the constraints of wealth and sin....

Me too, Lawrence thought, there must be the adivasi in me, at least a single link, somewhere. Amidst the concrete of Nagoreoil, I hunt for the forest, its life-beats, its simplicity, its sanctity... at the bottom of my mind is the forest, endless forest. It occupies my whole being with its green, its smells and life that pulsates in every atom.

It had been a plantation jungle, according to Grandfather. Once upon a time, this wet ground caused me to shiver with cold; so thick were the plantain trees... underneath a roof of intermingling leaves was a black earth, never visited by the sun, wet with seeping ground water. Then came the settlers. The plantain jungle became a banana plantation. Among trees, there was none to beat the plantain for its individuality. It was silent, free from noise and commotion. Each node exuded softness and coolness. It spoke to the birds a great deal, probably more than all other trees. Its young leaves held a liquid light. There was nothing in it to suggest brute force. Even in its maturity and ultimate fall, it fed its young ones with its own remnants. It revealed the unfailing rhythm of nature at its poetic best. A shy and soft femininity that was the plantain tree, was nature's antidote for the awe-inspiring giant trees of the jungle....

Rubber was planted a generation ago. First it was cultivated by the Kottayam Moplas. Soon rubber filled the entire jungle. Plantain trees were slashed to the ground. Rubber trees took their place, exuding their peculiar fleshy smell. They needed neither human care nor their nearness. Today, there were no forests. All the slopes were covered with rubber trees, as far as the eyes could see. Row upon row, standing above a bed of crunching dry leaves. To enrich a civilisation, they stand, shedding drops of blood. Their bodies were full of wounds - bleeding wounds, drying wounds, scars, scratches. Their lives were being roughed across tarred roads by strange men. It was always a painful experience for him to walk through a rubber plantation. Trees like a row of waiting beggars holding on to their tin cups, quietly shedding blood. A civilisation that tortured millions of trees, cheapening its own soul in the process. Any man partaking of that sin, knowingly or unknowingly, could never be moved to break down into tears that were true.'
ERODING CIVILISATIONS

An Agricultural Perspective

There is the moral of all human tales,
'Tis but the same rehearsal of the past;
First, Freedom, and the Glory - when that fails
Wealth; Vice, Corruption - Barbarism at last
And History, with all her volumes vast,
Half but one page.'

-Byron

Prophectic lines indeed! The author, in his own
inimitable style takes an
aerial historical survey of the
connections between the
decline of ancient
civilisations and the possible
fate of mankind today.
Interestingly, agriculture
plays a big role in both these
processes. Are we on the
brink of desertification
created over the last fifty
years than ancient
civilisations managed in the
previous five thousand?

MALCOLM'S

The riddles of archaeology pro-
vide endless fasci-
nation. Decades of
speculation and
debate have raged
about the abandoned cities of
Mesopotamia, the sudden demise of
Mayan civilisation, and the fall of the
Roman Empire. Theories of war,
epidemics, political intrigue and moral
decadence have captured the
imaginings of historians and
archaeologists alike. However, as

investigative techniques become more
sophisticated, the underlying cause for
decline and collapse becomes apparent.
Quite simply these ancient
civilisations burgeoned on a system of
agriculture which was unsustainable.
Ruling elites and priesthoods were kept
in power by their ability to allocate
productive land, manage complex irri-
gation systems, and store grain for
distribution in famines. As soon as
agricultural production began to de-
cline, the foundations of these ancient
civilizations were undermined and
they then fell prey to economic
uncertainty, internal strife, and
marauding enemies.

It is hard to imagine that the desola-
tion of contemporary southern
Mesopotamia was covered by green fields and sophisticated irrigation systems. It's amazing to think that the once dense rainforests of Central America cover the intricate terracing of the Mayan Empire, and it takes quite a leap of imagination to realize that much of North Africa was formerly the breadbasket of the Roman Empire. Ironically, it was the very ingenuity of these civilizations which proved to be their downfall. For the Mayas, their system of forest clearance and efficient cultivation caused fertile tropical soils to become exhausted and eroded. The consequent reduction of food surplus and shortage of productive land led to massive population decline, civil war, and increased warfare with neighboring cities. Finally, the cities themselves were abandoned, and not rediscovered until the nineteenth century.

Mesopotamia is said to be the cradle of Western civilization. In this land between the rivers Tigris and Euphrates, the myth of the first man and woman (Adam and Eve) in the Garden of Eden has its origins. It was here that the Sumerians began to build the world's first cities more than 5000 years ago, and create an empire of city-states which was to last for ten centuries. They worked in metals, developed written language and mathematics, domesticated wild animals, and learned to sow cereals. As the historian Clive Ponting points out, the growing of crops in such an arid region requires considerable ingenuity. Tree-rivers were at their lowest precisely when the crops needed most water, so an elaborate system of storage and structure in this region coupled with high evaporation rates eventually created high degrees of salinity hostile to plant growth. Contemporary aerial photography reveals that the Sumerians made several attempts to stave off disaster by digging more irrigation channels and opening up new areas for cultivation. However, such efforts were in vain, and a civilisation which had lasted a thousand years finally succumbed to the ravages of environmental destruction and Assyrian assault.

The reason for the decline and fall of the Roman Empire remains a contentious issue. Aside from the problems of internal strife, decadence, rising inflation and colonial revolt, it is forgotten that the Romans were losing the ability to feed themselves. As the demand for grain increased, huge areas were deforested and brought under cultivation. The soil rapidly eroded and brought about ecological degradation on a massive scale. The former highly productive provinces of North Africa were turned to arid scrubland and desert. The ruins of once great cities, now parched in the sand, bear witness to the folly of short-term agricultural plunder.

Such examples can be multiplied throughout recorded history. The Sumerians, the Mayas and the Romans each had highly developed systems of food production and distribution - the evidence is readily available. However it has taken much more exhaustive research to find out why these civilizations flourished and died. History does not tend to record its failures, and yet if we are to learn lessons from past experience it is crucial to understand both its triumphs and disasters. Moreover it is often tempting to ask the question "What if?". Suppose the Sumerians had halted the process of soil salinity. What if the Mayas had allowed land to regenerate by letting it lie fallow? Imagine the course of history if the Romans had discovered the secret of sustainability.

But what of modern agricultural practice? From a European perspective it appears to be highly successful. Our supermarket shelves bulge with 17,000 brightly packaged food choices. Our farms are highly efficient and productive - no, more than that, they are over-productive. Granaries bursting with wheat, lakes of wine and mountains of butter. Any small town supermarket will stock green beans from Zimbabwe, baby sweet corn from Thailand, mushrooms from Sri Lanka, apples from New Zealand or even parsnips which make the 9000 mile journey from Western Australia. It's a marvel that any cuisine in the world is readily available to whet our appetites and delight our jaded palates. However, set the brightly lit supermarket shelves against one fifth of all humanity (1.3 billion people) who flounder in the abyss of dire poverty and malnutrition then a different picture begins to emerge.

It is probably true to say that agricultural practice has changed more in the last 150 years than it did in the previous two thousand. Couple this with the fact that Europe enjoyed a period of colonial expansion parallel to the industrial revolution, then it is easy to understand our current affluence. However, the crucial question remains - is it sustainable? In addition, how long will it be before the undernourished of this world get the message that the 'trickle down' theory of economic development does nothing to ease their plight.

In the 1970s, huge amounts of money were lent to third world countries at low interest rates so they could develop their economies. American Secretary of State, Henry Kissinger said that "no child would go to bed hungry by 1990". How empty those words seem now. Much of the money was lost through corrupt ruling elites, the remainder was often invested in wholly inappropriate hi-tech agricultural and industrial enterprises. When interest rates began to soar in the 1980s, poor countries found themselves unable to pay even the interest on loans.
which had so freely been given a decade earlier. There was little sympathy from the rich industrial north. The message from the International Banks and the International Monetary Fund was essentially simple. It said: "Earn more, spend less." So, developing countries were forced to put severe restraints on the home economies and produce cash crops instead of food. Then they were forced to compete in the global marketplace where the goods they produced had prices fixed in the commodity markets of the north.

Such policies have had devastating social and ecological consequences. Third world countries have been forced to plunder their resources in order to survive while we in the north buy their produce cheap, and end up giving them charity. Millions of people have been forced off their land into the slums of Asia, Africa and Latin America where there are some twelve million homeless children. Clearly, such policies are not sustainable, and the world’s political leaders need to address this problem as a matter of urgency before tragedy compounds tragedy.

We have now reached a stage in history when the expansion of viable agricultural land has virtually come to a halt, and world stocks of grain are in decline. (In 1988, for the first time in history, the United States failed to grow enough grain to feed its own people). At the same time, world population increases by 93,000,000 each year. Add to this the fact that 24 billion tonnes of topsoil are being eroded annually (the equivalent of the wheatlands in Australia), then one wonders how many more people will join the starving and destitute before the inappropriate methods of agribusiness and monoculture join the ancient civilisations buried by drought and long dust storms.

The second avenue of response is to make claims for even more hi-tech genetic engineering solutions to feeding the hungry. At first the prospect is exciting - bumper crops of rice and wheat, huge nutritious vegetables which can survive frost, drought and long dust storms - but these foods will only end up feeding the market, ahead already with yields of milk, meat and wool. In the end, these methods will have to be vigorously protected by patent laws, then the scene is set for an agricultural system which links food to profits rather than feeding the hungry. There’s no point for guessing who will be the losers in this system. In addition, farmers and scientists will have no idea how genetically engineered species will react once released into the environment. The power of such manipulations is truly awesome, and may face humankind with problems beyond our limited grasp of reason and morality.

Simpler solutions are closer to hand. Our first responsibility in the rich industrial nations is to release developing countries from the burden of debt which now amounts to one trillion dollars. In future, any money which is given as aid or lent as a commercial proposition to Third World countries needs stringent controls to make sure it goes direct to the needy - so far most of the megadam projects and agricultural assistance programmes have simply succeeded in driving people off the land into slums. As James Goldsmith
Malcolm Baldwin is a gifted teacher, writer and a dedicated environmentalist. Born in the U.K., he has a B.Ed degree from the University of Sussex. He has worked in theatre and as film editor mainly for the BBC TV. He has been cameraman and director for several BBC productions. He is deeply committed to organisations such as Green Peace, Friends of the Earth, Environmental Investigation Agency, and has produced environmental educational material. Malcolm lives in Devon, UK.
THE FERTILISER CYCLE

1929

“...I presume that there are no such farmers in India foolish enough to burn cowdung and buy chemical manure... It is possible that after sufficient research the value that is attached to chemical manure today will be considerably lowered.”

Mohandas Karamchand Gandhi, Navajivan

1967

“If I were a member of your parliament, I would leap from my seat every fifteen minutes and yell at the top of my voice, ‘Fertilisers! Give the farmers more fertilisers’. There is no more vital message in India than this. Fertilisers will give India more food.”

Norman Borlaug, Nobel Prize Laureate in 1970 for Mexican dwarf wheat varieties, from Jack Doyle, Altered Harvests.

1978

“Given the opportunity, the web of man-made chemical technology would continue to grow in beauty and diversity, creating many new and beautiful species, eliminating some old species and relegating others to more specific ecological niches... “The chemicals we make are no different from the ones God makes.”

Dr. C.A. Goring, Dow Chemicals Trade Magazine.

1984

“One way in which agricultural research went wrong was precisely in saying and allowing it to be said that some miracle was being produced... Historically, science and technology made their first advances by rejecting the idea of miracles in the natural world. Perhaps it would be best to return to that position.”

Angus Wright, Innocents Abroad American Agricultural Research in Mexico.

1991

“This cultural crises has been exacerbated by the fashionable concept that farming is ‘just another business’. Any long lasting solution to farming’s problems will have to address both the economic and cultural issues... Control on fertilizer use... is a highly contagious idea. A reduction in nitrogen... would solve the over-production problem. It would also help reduce the amount of pesticide needed...”

Prince Charles to the Royal Agricultural Society of England

Vegetables sold in Delhi markets show pesticide residues

By N. Surash
Business Times Bureau
SOHNA (Haryana), April 23.

Vegetables sold in various Delhi markets indicate significant levels of pesticide residues. Alarmed by this, the agriculture ministry has launched southeast Asia’s first integrated pest management (IPM) project to make available chemical-free vegetables in the Capital. Random samples were drawn from Delhi’s wholesale market at Azadpur. Thirteen cauliflower, nine brinjal, nine cabbage and eleven samples of spinach were analysed at Central Insecticides Laboratory. Except for spinach, more than 90% of the samples had significant levels of either BHC or malathion. According to experts, consumption of vegetables containing pesticide residues even below tolerance level is more dangerous than acute poisoning (high levels causing instant health problems) due to long-term accumulation. Scientific studies in India show that accumulation of pesticides in human bodies over a long time leads to cancer, affects kidney functions and causes problems in blood circulation. The impact also varies in individuals depending on their general health status as well as frequency of exposure.

Studies done by the agriculture ministry’s plant protection directorate showed widespread use of pesticides within Delhi’s vegetable growing areas. For instance, pesticides are sprayed every week in nearly 600 acres of vegetable-growing patches on the Yamuna river bed near the Inter State Bus Terminals. So the case at 700 acres of vegetable farms south of this point near Mayur Vihar. To tackle this menace which arises due to indiscriminate use of pesticides by farmers, the ministry has started an initial level campaign to promote IPM. Most of Delhi’s vegetable supplies come from neighbouring states. Surveys in major supply centres such as Tonk, Gurgaon, and other cities too showed indiscriminate use of pesticides.

As for the campaign part, 36 agricultural extension workers from six north Indian states were trained in the use of IPM methods for 45 days at this Haryana Village. The joint programme of the Food and Agricultural Organisation (FAO) and agriculture ministry concluded today. The trainers in turn will train other extension workers and farmers. IPM is a mix of various methods for total crop management to provide protection against pests. The emphasis is on the use of genuine seeds and disease-free planting materials, better varieties, surveillance to suggest need-based and judicious use of chemical pesticides, and large scale use of natural predators of pests.

Almost all the farmers who were exposed to IPM were very happy. Said a Solana Farmer Ram Kilawan, echoing other participant’s views, “Now we realise there is no need for chemical pesticides.”

Courtesy: Times of India (An extract from the original).
BUDDHIST AGRICULTURE

IN CONVERSATION WITH

Masanobu Fukuoka

Natural farming is... the unmooring way of Bodhidharma. Although appearing fragile and vulnerable, it is potent for it brings victory unfought, it is a Buddhist way of farming that is boundless and yielding and leaves the soil, the grasses and the insects to themselves.

Fukuoka.

Rajiv Singh

Dr. Masanobu Fukuoka is an agricultural scientist who has devoted the past fifty years to develop and practice natural agriculture. He wittily calls it 'do-nothing agriculture.' He bails from Japan, which, during his lifetime, has moved dramatically towards high technology agriculture and industry. Dr. Fukuoka's experiment with agriculture is an experiment with life itself. His experiment transcends agriculture into a philosophy of life. He has been honoured with various awards including the Magsaysay Award and our own Desbi Kottama Award of Visva Bharati University. He came to India nine years ago and fell in love with her. In the course of his travels here he impressed many agriculturists as a result of which there are hundreds of little farms practising his method of farming. He sincerely believes that in the land of Buddha, nature will find her rightful place. During another visit here he has met the Prime Minister, Ministers for Agriculture and Environment as well as small peasants and volunteers. Despite his hectic schedule he agreed to spare time for THE EYE because he feels the young who have the 'shine in their eyes' can change the world, especially at a time when, in India, tremendous changes are being conceived and there is a heavy proselytisation of the youth towards the open market and industrialised economy.

Here are some excerpts from the conversation be had with Rajiv Singh which was interspersed with readings from his books.

Rajiv Singh: Sir, your transformation from a microbiologist to a 'do-nothing' farmer must have involved a drastic change in your outlook to life. How did it come about?

Masanobu Fukuoka: It all happened one day when I was 25 years old. I had just suffered from acute pneumonia. I recovered from that but the stay in the hospital had plunged me into a state of depression which persisted. I used to
wander about in the night trying to free myself of the agonizing doubt about the nature of life and death. (he asks the interpreter to read from One Straw Revolution) 'One night, I collapsed in an exhausted on a hill overlooking the harbour, in a daze I watched the harbour grow light, seeing the sunrise and somehow not seeing it. As the morning breeze grew up from below the bluff, the morning mist suddenly disappeared. Just at that moment a night heron appeared, gave a sharp cry, and flew away into a distance. I could hear the flapping of its wings. In an instant, all my doubts and the gloomy mist of my confusion vanished. Everything I had held in firm conviction, everything upon which I had ordinarily relied was swept away with the wind. I felt that I understood just one thing. Without my thinking about them, words came from my mouth: 'In this world there is nothing at all...'. I felt I understood nothing.

R.S.: Is it this recognition of insufficiency of intellectual knowledge which makes you suspicious of science, in spite of being a scientist yourself?
M.F.: I am not against knowledge, but I am against specialization or compartmentalization of knowledge which usually passes off as science. The path that I have followed - the natural way of farming - strikes most people as strange and was interpreted as a reaction against the advance and reckless development of science. But all I want to show is that humanity knows nothing, there is no 'advancement of science'. Understanding of nature is beyond human intelligence. Science which isolates from the whole, in order to ‘understand’ and ‘use’ nature, destroys nature in the process and moreover understands only the destroyed nature and not the real thing. The role of science in society is the same as the role of discrimination in your own mind. Only a child sees true nature - without thinking - in its complete and true form.

Specialization takes us more and more away from nature, but if people are merely caught up in reacting to this, like through the 'returning to nature' and anti-pollution activities, no matter how commendable, they are not moving towards a genuine solution. Mere reaction to overdevelop-

The ultimate goal of farming is not the growing of crops, but the cultivation and perfection of human beings.

Masaobu Fukuoka

R.S.: Your method is not just a way of farming, but a complete way of living. You believe that natural farming proceeds from the spiritual health of the individual and that the healing of land and purification of human spirit are one process. What are the methods by which this process takes place?
M.F.: The method is still evolving, because the task is enormous - a practical and beneficial transformation of the whole world by evolving a society based on love and co-operation, a society in which man's relation with his fellow beings and other living creatures are non-exploitative and non-violent. Given the present sorry state of soil degradation due to excess irrigation, heavy use of chemicals and thoughtless destruction of bio-mass, the only remedy is natural farming, else our existence on this planet is threatened. There is no blue-print for natural farming, but I believe there are several main principles based on reducing the human input to the bare minimum necessary - just so that the air, water and soil can combine fruitfully themselves.

The first principle is no cultivation. No ploughing or turning of the soil. The earth cultivates itself by the penetration of plant roots, the activity of micro-organisms, small animals and earthworms. The second principle is no chemical fertilizer or prepared compost. Left to itself, soil maintains its fertility naturally, in accordance with the orderly cycle of plant and animal life. The third principle is no weeding by tillage or herbicides. Weeds build soil fertility and balance the biological community. The fourth principle is no dependence on chemicals. The sensitive approach to disease and insect control is to use sturdy (natural) crops in a healthy environment.

R.S.: But in India there are so many more mouths to feed. Do you think that natural farming can take on chemical farming in the efficiency of feeding India's millions?
M.F.: The yields from my farms are about one tonne per hectare - comparable to yields from chemical farming anywhere. Moreover, grain, fruits, and vegetables grown naturally are free of chemicals, taste much better and are much healthier for the body as well as mind. Since there are virtually no inputs, apart from labour, in this method, the net profits are much higher. It is practical, not only in terms of yields, but in that it provides constructive and spiritually alleviating employment opportunities which no modern capital intensive activity can provide.
R.S.: If it is indeed so advantageous, then what are the reasons that it is not spreading fast?
M.F.: One basic reason for this is that the world has become so specialized that it has become impossible for people to grasp anything in its entirety. People try to combine natural farming with mechanized harvesting, etc., not realizing that natural farming is gentle and easy - a return to the source of farming. A single step away from this source can lead one astray.

The other more practical reason is that political and economic pressures from the companies which provide these 'improved' (weak) seeds, fertilizers, weedicides, pesticides, etc., work effectively on policy makers because these companies usually are transnational corporations. All the negotiations in GATT etc., are exercised to promote the interests of these global dragons. The agricultural co-operatives also do not support natural farmers because they have to show a record of their performance which is not enhanced by natural farmers who need neither the seeds nor fertilizers or other inputs which the co-operatives provide. Still, one thing is clear, the failure of chemical agriculture is inevitable - it has lost its direction and become unstable.

R.S.: Finally, what has been your experience in India on this visit?
M.F.: I have found the government in India to be the most receptive of all to my ideas. They want to develop wastelands and make deserts green. I have advised them about aerial seeding of seeds like Egyptian clover to 'awaken' the Indian land. I have told them that just not killing cows is insufficient. We have to stop multiplying them for our own needs. Also, I told them that big projects like Narmada will not help farming. Land has to be 'moistured' through plants. Dams are no solution. If the land is green it helps in attracting moisture and retaining it. Rain comes from below and not above. Even the population problem is a result of the imbalance of nature. My message to the people of India is: you have the message of Buddha and Gandhi in your hearts; simply serve nature and all will be well. The key to peace lies close to the earth.

I conclude with a passage from my first book:

"I believe that Gandhi's way, a methodless method, acting with a non-winning, non-opposing state of mind, is akin to natural farming. When it is understood that one loses joy and happiness in the attempt to possess them, the essence of natural farming will be realized. The ultimate goal of farming is not the growing of crops, but the cultivation and perfection of human beings."

Books by Masanobu Fukuoka:
- One Straw Revolution
- The Natural Way of Farming
- Mu - The God Revolution
- Sowing Seed in the Desert
- Road Back to Nature

Rajiv Singh has recently graduated from the Indian Institute of Technology (IIT) Delhi. As a student there, he was very active with the Nature Club of the Institute which was responsible for sensitising young people towards ecological issues. He has trekked extensively in the Himalayas. He is now with Carrier Air Con working to phase out CFC's.
GRAIN ON THE POTTER’S WHEEL

THE CRAFT - AGRICULTURE CONNECTION

It has become both a necessity and a cliche to say that the number of people self-employed as artisans and craftspeople is second only to those working in the agricultural sector. What is usually the case is that those who say it and those who hear it handle these as statistics and do not go into the fact that both are deeply inter-related and mutually sustaining.

Jaya Jaitly

Artisanal activity is, by its very nature and tradition, related to an agro-based economy. Even before the advent of settled cultivation, the acquisition of food was technically assisted by tools and implements made by blacksmiths, stone cutters, basket makers and others. Food was exchanged for such goods in a system of barter, since most implements, vessels, cloth, nets and baskets were made for domestic use. As people began to settle and cultivate land, whether in the plains, by the rivers or on mountain sides, technological innovations such as the framed loom and the potter’s wheel increased production from domestic use to marketable quantities.

In an agricultural economy, the most important asset for any person is obvi-
ously land. In the caste hierarchy of India, the landed farmers were of different castes while the more backward and landless provided either skills or goods. Amongst these socially backward communities were the weavers, potters, toddy tappers, barbers, fisherfolk, the scheduled castes and tribes. Each was connected to the farming community. Where feudal patronage provided a relatively secure support structure, the relationship allowed for creativity; but in many parts of the country it also brought about untold social oppression.

If one were to take a look at the activities, both religious and cultural that take place during festive seasons, the link between agriculture and crafts is clearly visible. Harvest seasons are times for celebration, marriages and other ritualistic events which call for the use of new clothes, replenishment of earthen pots used for grain and water storage, purchase of cooking vessels and the worship of implements used for work. Printers prepare yards of cloth with bright handblocked designs for turbans, skirts or head cloths. Decorative activity inside the home is undertaken by the entire community or its womenfolk. The better the harvest, the more prosperous the farmer. However, a lean year directly affected the sale of artisanal products and artisans would temporarily have to migrate to more prosperous areas. In feudal pockets, where services were bartered for grain, the extent of bondage would increase.

Designs and motifs in crafts among rural and tribal populations (where large sections of crafts originate), have close links with agriculture. Symbols of fertility like grain, an ear of corn, a flowering tree and figures chewing butter are important motifs. When the harvest is good, in some states like Tamil Nadu and Rajasthan, the village carpenter, wood carver and blacksmith are commissioned to make ornate doors. Agriculture are directly moulded in the same fashion. The North Eastern region of India is a typical example of this. Rivers, streams, forests and large tracts of bamboo in Tripura, Nagaland and Assam, produce raw materials for hunting implements, special fishing baskets and backpacks. Many types of baskets are woven: for measuring quantities of produce, transporting goods to the marketplace and for winnowing and storage.

Just as the availability of local water and its quality guide the nature of local food patterns, so too does local artisanal work depend on water, soil and the needs of the community. The colour and quality of yarn and fabric is as much affected by local soil and water as much as the colour and quality of grains and water storage, purchase of cooking vessels and the worship of implements used for work. Printers prepare yards of cloth with bright handblocked designs for turbans, skirts or head cloths. Decorative activity inside the home is undertaken by the entire community or its womenfolk. The better the harvest, the more prosperous the farmer. However, a lean year directly affected the sale of artisanal products and artisans would temporarily have to migrate to more prosperous areas. In feudal pockets, where services were bartered for grain, the extent of bondage would increase.

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Village markets developed and even today, in most parts of the world, where agrarian economies dominate over industrial ones, the rural market is the hub of the trading activity. It has a vast variety of both foodstuffs, fresh and dried, as well as rope, containers, baskets, floor mats, tools and earthen vessels which are made by rural artisans. Many of these objects are made from the residues of agricultural crops. Mutually sustaining and interdependent, crafts and agriculture have a natural link.

Unfortunately, mass produced goods from urban factories have now begun to flood the market place and the farm sector, like all others, have shifted to these alternatives. This has displaced the artisans to city slums in search of work. They take up non-skilled tasks, manual labour and 'sweat shop' work, usually far removed from their known tal-
The fundamental link between harvests and craft production will be severed except in cases where religious festivals occur at the same time. Even here, it is not unusual to see plastic gods, laminated wall pictures of foreign landscapes and Maggi masalas.

When the global norms and cultural practices of the economically powerful West dictate all market needs, local needs are rendered irrelevant and the compulsion to produce for an alien market cannot be understated. Even the slightest technological inadequacy (as per alien standards) renders artisans as incompetent. Naturally, the more financially stronger component then takes over. Gradually, the result is the creation of poverty both in terms of local creative skills, variety and range of food or artifacts and a soulless homogenization of rootless cultural expression.

Today's global markets and world trade have impacted upon cultural and local community patterns, forcing a common norm of production, marketing and technology. The new milieu has heralded the shift from community based activity to the individual or corporate activity. Units of profit become the sole criteria of success. Farming practices, from sharing seeds to sowing and harvesting are primarily community based in which extended families, villages and larger communities participate. Similarly with craftspeople. Any design, product adaptation or technological input which has visibly demonstrated its ability to secure better markets is immediately adopted by most artisans of the same community. Modern economists believe this leads to more competition and a consequent drop in profits for each individual or producing unit. The know how of progressive interventions are however more evenly and democratically distributed so that a wider base is benefitted. Mechanised farming, the abolition of land ceiling, non-implementation of land reforms in most parts of the country, the arrival of multinational companies in the field of food production and processing emphasise the individual rather than the community.

Today's global markets and world trade have impacted upon cultural and local community patterns, forcing a common norm of production, marketing and technology.

Industrialised nations have engineered the concept of obsolescence into their products to ensure regular markets. Craftspeople too, particularly those that work with mud, paper and grass and even textiles can ensure regular sales of their items as they are easily destructible. The difference is that in the case of the latter, all wastes can be easily recycled. Mud toys for children, votive offerings at religious occasions, the natural crumbling of reeds and grasses are part of nature's cycle where creation and destruction, replacement and re-creation are a necessary and expected pattern for the renewed demand for artisan products. One doesn't have to look too far to see how modern storage systems, food processing and global distribution technologies will affect the cyclical renewal of the demand for local agricultural and craft goods.

Arthur Dunkel, the (in)famous head of GATT once demonstrated his ignorance of India's craft traditions when he visited India two years ago. He was trying to impress upon his audience the value of patenting a design by pointing to the paisley design on a tie and saying that it would bring huge profits to the craftsman if he could patent the paisley, since people all over the world would have to pay him royalty for its use. Obviously, Mr.Dunkel was ignorant of the fact that the 'traditional' paisley design comes in myriad forms, having travelled lands and centuries, evolving constantly in the hands of each creative craftsman, depending on the medium, the time, the place, the cultural and historical influences and market needs. No single craftsman could ever claim the patent right on a paisley design, or else there would have to be tens of thousands of patents for each paisley design !

Jaya Jaitly is one of the few persons spearheading the crafts movement in India. She has been and is a consultant for the marketing and design of handicrafts and handlooms for many states. As an office bearer of the Hind Mazdoor Kissan Panchayat, a trade union federation, she organises artisans and creates rural-urban links. She is the founder of the Dastakari Haat Samiti, a self-sustaining craft initiative. She is a civil activist and is part of the socialist group in mainstream politics in India. Jaya lives in Delhi.

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Agrarian Change under the Raj

Some Issues

Omkar Goswami

How isolated were Indian farmers from commercial agriculture and its requisite cash crops before British colonialism? Not very, says the author of this article; the British merely latched on to and developed what already existed. For decades, economists who have looked at the growth of commercial agriculture under the British have noted its benefits in income, food security, etc. Have farmers merely forgotten to count their blessings? The author takes a different look at some of the issues.

Until the late sixties, there was a standard tale of Indian agriculture under colonialism which went thus. Pre-colonial agrarian society was structured in terms of 'self-sufficient villages' where land and water resources were distributed in an equitable and egalitarian manner among villagers. There was hardly any commercial agriculture, precious little trade and monetisation, and villagers concentrated on producing food which was bartered for other basic necessities of life. Of course, life could be occasionally harsh, but the peasants were immune from the evil winds of trade, commercial crops, rapacious money-lenders, debt peonage, land grabbing zamindars and kulaks, and the threat of becoming immiserised to a point where they were dispossessed of their land and became landless labourers. According to this story, colonialism changed this age old pattern of life. It heralded the advent of commercial cropping, forced peasants to give up their food security for market driven cash crops, created markets for land rights, gave free rein to money-lenders and shroffs, created massive volatility in prices, led to increasing inequalities and sharp polarisation of land holdings in hitherto equitable societies, and eventually contributed to systematic pauperisation and steady growth of landless labour.

Like most tales, this has its combination of truth and fiction. In this article, I will attempt to give an objective account of the development of agriculture and agrarian society under the Raj, particularly during the period 1860-1940. The period is important for two reasons. First, it saw the greatest growth of commercial agriculture. Second, and no less important, it is the period that has attracted a huge amount of detailed research in the past twenty-five years — work that has challenged and modified the simple story that I sketched above. Given India’s sheer size, agronomic and ecological diversity, and vast differences in pre-colonial agrarian relations (that is, on how agriculture was organised, who collected revenues and rents, and the structure of land rights), it is impossible to give anything but a thumb-nail sketch of the process. Instead of at-

"COMMERCIAL AGRICULTURE... BLAH... BLAH...
Isay... These natives are darn progressive chaps..."
AGRARIAN CHANGE

tempting to write on 'everything that you wanted to know about agriculture but was afraid to ask', I shall take up a few central themes, share with you the major findings and, in doing so, suggest that agriculture and agrarian relations are far too complex issues to be neatly slotted into politically and ideologically convenient types.

Was there no commercial agriculture and no cash crop prior to colonialism?

Most certainly not. Even during the early and mid-Mughal period, Malwa and Bihar were major producers of opium and indigo, the Yamuna-Ganga doab an important wheat granary, Bengal a large exporter of cotton, silk, rice and sugar, the Godavari-Krishna delta, Thanjavur and the tank irrigated regions of Tamil Nadu were rice surplus zones, and the Malabar coast was internationally famous for its spices. It was in the relatively drought prone dry districts of central India (the interior of Maharashtra, Madhya Pradesh, and parts of Andhra Pradesh), and North Gujarat, Rajasthan, and East Punjab that the focus was on single cropping where the dominant crop was coarse grain such as jowar or bajra. When we talk of better economies and subsistence-oriented pre-colonial agriculture, we forget that until the sixteenth century India was the largest exporter of spice and indigo; that the late seventeenth up to the mid-eighteenth century was the biggest world producer and exporter of calico; that we had busy trade in agricultural products with South East Asia, the Middle East, East Africa, and Persia; and that there was massive internal trade in agricultural produce throughout north and south India which was financed by traders, money-lenders, and bills of exchange.

Did colonialism lead to a sharp growth in commercial agriculture?

Yes, it most certainly did. The American Civil War (1860-65) led to a sharp drop in the supply of raw cotton to the textile mills of Lancashire, and the focus shifted first to the black soil region of Maharashtra and the Central Provinces, and then to the canal irrigated zones of West Punjab (now in Pakistan). Soon, these regions began to cultivate long and medium staple cotton. The demand grew in leaps and bounds which, in turn, led to a steady increase in the area under cotton. In a similar vein, the Crimean War (1854-56) abruptly cut off the supply of Russian flax, and forced the flax mills of Dundee to search elsewhere for their packaging material. The substitute that rapidly gained in importance was jute - a crop cultivated in the riverain plains of East Bengal. In a short period, this region became the world's largest producer and exporter of raw jute and burlap. So, if we were to compare areas under principal crops in 1800 with the areas in 1875 or 1900, there can be no two opinions about the rapid and sustained growth of commercial agriculture.

Was the growth in commercial agriculture exclusively for export markets?

In the first stage (up to 1875 or thereabout), it was definitely so. The bulk of both cotton and jute was exported in their raw form to Britain for processing into cloth and gunny bags. Although jute mills came up in and around Calcutta by the 1860s and took up three quarters of the raw jute crop by World War I, jute - raw or as gunny - was largely for the export market. Cotton was a different story altogether. By the last quarter of the nineteenth century, largely Indian owned cotton mills were established in Bombay, followed by Ahmedabad, Kanpur and Coimbatore, which converted the raw cotton into cloth for the domestic market. Thus, by the mid-twenties, over two thirds of India's growing cotton crop was used for domestic consumption.

Was the growth in commercial crops at the expense of food security?

Evidence points otherwise. Indian peasants are, and have always been, extremely prudent and risk averse. In single cropping areas, peasant households invariably kept aside a certain amount of market oriented cash crops. In rainfed or irrigated double and multiple cropping zones, one crop was always a food grain. For instance, in Bengal, while aus or autumn paddy competed with jute in the medium and low lying lands, aman or winter paddy competed with jute in the medium and low lying lands, aman or winter paddy was always sacrosanct. So, it is almost impossible to prove that food scarcity and famines were outcomes of greed induced by commercial agriculture.
These occurred because of the cruelty of the rain gods, and not due to the malign forces of markets.

What motivated peasants to opt for larger areas under commercial crops?

All detailed and carefully worked out studies point to relative prices. Simply put, given rainfall patterns, soil heterogeneity, and the efficiency of irrigation, the area under cotton or jute or sugar (vis-à-vis their agronomically competing crops) was greatly determined by past trends in relative harvest prices. If there was an excess jute crop in the previous year leading to lower post-harvest prices, then farmers would invariably re-allocate their land in the current year to plant more autumn paddy and less jute. This simple observation - that farmers are extremely responsive to and canny about prices - should not come as a surprise. After all, their livelihood depends upon it, and there is no reason why farmers should behave irrationally about prices while city slickers don't. The fact that ideologues believed otherwise only points to their cultural and intellectual elitism, and their desire to appropriate the rationality of 'lesser beings'.

Did commercialisation lead to gains in real income?

Right up to the great depression of 1930-35, all evidence squarely points to substantial and steady increase in money as well as real income in the commercial agrarian districts of India. The watershed was the depression, which brought with it a massive and sustained fall in agricultural prices of both foodgrain and non-food crops - a process that triggered off widespread debt defaults, land attachment, and polarisation of land-holdings.

Finally, did commercialisation necessarily lead to greater power of money-lenders, debtpeonage, forced cropping, and consequent penury?

This is a complex issue and requires to be broken down to time components.

Except for a small hiccup during the 1890 and World War I, agricultural prices and demand steadily increased throughout the period up to the Depression. An environment of rising demand led to the growth of commercial agriculture which, in turn, was increasingly financed by money-lenders-sam-traders. Now, as long as prices continued to rise, peasants did not find it a problem to take working capital or even consumption loans and repay them after harvest - even at steep rates of interest. So, while money-lenders certainly had a greater role in funding commercial agriculture, they did not exercise greater power in the sense of widespread attachment of land, or turning farmers out of their plots in lieu of default. Nor is there any substantial evidence of peasants being forced to plant a commercial crop when they would have preferred to cultivate subsistence foodgrain.

However, the problem of commercialisation and market forces is that there is always a risk of falling prices - triggered either by international or domestic considerations. If the slump is a short one, farmers recuperate. If it is not, then they are exposed to a steady, often geometric downside; and this exposure is the greatest for those who are least insured - the small and marginal peasants. The Depression not only led to a sharp fall in prices (by almost 50% over the level of the twenties) but also wreaked havoc for six years - far too long to prevent the economically less endowed from getting enmeshed first in debt trap, and then spiralling towards landlessness. Thus, we get a picture of remarkably sharp contrasts. From 1960 right up to 1929, commercialisation was a boon for agriculture and large sections of the peasantries. In six years (1930-35), the long term gains to the relatively poor farmers were wiped out. In the backdrop of the Depression and rapidly falling demand, agrarian India saw the emergence of sharp divisions between the haves and the have-nots - divisions that were then maintained and often exacerbated by elitist politics of post-independence India.

So, was commercialisation worthwhile?

To answer this, we need to examine the counter-factual: widespread prevalence of non-marketable, subsistence agriculture. This counter-factual never existed anywhere except in tribal societies. It certainly did not exist in vast swathes of India.

Dr. Omkar Goswami did his Ph.D in Economics from Oxford University, UK. He currently teaches at the Indian Statistical Institute, New Delhi.

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Whether we live in Delhi, Bombay, Madras or any other Indian city, almost everyday, we encounter situations that tie us through various essential relationships to rural, mostly agricultural regions. The links between city, agriculture and rural culture are countless and sometimes striking, but how much really comes to our notice? In a typical day, you may buy the day's fruit and vegetables from the local fruit stalls. Passing a city park, you may see women collecting grass to be used as fodder. Early morning, one sees people using the roads, travelling from their villages to residential colonies, to deliver fresh buffalo's milk. From a train window, one sees the semi-rural character of the city limits, a bizarre collage of gaudily printed advertisements, scattered industrial buildings, large fields, village ponds, and bathing buffalos defining the landscape. These commonplace examples intimate a complex and dynamic link between our urban existence and rural culture, one that is essentially dependent on the agricultural production in rural areas. It seems that an inevitable consequence of the city/rural link is a gradual dissolution of agriculture based, rural cultures. What follows is an attempt to look at how our urban lifestyles as well as how urban society's cultural, economic, political forces, create or destroy the possibility for a more equitable coexistence between urban and rural areas.

A Constructed Divide

Theodore Roszak writes, 'the modern city represents the most daring attempt to live beyond nature as its detached observer and master'. Managing the needs of the city as it grows becomes an all consuming paradigm unto itself. The city - centered view of life thrives on the creation of an exaggerated sense of basic needs without considering how our urban consumption demands impact surrounding rural land and societies. Our work, time schedules, and the city landscape all help to encourage most middle class and wealthier urbanites to be physically and mentally distanced from the land. Cities provide a dream world of 'infinite' resources. Resources like
water, food, and power, flow to the city mostly from rural areas. The impact of greater and greater resource demands are only perceived as how our lifestyle is raised, satisfy a desire or need, but not as how they sustain or disturb ecological cycles.

As in our relationship with land and ecological cycles, we urban dwellers are also increasingly divorced from rural cultures. Urban life dominates the public domain, getting the majority of mainstream media attention and giving city dwellers a biased sense of the urban and rural imperatives of India. However, it is common knowledge that India is still predominantly rural; 74.3% of the population live in rural areas.

Diverse agricultural traditions, knowledge systems of the biological world, and rituals still persist in many Indian rural cultures, albeit sometimes very tenuously. Their agricultural practices are expressions of efforts through time to meet the food requirements of an area. Farms have been more than just parcels of land to be managed for maximum yield. They represent a basic link between man and nature (see Madhu Khanna and Winnie Pereira this issue). As rural farms and areas are compelled to meet the population demands of India’s urban, and even global, markets, the link between farmer and consumer, and with rural and urban culture, diminishes rapidly, in the end, being purely economical.

This purely economical relationship is now being taken to an extreme. Read a copy of any of the major national newspapers and you will be enlightened about the latest agricultural trends. In nicely packaged advertisements, urban readers are persuaded to get their ‘earth unit’ and to become, in a sense, agriculturists. Side-by-side with very eco-friendly references to ‘mother earth’ are the advertisements’ key words - agro-investment and returns. In truth, these agriculturists nurture only dividends and statements and yield only percentages and rupees. This new urban farming phenomena is purely an economic process, the distance that separates the ‘farmer’ from the land, soil, and natural cycles, more than just geographic.

Urban Markets and Commercial Agriculture
Rapidly paced commercialization of agriculture and orientation toward cash and export crops, especially in the last century, is in part created by our growing demands in urban centres and has subtle and not so subtle consequences for rural economies and lifestyles. Decreased household food security is one example cited by Stuart Gillespie and Geraldine McNeill in a recent book. New income from commercial production may not necessarily be used to buy food formerly grown for domestic use. Money may be spent on more expensive food, while total calories consumed decreases. Winnie Pereira cites a case of malnutrition in which a child died after a steady diet of packaged biscuits. He had rejected traditional finger millet porridge. His mother also assumed that the biscuits, because they were costlier, were better food. Other studies show that traditional grain crops provide multiple uses, while commercial varieties favour only maximum grain production. For example, 50% of the yield from traditional rice or wheat can provide fodder and straw. With commercial varieties, 70% of the yield is grain, leaving the farmer to look for outside fodder and straw sources.

Commercialization has also fostered the development and production of traditional Indian crops solely for export markets. There are urban Indian wholesalers who depend on putting
their brand name on varieties of basmati rice exclusively for export - being too expensive to capture a big enough market share even in Indian urban areas. With the complicity of usmore affluent urban consumers, commercial farming now dominates rural agricultural life even where it may be most inappropriate given ecological, social, and economic factors.

In another example, the millennia old cultivation of Indian sugarcane for products such as gur, jaggery, phanita and chand drastically changed with

**Delhi residents take loaves of white bread (a non-Indian food) as a staple in their diet, but are unaware of the different types of millet or other grains grown within less than a day’s drive from the city.**

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production for urban and export markets. Refined sugar has been marketed to and preferred by urban markets over traditional sugars. Some ads claim refined sugar as superior because of its modern production processes, thereby suggesting that traditional products and technologies are inherently inferior and dirty. Upto independence, gur production from sugarcane, well surpassed refined sugar production; now, the opposite is true. In 1994, government officials proposed to ban the manufacture of gur to meet the demand for sugar. The issue of providing refined sugar has taken the national centrestage for political reasons and the debate focuses on the integrity of the current powerholders. Instances like these highlight a trend towards product homogenization for personal gain. That many studies find gur to be a healthier alternative is ignored. Gur provides not only sugar but a range of other vitamins and minerals, such as iron, and is an alternative to taking synthetic mineral capsules.

**Food Processing and Packaging**

Consumption options in urban markets are fundamentally transforming with growing food processing and packaging industries. India’s first food processing industries focused on traditional products, such as chutneys and pickles. Modern processing is not concerned with providing food for severe nutritional needs, but rather creates an unlimited range of consumer products. Each product comes with a sophisticated marketing scheme that convinces consumers of their absolute necessity. Government policies pursuing economic liberalization fuels the trend for more and more supermarkets and forebodes a rapid rise in the number of processed, prepared and packaged foods.

The assortment of frozen, canned, bottled, dried, and elaborately packaged foods available now reveal that convenience for the consumer as well as aesthetics define the industry’s criteria more than anything else. Frozen and canned goods mean certain fruits are available year round; powdered soups or ready-made gravies save time, appropriate to our ever busier lives. However, how many of the gains in convenience are offset by the loss of vitamins and minerals in processing, and the cost of producing and disposing of the packaging? There are other costs as well in terms of energy expended.

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**Above and below:** Advertising for the health of society! Promotion of an ‘international diet.’
Vast waste is created when the crop is culled on the basis of size. Numerous studies of food processing industries in the West point to the much greater total amount of energy used to grow, process, package, and transport the product than what's in the food itself.

Small farmers do not fit well with the food processing industry. It is more cost efficient for processors to deal in large quantities either from large farmers or, easier yet, from their own corporately owned, and farmed land. Processing also requires the crop to be subjected to standard fertilizer, pesticide, and herbicide regimes. Before buying such products, we should consider whether in the overall input/output equation, food processing acts as a net resource drain, especially for rural areas.

Over the past several decades, a combination of global marketing, advertising, processing, and the systematic spread of green revolution crop varieties is helping to create an 'international diet'. A select group of grains, fruits, and vegetables are consumed by urban populations worldwide. As a case in point, Britannia boasts of its 'international' recipe for some of its baked goods and relies on the notion that you can 'now enjoy bread the way the world does'. The package of grains, fresh produce, and processed goods offered in urban markets has not come about through a value-neutral process. Increasingly, the choices presented to consumers favour products that are readily derived from a relatively small set of crops that are the main focus of agroindustrial and commercial interests.

What we have begun to think of as bountiful in our urban markets may only be because of a lack of knowledge about an existing diversity that is hardly ever the focus of advertisements or popular media.

At what expense to the great diversity of traditional crops does catering to the urban market, and especially the processed foods market, come? Delhi residents take leaves of white bread (a non-Indian food) as a staple in their diet, but are unaware of the different types of millet or other grains grown within less than a day's drive from the city. Advertisements tempt us with California-derived strawberries grown in India, implying that the abundance of tropical fruits available here is not sufficient. As these products become the new staples for city residents, even among the small percentage of consumers who can afford them, the more traditional crops are relegated to inferior 'village' fare or poor man's food.

For rural areas and agriculture, these are important consequences for cultivation patterns and nutritional standards. Navdanya, a grassroots organization working to conserve agricultural diversity, describes this process; it is a central concern to their work with village agricultural...
Markets of Change

In the Indian context, plants that have been displaced by plant improvement in the Green Revolution have been those which have traditionally been the main providers of nutrition: pulses and oilseeds. The amaranth and the bathua, two varieties of green leafy vegetables that were an integral part of traditional diets have been named weeds and are being exterminated.

Cultural Dominance

To the advantaged, a city offers educational and recreational facilities, professional and business opportunities, health and emergency medical care, the chance to explore a liberal culture, modern information and mechanisation systems. To the poor, they offer an escape from a possibly oppressive life in a village and a slim chance to avail of these facilities. However, paradoxically, while cities are often a hotbed for diverse culture, there is a growing trend towards homogenisation. More often than not, the power structures of the modern Indian city – politicians and corporations – find the greatest benefit from promoting that aspect of culture based on consumerism and competition. The miracles of science have much to contribute to this. While scientists have created many marvels through rigorous investigation, their own role in society has only now begun to be critically examined.

So called modern cultural values are the single greatest commodity exported by cities to rural areas, and one with incredible power and persuasion, especially on young people. One usual consequence of this kind of process in villages is the change in people’s attitude towards agriculture. In the inevitable comparison of their own lifestyles with pictures of modern India ‘moving into the twenty-first century,’ and the increasingly westernized city-dweller, they seem to come up short. With the idea that they should aspire to something greater than a rural, farming lifestyle and that their knowledge base is backward, some will sacrifice their livelihoods and become one of the hundreds of thousands of low income migrants to urban areas.

Examples of this process in India abound. Helena Norberg-Hodge, who has worked and lived in Ladakh on and off for the past 20 years, says, “...Punjab rice and plastic have become needs... Traditional foods are no longer a source of pride. Now, when I am a guest in a village, people apologize if they serve ngampae instead of instant noodles... I have watched people become separated from the land, as self-sufficiency is gradually replaced by economic dependence on the outside world.”

“...Punjab rice and plastic have become needs.... Traditional foods are no longer a source of pride. Now, when I am a guest in a village, people apologize if they serve ngampae instead of instant noodles...”

Expanding Urban Boundaries

City governments face the task of appropriating greater and greater areas to support their populations. The land swallowed by the city’s expanding borders is often some of the very same agricultural land that previously fed the city’s residents. For instance, Delhi’s Master Plan for the year 2001 for ‘controlled and balanced development’ provides that an additional 24,000 hectares of agricultural land be urbanized; the city is growing beyond the urbanizable limit of 32,800 hectares set in the original Delhi Master Plan of 1962. Gradually, we see the surrounding rural areas squeezed by pockets of residential, industrial, and corporate development. Gerald Breese, who has studied urbanization in developing countries, describes this process as creation of village enclaves, areas which retain many aspects of village life amid the urban build-up. Several decades ago, these enclaves would become new marketplaces for the urban areas, provide low-cost housing, and create a new labour force as domestic servants by displacing agricultural land and workers. Today, because of soaring land prices, the same process may be welcomed by village residents who can sell their land for a good price. One consistent feature in this process has been that pursuing agriculture as a way of life usually becomes unfeasible. In addition, as agricultural land is converted to other uses, to sustain total agricultural production, either more land needs to be brought into cultivation or production elsewhere is intensified (i.e., more is grown on the same amount of land).

Individual Responsibilities

What responsibility can we, as city residents, assume for the trends eroding traditional farming cultures and agricultural biodiversity? It would be naive to think that we, the more affluent urban consumers, alone account for so much influence. ‘Modern’ agriculture owes its growing predominance in the developing world to a combination of corporate strategies, government policies, and various constraints through international development and funding agencies. Indeed, many have begun to view the growing dependence of western models of industrial agriculture and the ready political acceptance of GATT as a period of reorientation of developing countries by multinational agro-chemical corporations and international aid institutions.

Our greatest impact certainly is through our consumption choices and pursuing alternatives that foster the production of a diversity of traditional crops and support sustainable methods of farming. We also can re-examine our seemingly inevitable bias for urban culture and, perhaps, the consequential ignorance of rural culture. To quote from Helena Norberg-Hodge (1991), “If our starting point is respect for nature and people, diversity is an inevitable consequence.”

Note:
Ngampae is barley that is roasted, then ground into flour; it is a staple in the Ladakhi diet.
Case Histories

PEPSIC ULCERS, CARGILL CANKER

Devinder Sharma

Economists will churn out statistics to establish that the Indian economy is based on agriculture. The often repeated saga of Green Revolution is cited as the only achievement of which India is proud. It was the Green Revolution which proved the prophets of doom wrong. From leading a ‘ship-to-mouth’ existence, the once Indian farmers have made the country surplus in foodgrains.

But it is the indifferent attitude towards agriculture that has led to stagnation in foodgrain production during the last seven years. This year too, production is anticipated to be in the range of 182 million tonnes. Foodgrain production in the front-line agricultural states of Punjab and Haryana has already reached a plateau. Alarming though it is, the government appears to be not even remotely concerned. Equally alarming is the continuing decline in the rate of investment in agriculture.

At a time when there is much talk of globalisation, not enough attention is being paid to a call by some well known economists as well as the World Bank urging to bring farm prices in India at par with global prices. Farmers have been demanding it. Economists like Dr. B.S. Minhas have been pleading for it. But perhaps the right kind of recipe came from the well-known economist and a former Finance Minister of Pakistan, Dr. Mahbub-ul-Haq. He had called for a major shift in the farm policies being propagated by India.

“We should make sure that our high tariff rates enable the industry to get twice the international price for manufacturers, agriculture is denied international prices and is subjected to export duties. It is one of the most massive transfers of resources from rural to urban areas, from the weak agriculture community to entrenched urban industries,” he said. His suggestion is that India must lower its custom duties, integrate the farm sector with the global economy and release farm prices to provide for a decent rate of return to farmers.

Terming it as a ‘prescription for stagnation in agriculture’, Dr. Haq says that the current practice of giving low prices to farmers forces them to produce less thereby resulting in imports. This may possibly be the reason behind India’s recent import of three million tonnes of wheat.

And yet, the economic liberalization that Manmohan Singh talks about is only confined to the industrial sector. Agriculture, in all probability, has been forgotten.

It is true that Indian farmers cannot be expected anymore to subsidize an inefficient industry. They have done so in the past. In cotton, for instance, farmers have and still continue to subsidize a highly inefficient cotton industry. Between 1980 and 1990, cotton prices in the domestic market ruled 29 to 40 percent lower than the interna-

Pepsi has finally made the right choice. With all eyes focused on the great cola war, Pepsi is quietly negotiating with the global food processing giant, H.J. Heinz, for the sale of its tomato paste plant in Punjab. This may well be the beginning of the end of the horticultural revolution that Pepsi had all along promised.
tional prices. It was because of such low domestic prices that the country could earn substantial foreign exchange through textile exports. If the Indian textile industry could compete in the world market only at the cost of its farmers, does it not imply subsidization of the inefficient industrial sector by the poor farmers?

The concept now being mooted is to give a commercial orientation to the farming sector. And this is being proposed to be done by organizing markets and producing commodities that can be processed and then exported. It sounds to be a perfectly correct approach to empower the farming communities. But what the government has in mind is not so much to encourage the small-farmers-agri-business consortium but to invite multinational food companies to set up shops, taking care of production and marketing.

Let us look closely at the performance of two multinational companies which ventured into the agriculture sector.

PEPSI FOODS

Pepsi has finally made the right choice. With all eyes focused on the great cola war, Pepsi is quietly negotiating with the global food processing giant, H.J. Heinz, for the sale of its tomato paste plant in Punjab. This may well be the beginning of the end of the horticultural revolution that Pepsi had all along promised.

If Heinz is able to acquire Pepsi's paste plant, negotiations for which are in the final stages, Pepsi would feel relieved to take on the challenge posed by the entry of its soft-drink rival, Coca-Cola, into the Indian market. The sale of the state-of-art tomato processing factory would solve yet another riddle for Pepsi: Heinz will take care of the contract farmers as well as the tomato crop.

And with that would end Pepsi's commitment to usher in a second green revolution in India.

It is now abundantly clear that Pepsi's entry into India was primarily aimed at capturing the huge soft-drink market. Agricultural research and development were apparently used as a ploy to gain entry. Ever since the project was cleared in 1988, Pepsi had felt Pepsi has so far relied on the Indian hybrid 'navin'.

The company had promised to set up a research center in collaboration with the Punjab Agricultural University, Ludhiana. The agro-research centre was to come up with an outlay of Rs 12 crore. While there is no sign of the research centre that was proposed at the time of seeking clearance, Pepsi has also not honoured its commitment of bringing in improved varieties of fruits and vegetables into India. In any other country, including the US, anomalies on the part of a private company would have invited punitive action.

Three years after setting up of the project, even the government had reluctantly accepted that all was not well. Another four years have passed since a high-level committee, appointed by the government, submitted its highly-critical report sometime in the beginning of 1991.

Agricultural research and development was not the unattractive proposition, but Pepsi lacked the will to operate in rural areas when a more profitable business was available in the soft-drink market. Pepsi had instead worked hard on transferring the technology that was already available with the Indian scientists. The technology for nurseries in 'plastic tunnels' and the ridge cultivation of tomatoes was already proven. And so were other technologies like deep placement of seedlings and frost prevention with the help of sarkanda grass. Pepsi had very cleverly passed on these as 'research' achievements through ignorant and gullible media personnel. Pepsi's experiment with 'research', therefore, casts a shadow over the future of privatization of agricultural research in the country.

CARGILL SEEDS

After Pepsi Foods, came Cargill Seeds, claiming to incorporate bio-technology for 'directly benefiting the Indian farmers'. While Pepsi's promise was forgotten in the very second year of
its operations, Cargill Seeds finds itself in the thick of a controversy following the ransacking and demolition of its seed processing plant in Karnataka by farmer activists sometime in July 1993. Established in 1987, prior to the framing of the new seed development policy by the Rajiv Gandhi government in 1988 (and that too against the wishes of Indian scientists), the company had entered the commercial market through sunflower and maize hybrid seeds. Cargill Seeds India Pvt. Ltd. is a joint venture involving the Cargill Inc., USA and the TEDCO group of Delhi.

Like any other multinational company, Cargill’s primary aim is to multiply its profits rather than disseminate the latest technology among farmers. And it is for this reason that the company has been marketing a sunflower hybrid, whose yield is far less than what it claims. Since India has no precedence of prosecuting erring companies, Cargill will never be penalized for deliberately marketing inferior quality seed under the label of a high-yielding hybrid seed. Like Pepsi Foods, whose claims remain unfounded, Cargill will also get away scot free.

Cargill’s managing director, John Hamilton, asserts that “you can take it from me that the company is not going to patent its seeds even after the GATT becomes a reality.” For those who have closely followed the operations of Pepsi, what Hamilton declares today is nothing different than what the former managing director of Pepsi, Ramesh Vangal, used to claim a few years back. Vangal had promised creation of an additional 50,000 jobs but in effect employed only about 900 personnel. He went back on his promise of introducing improved vegetable and fruit varieties from the United States.

How sincere is Cargill when it comes to farmers’ welfare can be seen from the way the company has deprived millions of rice growers in South East Asia of higher yields by keeping the rice hybrids away from them. The hybrid rice varieties, capable of boosting harvests by upto 25 per cent, and covering more than a third of China’s 33 million hectares of rice paddies, has been patented by Cargill Seeds and Ring Around Inc. (a subsidiary of Occidental Petroleum). Both the companies are known to have exclusive license agreements with the Chinese government for seed development, production and marketing in specified the Chinese government and the two US companies forbade the sharing of information and materials concerning hybrid rice with other governments or with the International Rice Research Institute in the Philippines.

Since Cargill clearly wished to make a profit from its marketing, the technology—a so-called male-sterile line of rice that will not self seed—in is not being made available to the rest of Asia, where it could have made a major contribution by increasing rice production. The availability of Chinese know-how has definitely slowed down the development of hybrid rice technology for the tropics. Cargill is a party to this sinister design and needs to be shunned for its anti-farmer behaviour. What Hamilton claims, therefore, has no meaning considering the rapacious role the company has been playing with the Asian farmers.

And as if this is not enough, Hamilton promises to come out with hybrid rice seeds in another seven to eight years, for India. There is a good reason behind Hamilton’s offer. Cargill had originally expected that the hybrid rice varieties it patented would have immediate commercial value for the world’s rice markets. The varieties did not prove profitable in the northern markets and nor did the Asian countries make a beeline for the company’s headquarters in the US. What the company is now planning to market in India is not the hybrid seed we require but the seed for which there were no takers. The Chinese hybrid varieties are not suitable for India and hence there is a greater need to check the veracity of Cargill’s claims before introducing improved germplasm in the country.

Devinder Sharma is a development journalist and author of GATT and INDIA: The Politics of Agriculture. The book has since been revised and published as GATT to WTO: Road to Despair. It has also been translated into Hindi. Mr. Sharma is a former Agriculture Correspondent of the India Express. He served as a Visiting Editor to the International Rice Research Institute in the Philippines in 1976-87 and was a Visiting Fellow to the School of Development Studies at the University of East Anglia in Norwich, UK, in the later part of 1993. He is also a consultant to the World Wide Fund for Nature, India.

GOVERNMENT OF GOA

Blessed with Nature’s bounties and supported with untiring human efforts, Goa has achieved impressive success in literacy, healthcare, road transport, agriculture, industry and communications.

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PATENTING LIFE FORMS

Ashish Kothari

Imagine if you had to eat tomatoes and potatoes all summer, the subzi walla no longer able to offer bhindi, tori, karela, and yam. Boring, wouldn’t you say? Not only would our summer curries lack their traditional flavours, but it would be symptomatic of the diversity being rapidly lost in Indian agriculture. The day is not too far off when this could well be reality. As real as the pollution masks you see on the city streets today. You didn’t think it would happen, did you?

Long before preserving biodiversity became a topic for international debate, farmers were astutely aware that the roots of their agriculture lay in diverse habitats, local plant and animal communities. Yet, the institutions and individuals connected to modern farming have only just begun to realize that biodiversity is absolutely necessary for healthy agriculture, and consequently, the need to conserve biological resources of the diversity-rich South.

But what is actually happening towards the conservation of biological diversity? First, there has been the international agreement, called the Convention on Biodiversity, the spotlight of the June 1992 United Nations conference in Brazil. Signed by 64 countries by June 1994, the convention calls for several conservation strategies. However, many are still wondering whether conservation is achievable through this alone. Many other developments, such as biotechnology, and the homogenization of crop plants world-wide, will result in decreased agricultural diversity. The author of this article, focuses on another major trend surfacing in this debate: patent laws. He describes what they are and some of the social and ethical consequences if they are extended to plant and other life forms. He questions whether patents run counter to biodiversity conservation and the freedom of farmers to continue their traditional use of resources.

Increasingly, humans are playing god. Not only are the most incredible experiments on transferring genes from one species to another going on in the world’s biotechnology laboratories, but individuals and agencies are also laying ownership over entire species of organisms. Private monopolies are being claimed over even human genetic material. This then, is the crux of the increasingly bitter controversy over the patenting of life forms.

Patents belong to a larger class of legal entities called Intellectual Property Rights (IPRs). The argument, which like so many other retrograde things that originate in the West, is that just like there are property rights over land, so there should be rights over new ideas and inventions. Such IPRs would give their owners an exclusive or primary

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right to use their inventions. There are many kinds of IPRs: copyrights (e.g. on books, music tapes), trademarks (e.g. on consumer goods), patents (e.g. on industrial inventions), trade secrets, and commercial use for a specified period. Throughout their history, patents have mostly been applied on inventions (products or processes) of a technical nature which are industrially applicable.

list of living beings for whom patents and PBRs have been given, or claimed, has swollen manifold. Not only plants and micro-organisms, but also several dozen animals which have been geneti-

a relatively new one called plant breeders' rights (PBRs).

In popular debates, PBRs and patents are often confused. PBRs are given to those who breed new varieties of plants (mainly crops), which do not exist in nature, and which can be shown to have uniformity and stability in production. They give the breeder the right to exclude others from commercially marketing the varieties for a certain period of time. Under the currently accepted international convention on the subject, farmers are allowed to use and reuse these varieties without having to seek permission, and so are other breeders for research purposes.

Patents, on the other hand, do not offer any exemptions, and provide their holders with virtual monopoly over novel, and involve an inventive step. In return for getting a patent, the applicant is required to disclose information which would allow the reproduction of the invention.

Perhaps the first IPR on a living being is the 1873 patent given to Louis Pasteur for a 'yeast free from organic germs of disease, and an article of manufacture'. Subsequently, several countries started giving weak IPRs on new varieties of plants, a trend which in 1961 resulted in the International Convention for the Protection of New Varieties of Plants (UPOV).

A major breakthrough took place in 1979 when a patent claim for a genetically modified, oil-degrading bacteria was granted in USA to microbiologist Ananda Chakrabarty. Since then, the
cally tampered with (such as the famous 'once-mouse' developed by Harvard scientists) are included in this list. Ingenious ways have been found to get around the restrictions on patenting animals and plants in many countries. For instance, when Harvard's scientists appealed against the European Patent Office's rejection of their patent for the 'once-mouse', the Board of Appeals of the Patent Office judged that 'patents are grantable for animals produced by microbiological processes', and that the act bars patentability 'of certain categories of animals but not to animals as such'. The patent was subsequently granted.

Humans, too, are not being spared in the mad race for profits. Even the corporate world was shocked recently
when the American government made a patent claim on a cell line developed from the cells of Guaymi tribal woman of Panama, which had been found to be resistant to a particular disease. Typically, the groups concerned are not being informed that the tissue may eventually be used for patent claims and resultant profits.

**ETHICAL AND SOCIAL IMPLICATIONS**

With the international trend veering towards bringing more and more life forms under IPRs, and with the GATT treaty seeking global standardisation of IPR regimes, there needs to be a very serious consideration of the ethical, social, and economic implications of patenting life. First and foremost, what gives us the right to claim ownership rights over other species? Such a claim is rooted in the modern Western worldview of human beings as 'the masters and possessors of nature'. In contrast, traditional communities in India and elsewhere have viewed humans as a part of nature. IPR claims on life forms ignore the fact that even if some inventive step is involved in the genetic modification of a creature, the fundamental life processes which make that creature work are not the creation of humans.

Patent and PBR claimants also ignore the fact that the 'new' variety of plant or animal is itself often based on genetic material (including traditional crops and livestock), practices and innovations developed by farming and other traditional communities. IPR claims therefore are hypocritical, while modern breeders want the world to acknowledge their intellectual contribution and pay for the new plant/animal variety, they are themselves not willing to acknowledge or pay for the intellectual contribution of the communities from where the parent material is obtained.

Beyond these ethical considerations, there are several social and economic implications of accepting monopolistic IPRs on living beings. Perhaps the most threatened are small farmers and seed firms. At present the vast majority of seeds being used by farmers come from their own harvest, 'across the fence exchanges' with other farmers, and purchase from small seed manufacturers. The PBR regime that the Ministry of Agriculture has recently proposed, following the dictates of GATT, allows bona fide reuse and non-commercial exchange of protected seed (i.e. seed on which a PBR is granted). However, small seed manufacturers, who have been rendering the important service of reproducing and widely distributing seeds developed by research agencies and larger companies, will be badly hit by the new law, since they will have to seek permission from the breeder and pay royalties.

It is also likely that the farmers' right to reuse and exchange seed may be threatened as the role of large corporations in seed development increases. In many countries, multinational seed companies have been demanding that this right be curtailed, and indeed in a recent amendment of the UPOV Convention, this has been done. With the increasing entry of multinationals into India, encouraged by the current gov-
government, such demands will be heard here too. Nor will these be restricted to crops. In 1988, the US patent office decreed that the offspring of patented livestock would also be subject to royalty charges throughout the 17 years of patent protection. In other words, a farmer who buys a patented breed of cow, would not ‘own’ its calf! Such a regime is yet remote in India, but not an impossibility.

Indeed, worldwide trends suggest that the IPR juggernaut is now totally out of control. W.R. Grace, a giant chemical multinational, has in the 1990s been granted patents on not just new varieties of crops, but on genetically modified cotton and soybean per se. In effect, any transgenic cotton or soybean, irrespective of who develops it, will ‘belong’ to W.R. Grace! The stakes are immense: the world soybean crop has been valued at US$ 27 billion worldwide, and the company could now develop exclusive monopoly over it. W.R. Grace is now planning patent applications for transgenic maize, rice, and beans too. Recognising the damaging implications of such monopolies, the Indian government recently revoked a patent it had granted to W.R. Grace on transgenic cotton, though it is very mysterious how such a patent had been granted in the first place.

IPRson life forms must be rejected. This may sound completely unrealistic now, given the rapid pace with which the world is accepting such IPRs. But like ‘development’, IPRs are human constructs; the former is currently under serious review with regard to its environmental and social impacts, and there is no reason why the latter cannot also be reassessed.

Readers are urged to send strong letters of protest to the Government of India regarding any attempts to introduce plant breeders’ rights and patenting of micro-organisms, under the influence of GATT. Such a move will benefit only large industries, at the cost of small farmers, independent scientists, and even public sector researchers. If, despite our protests, the government does allow IPRs on life, let us support farmers and others who willfully violate such a law, much as Gandhi deliberately broke the British Salt Act. Let us heed the words of Isidro Acosta, President of the Guaymi General Congress of Panama: “I never imagined people would patent plants and animals. It’s fundamentally immoral, contrary to the Guaymi view of nature, and our place in it... that violates the integrity of life itself, and our deepest sense of morality.”

Ashish Kothari is a founding member of Kalpavriksh, a Delhi-based environmental action group. He is on the faculty of the Indian Institute of Public Administration, where he is involved in the preparation of a detailed status report on India’s biodiversity. He has keenly followed the course of the Convention on Biological Diversity, and is helping India’s Ministry of Environment and Forests in preparing both a National Action Plan and a comprehensive legislation on biodiversity.

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THE EVE VOL. III NO. 1
55
CAN LIFE BE MADE?
CAN LIFE BE OWNED?

The new Biotechnologies and Genetic Engineering

Vandana Shiva

The Seed Keepers
Burn our land
burn our dreams
pour acid on to our songs
cover with sawdust
the blood of our massacred people
muffle with your technology
the screams of all that is free,
wild and indigenous.
Denude the forests
and the earth
till no insect
no bird
no word

can find a place to hide.
Do that and more.
I do not fear your tyranny
I do not despair ever
for I guard one seed
a little live seed
that I shall safeguard
and plant again.

A Palestinian Poem

The perception that
intellectual property is only
recognisable when produced
in laboratories by men in lab
coats is fundamentally a
racist view of scientific
development.

Pat Mooney, Rural
Advancement Foundation
International (RAFI)

The land, the forests,
the rivers, the oceans,
the atmosphere have
all been colonised,
eroded and polluted.
Capital now has to look
for new colonies to
invade and exploit for
its further accumu-
lation. These new colonies are, in my
view, the interior spaces of the bodies of
women, plants and animals.

The invasion and takeover of land as
colonies was made possible through the
technology of the gunboat, the invasion
and takeover of the life of organisms as
the new colonies is being made possible
through the technology of genetic
engineering.

The ideology of fragmentation
and polarisation that expresses itself in
the demographic wars and the abortion wars
is also at work in genetic engineering.

Genes are separated from the organisms
of which they are a part and with this
reductionism, a new form of rights,
intellectual property rights in life forms
became a possibility, unleashing
new forms of power, control and
conflict.

Biotechnology, as the
handmaiden of capitalism in the post-
industrial era, makes it possible
to colonise and control that which
is autonomous, free and self-
regenerative. The re-constitution
of the seed from being a
regenerative source of life into
mere raw material goes hand in
hand with the devaluation of those
who regenerate life of the seed
through the seed, that is, farmers
and peasants of the Third World.
WHAT IS LIFE?

The capacity to self-organise
is the distinct feature of living
systems. These systems are
autonomous and self-referential. Self-
organised systems interact with their
environment, but in autonomy. The
environment only triggers the structural
changes; it does not specify or direct
them. These systems need nothing else
but reference to itself.

Living systems are also complex.
This allows for self-ordering and self-
organisation. It also allows for the
emergence of new properties. Living
systems are diverse. Their diversity
and uniqueness is maintained through
spontaneous self-organisation. Self-
healing and repair is another
characteristic of living systems deriving
directly from the above two factors.

FROM SEEDS OF THE EARTH TO
SEEDS OF THE LAB

While the Green Revolution was
based on the assumption that the earth is
 inert, the biotechnology revolution robs
the seed of its fertility and self-
regenerative capacities and colonises it
in two major ways: firstly through
technical means and secondly through
property rights. Processes like
hybridisation are the technological means which stop seed from reproducing itself. This provides capital with an eminently effective way of circumventing natural constraints on the commodification of the seed. Hybrid varieties do not produce true-to-type seed, and farmers must return to the breeder each year for new seed stock.

To use Jack Kloppenberg’s description of the seed, it is both a ‘means of production’ as well as a ‘product’. Whether they are tribals engaged in shifting cultivation or peasants practicing settled agriculture, in planting each year’s crop, farmers also reproduce the necessary element of their means of production. The seed thus presents capital with a single biological obstacle; given the appropriate conditions, it reproduces itself and multiplies. Modern plant breeding has primarily been an attempt to remove this obstacle.

The hybridisation of seed was an invasion into the seed itself. The modified seed is ecologically incomplete and ruptured at two levels:

1) It does not reproduce itself, while by definition, seed is a regenerative resource. Genetic resources are thus, through technology, transformed from a renewable to a non-renewable resource;
2) It does not produce by itself. It needs the help of other purchased inputs to produce. As the seed and chemical companies merge, the dependence on inputs will increase.

Ecologically, whether a chemical is added externally or internally, it remains an external input in the ecological cycle of the reproduction of seed. It is this shift from ecological processes of reproduction through regeneration to technological processes of non-regenerative production that underlies the drastic reduction of bio-diversity in agriculture.

The new biotechnologies make corporate seeds the basis of wealth creation. Indigenous varieties called landraces, evolved through both natural and human selection and produced by Third World farmers are ‘primitive cultivars’, those varieties created by modern plant breeders in international research centres or by transnational seed corporations are called ‘advanced’ or ‘elite’. Trevor Williams, the former Executive Secretary of the International Board for Plant Genetic Resources has argued that it ‘is not the original material which produces cash returns’. Plant breeding by farmers is not breeding; it is only when farmers’ varieties or ‘primitive’ germplasm are mixed or crossed with inbred lines in international labs by international scientists that ‘creation’ and ‘innovation‘ are seen to happen. Stephen Witt in Biotechnology and Genetic Diversity said,

‘At this point, real plant breeding begins. That is, the long, laborious, expensive and always risky process of back crossing and other means required. Only industrial production is truly creative because it produces from nothing that hides the ecological destruction that goes with it. The assumption of creation as the production of novelty is also false because no regeneration is mere repetition.

It involves diversity, while engineering produces uniformity. Regeneration is how diversity is produced and renewed, in fact.

REDUCTIONISM IN BIOLOGY

Reductionism in biology is multifaceted. At the species level, this reductionism puts value only on one species, the humans, and generates an instrumental value for all other species. Monocultures of species and biodiversity erosion is the inevitable consequence of reductionist thought when applied to forestry, agriculture and fisheries. We call this first order reductionism.

Reductionist biology is increasingly characterised by a second order reductionism - genetic reductionism - the reduction of all behaviour of biological organisms including humans to genes. Reductionist biology is also an expression of cultural reductionism, since it values all forms of knowledge and ethical systems related to living organisms that are not reductionist. This includes all non-western systems of agriculture and medicine as well as all disciplines in western biology that do not lend themselves to genetic and molecular reductionism.

THE IMPACT OF GENETIC ENGINEERING ON THE THIRD WORLD

The Third World and its hungry
people are the most common justification for rushing into genetic engineering. However, there are a number of problems in assuming that there is a causal link between the emergence of genetic engineering and the removal of Third World hunger.

The tendency of biotech research is to manipulate food quality rather than quantity. Quality is in turn determined by industry needs, rather than consumer needs. A recent analysis of genetically engineered food crops that have undergone field testing in the U.S. show that only 2% have been engineered for improved nutrition, 98% for production and processing traits useful to industry.

Since agricultural surpluses are a major problem in industrialized countries, quantity increases will exacerbate the problems of excess agricultural production. The OECD (Organisation for Economic Corporation & Development) report on Biotechnology therefore states that "It is increasingly evident that agricultural biotechnology should be directed more towards qualitative goals than quantitative production increases, and towards the development of novel industrial uses of biomass.

**ENVIRONMENTAL IMPACT: HIGHER IN REGIONS OF HIGH BIODIVERSITY**

Most agricultural applications of biotechnology have a focus on increased use of agrochemicals. The impact of these applications will be higher in the Third World because of greater native biodiversity. Most research and development in agricultural biotech is being undertaken by chemical multinationals whose immediate strategy is to increase the use of pesticides and herbicides by developing pesticide and herbicide resistant crop varieties. Twenty seven corporations are working on virtually all major food crops to develop herbicide tolerance.

For the seed-chemical multinationals, this might make commercial sense since it is cheaper to adopt the plant to the chemical than to adopt the chemical to the plant. The cost of developing a new crop variety rarely reaches US$2 million, whereas the cost of a new herbicide exceeds US$ 40 million and this investment is quickly recovered.

For the Third World, this strategy of employing more toxic chemicals on pesticide and herbicide resistant varieties is suicidal, in a literal sense. It is estimated that 400,000 to 2 million people die annually as a result of pesticide poisoning. Even when pesticides and herbicides do not kill people, they kill people's sources of livelihoods. Thousands of rural women who make their living by basket and mat making with wild reeds and grasses are losing their livelihoods because increased use of herbicides is killing the reeds and grasses.

Herbicide resistance also excludes the possibility of rotational and mixed-cropping, which are essential for a sustainable and ecologically balanced agriculture, since the other crops would be destroyed by the herbicide. *Bathua* is an important green leafy vegetable with very high nutritive value which grows as an associate of wheat. However, with intensive chemical fertilizer use, *bathua* becomes a major competitor of wheat and has been declared a 'weed' to be killed with herbicides and weedicides.

Genetic engineering can also end up creating superweeds. There is an intimate relationship between weeds and crops, especially in the tropics where weedy and cultivated varieties have genetically interacted over centuries and hybridised freely to produce new varieties. Genes for herbicide tolerance, pest resistance and stress-tolerance that genetic engineers are striving to introduce into crop plants may be transferred to neighbouring weeds as a result of naturally occurring gene transfer.

**THIRD WORLD - SUBSTITUTED PRODUCTS, DISPLACED WORKERS**

An area of application of the new biotechnologies is the substitution of biological products and agricultural commodities supplied by the Third World. This will have severe impact on the national economy and employment. Many high value plant-derived products used for pharmaceuticals, dyes, flavourings and fragrances are vulnerable to displacement as a result of current research.

Pyrethrins from India, C. America and East Africa; Cocoa butter from Africa, lauric acid (in coconut oil) from Philippines and India - are all facing substitution by 'lab production'.

When factories close in the North, compensation is given to workers. When new crops are first introduced by global agribusiness, the small peasant and agricultural worker are left to fend for themselves, as are their countries. Historically, the Third World was pushed to supply industrialized nations with raw materials and buy back their finished products. South needs to push agenda for compensation which is based on a notion of historical justice and which can be tabled before the full deployment of the new biotechnologies.

Third World agriculture will not just be affected by substitution of export products, but by concentration of agricultural production in the hands of a few multinationals.

This creation of proprietary products in agriculture is the biggest threat to Third World where agriculture is still a major source of livelihood.

Genetic engineering and biotechnology has made Third World crop biodiversity an important industrial raw material. But it is necessary to remember that long before northern industry discovered the value of biodiversity, Third World communities have known it and conserved these resources over centuries. These original contributors and custodians cannot be pushed aside now that more powerful groups have a stake in their resources.
NETWORK WITH THE EYE!

If you are an organisation wishing to give us a small write up about your work, we will be happy to publish it free of cost. They should concern the NGO/voluntary sector in any field and/or 'alternative' innovators working for the larger good of society. In case you want to be featured as a full length article, you may send us a well written article with good black and white photographs. Remember to highlight the work and not yourself! THE EYE travels quite a lot, so we invite you to ride piggy back on us.

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Indian farmers are actively voicing their opposition to many of the trends in agriculture that stem from domestic and international political, economic, and development policies. In Karnataka, farmers' organizations have come together to form the Karnataka Rajya Ryota Sangha to give strength to their ideas and create a political force. Begun in 1980, the KRRS is now in 15 of the state's 19 districts.

The KRRS has given voice to farmers' concerns throughout India. In the past several years, their mission has been directed toward preserving farmers' rights in the face of GATT and the advent of multinationals entering Indian agriculture. In October 1992, KRRS launched the Seed Satyagraha in Hospet to rally against the Dunkel Draft (of GATT). They decried what they call the piracy by corporations who, through patents, can monopolize the traditional resources and knowledge that farmers have used for centuries. Their concern especially lies with the possible curtailment of farmers' traditional ways of collecting, saving, and trading seed. Subsequent rallies were next staged in New Delhi in March and October 1993, where they were joined by representatives of farmers' organizations from Indonesia, Thailand, Philippines, Korea, Malaysia, Sri Lanka, Zimbabwe, Ethiopia, and Nicaragua.

Professor Nanjundaswamy has been at the forefront of the KRRS, and has been involved in organizing farmers since 1966. There is a tradition of farming and practising law in his family, both of whom he has done. He turned to activism after his education in order to "break the relationship of international imperialism and the vestiges of colonialism". Side by side with organising, he has been teaching at Bangalore University for the past 30 years. He has also served as a member of the Legislative Assembly.

During a visit to Delhi, we asked him about his involvement with the KRRS, especially concerning the protests against Cargill Industries and their activity in the sunflower seed sector. He also gave us his thoughts on the future of the farmers' political movement. Coupled with the political organizing of farmers, he sees a very basic need to challenge our young people to think critically about India's direction via 'development' and economic globalization. With them lies the responsibility to preserve India's diverse cultural traditions and devise alternatives to following a solely Euro-American style of life.

Q: Did you develop this idea of the Seed Satyagraha and what were you inspired by? How did you go about starting this Seed Satyagraha in Karnataka?

Prof. Nanjundaswamy: Ryoja Sangha from the beginning was started on the...
**CONVERSATION**

**Unless the farmers make a concerted effort to revive some of their traditional seeds, it will be very hard for them to turn to sustainable agriculture. We are starting our own seed banks and own methods of seed production and distribution. The only thing that’s necessary is the will power to do so.**

What is the genesis of farmers’ problems?
P.N. : It’s almost the same all over the country. All their problems are the same because the genesis of these problems is the same. The genesis is the vestiges of the imperial system both old and new. But the fact remains that the farmers’ movements in different states are in different stages of development because of diverse factors.

Q : Is the farmers’ movement becoming a strong political force, something like the Green Movement in the West? Can they find political seats as a farmers’ party?
P.N. : I think it will take some more time for it to become a strong political movement. Farmers need to experience the new regime. Ultimately, they will be forced to become a political force. So long as the present day political parties continue to behave irresponsibly and indulge in non-issues like mandir, masjid and mandal. If they continue to behave irresponsibly towards this particular issue of GATT. It’s not only that the Indian farmers will launch a Green Party comparable to any of the Green Parties in Europe, they will have to inevitably. It becomes inevitable.

Q : Getting back to the concept of satyagraha and the boycott of certain types of interference. How can young people use their consumer power and not cooperate with this outside interference?
P.N. : By telling the Indian youth how impossible it is for us to have a Euro-American model of development and a Euro-American style of life. We will have to demonstrate to them how it is impossible in a country of 800 million people. In other words, we should tell the youth that we should evolve our own model of development and our own style of life. For a radical change to be brought about among Indian youth, I think you will have to ask them first what they want and what they are dreaming about. We will have to make them realise that they are living only on dreams. For that you will have to explain to them whether such a dream can become a reality under the existing economic situation.

We will have to demonstrate to them
CONVERSATION

the disparity between India and Europe or the United States of America. This can be done using economics. There is something called the per capita tool equipment (PCTE) in a particular country, that can be calculated. Take any tool of production, such as the plough, and calculate its actual production value per capita. You can calculate the PCTE in India, the PCTE in Europe and the PCTE in the United States. The disparity between the tool of equipment in India and the tool of equipment in America is even now equal to twenty or thirty thousand with the present kind of technology. The question is whether you can, in India, build up the economy and the PCTE up to the level of the U.S. What effects will it produce on the Indian economy? Things like automation. To create full employment for Indian youth with the kind of technology the United States has is impossible. Even with the entire wealth of the United States and Europe put together is brought into India, it will not be enough. It would take not less than 200 years compared to the 5th five year plan outlay. Which means that you will need nearly 50 more five year plans for 200 years. We, the Indian socialists, have made such a calculation.

Q: Young people, when I talk to them all the time, believe MNCs are very lucrative and they will offer jobs. How would you tell the youth that these people are in fact invaders of indigenous culture? Is it not far-fetched?
P.N.: Use the actual figures connected with the economics behind the whole exercise. They think that because so-and-so’s son got a job in a multinational corporation, that all of us will be getting jobs. But that is not the fact. Not even 0.1% of the youth who are dreaming of such a career in their lives will get it. We need to convince them to develop our own model of development.

Q: The primary target of your mobilization in Karnataka was Cargill Industries. What’s the present situation with Cargill? Are they beginning to get apprehensive about similar movements stemming up all over the country?
P.N.: We tried to pull down their factory in Bellary. But they are going ahead with construction using police protection. They are not paying for the police protection. In fact, they are in arrears. Cargill is not very popular with the farmers. They are cheating farmers by grading the quality of seeds. Farmers are saying some seeds are often bad. Cargill is paying only half the price for what they produce and delaying payment. I keep getting letters from farmers almost every day asking me to get them out. But I have not done that yet. I want them to get more exposure with Cargill. And Cargill is becoming apprehensive. Otherwise the American ambassador wouldn’t have interfered. They are apprehensive especially now after our rallies in 1992 and 1993.

Q: Is the constitution biased against farmers. What central government policies hinder farmers’ rights?
P.N.: The constitution itself is not a bad document; the implementers are doing a bad job. The policies definitely hinder farmers and this is especially true for policies concerning prices and markets. The prices for agricultural goods come from a totally undisciplined market. We should have a uniform pricing method for all categories of goods. In other words, there should be scientifically calculated parity between agricultural prices and industry prices. All aspects of production costs are accounted for in industrial prices, while in agriculture, much is not considered, such as food for workers, management responsibilities, upkeep and duties by the farmer and landlord. Also, farmers’ skills are not accounted for with respect to collection, storing, and selection of crops and seed.

Q: Do you know how the methods of costing you call for will affect farmers’ economic status?
P.N.: Unfortunately, the agricultural market is not a seller’s market, it’s a

They say, whoever controls the seed controls the farmer, and whoever controls the food trade controls the nation. That is what they are trying to do.
buyer's market. There is a lot of fluctuation of prices from season to season which not only hurts the producers, but also the consumers. Most of this is political and does not reflect reality. That is why I say political players are middlemen of middlemen. Even so, if the very costs I mentioned earlier are monetized, the farmers' debt in Karnataka which is said to be 350 crores, would be paid many times over. This is the scale of the farmers' service to society for just one year and one state. From all over India, if such a donation was totalled, it would be equal to one five year plan.

Q: Could you comment on some more fundamental issues of food and its linkages to freedom and culture?

P.N.: Once patenting of seeds is allowed and multinational corporations enter the seed sector with their money power, they can patent all the available varieties, and make farmers totally dependent on patented seeds. Once seed freedom is destroyed, agricultural production can be controlled by MNC's having patented seeds. They are capable of releasing seeds which can give you 10 quintals an acre. Our science has developed to such an extent that they can release another series of seeds which will give you one quintal. This is the language of the MNC's, I am just repeating their own words. They say, whoever controls the seed controls the farmer, and whoever controls the food trade controls the nation. That is what they are trying to do.

Indian culture is not in Connaught Place, it is in the villages. When Indian agriculture is controlled, small farmers will be uprooted. Eighty percent of the people who leave their villages, come to urban areas. What culture will be left in the villages then? This is a threat to Indian culture; its heritage will soon be totally erased.

Q: In the end is there any one issue that defines the kisans' problem?

P.N.: We are still living as a colony in India. After the exit of British colonisers we have been living as subjects of the local colonialists. The biggest problem is fighting against the national colonialist, if you should use that phrase at all. That should sum up everything.

---

**Charter of Farmers' Rights**

1. **The right to land**
   Prime land should be protected for social and environmental reasons and not be acquired for non-agricultural purpose. No agricultural land should be made available to multinational corporations.

2. **The right to conserve, reproduce and modify seed and plant material**
   Third World farmers are the original donors and custodians of most genetic resources. We affirm our faith in the Indian Patents Act which exempts horticulture and agriculture from patentability. We also affirm that the right to protect biodiversity on their farms and to reproduce and modify seed freely is non-negotiable.

3. **The right to feed and save the country**
   Farmers have a right to ensure the food security of the country.

4. **The right to just agricultural prices and public support for sustainable agriculture**
   The farmers of India are not debtors and owe nothing to any of the financial institutions. There is need for scientifically calculated parity prices for agriculture according to the price index, taking 1967 as the base year. Exports do not bring the Southern peasants assured markets or incomes. Farmers also need public support to make a transition to sustainable agriculture with changes in credit and prices to reflect the real environmental costs of production.

5. **The right to information**
   Farmers have a right to be informed at every stage of any development that will affect the agricultural sector, whether the government feels that the impact will be adverse or not.

6. **The right to participatory research**
   Farmers have been the original agricultural innovators and have the right to continue this age old tradition. Democratization of research is necessary for the implementation of this right.

7. **The right to natural resources**
   Local resources have to be managed on the principle of local sovereignty, wherein the natural resources of the village belong to the village. Article 14 (17) of Agenda 21 of the United Nations Conference on Environment and Development (UNCED 1992) requires governments to ensure 'equitable access of rural people, particularly women, small farmers, landless and indigenous people to land, water and forest resources'.

8. **The right to safety and health**
   The chemicalisation of agriculture that has occurred since the Green Revolution has not been matched with a concomitant effort to protect farmer or the consumer.

*Courtesy: Navdanya*

*Photographs courtesy: Vandana Shiva*
A column inspired by a school of ancient Greek philosophers founded by Antisthenes, popularly known as the School of Cynics. THE EYE will place henceforth, amidst bundles of hope and idealism, one such cynic who will bash at...everything. We hope this column appeals to the diehard cynic who woke up in the morning, stubbed his toe and bated the world. The writer’s views (which are expressed in a rather humorous tone) are his own (although we secretly agree with most of them).

Real monuments in India today are Mother Teresa, Medha Patkar or Kiran Bedi. All are women and all heroines. Thus, while Bill Clinton invites Kiran Bedi (no cousin of Nikki Bedi’s mercifully) for breakfast, when wife Hillary and daughter Chelsea without her pet cat Socks came visiting us recently, first on the list was Mother Teresa’s orphanage. All the movers and shakers of the Capital mattered little then. But in God she did not fly in to shake hands with this lawyer from USA and be on show.

The divide in India is more between the rural and urban and less between the rich and the poor. Urban India offers a plethora of choices which rural India cannot. The divide is understandable. But why should a man in a village not mangeta Dinnies Chips if he is growing the potato that makes it? I am no Marxist but I never met a man but me who thinks it is inhuman to throw food away in hotels and party bashes. We will soon wallow in our own waste.

Talking of waste, especially that of the human kind, it can be big business, if the activities of an NGO can be an example. Funding comes from international agencies to whom the muck lying around in India must create gory images of democratic defection. This NGO has an unending supply of the raw material and he is in perennial business. I salute such original thinkers who can make gold of another shade of more malleable yellow human waste!

Another such bright chap did better by bottling Ganga water, holy as hell to Hindus, which includes me who would pay five to ten baks for this bottled gift of the Gods.

Gods greatest gift to us is us itself. It is said that after 84000 (chauras hazar yoon), forms of life, we acquire human form. Can we for God’s sake, do justice to it?

Critic, commentator, photographer. Ashish Khokar served several cultural organisations like the Sahitya Kala Parishad, Festivals of India and INTACH, before taking up writing full time. Presently, he is the dance critic for the Times of India and a columnist for the Delhi-based magazine, First City.
BUY GENUINE KHOVAR PAINTING CARDS!

These cards are painted by the tribal women of Hazaribagh, Bihar, in the same way that they paint their house walls using natural earth and broken pieces of combs. In other words, the cards are not prints of the original, but are actually made on a mud background with combs. These decorations are made in their marriage rooms called Khovar; they represent the tradition of the pre-historic rock art of the region. The designs are painted during Diwali.

Proceed from the sale of these cards will go towards supporting the promotion of this traditional art form among the tribes of Hazaribagh.

Give a set of Khovar cards as a gift! Or frame them as a series. Or simply mail it...

Price: 1 set (6 cards): Rs. 120.00
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Cheques/Demand drafts can be sent to:

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59 A, DDA Flats, Shahpurjat, New Delhi 110049.
This is an INTACH Tribal Art Project.

CHANGING TIMES...

We've mulled over this for a year now, argued, worried and brainstormed. Finally, we concluded that painful as it may be, it has to be done.

We're talking of course, about THE EYE magazine. For those of you who've been subscribers over the last one to three years, you must have realized that we are behind our bi-monthly schedule. This is largely due to two reasons. One is that a tiny team, consisting of two full-timers, one p.c. and a few helpful souls who chip in and give of their time every so often, takes on the entire gamut of activities involved - editing, research, proof-reading, subscriptions, distribution, mailing... need we say more? The second reason is finance or rather, the lack of it. A problem that most 'little' magazines battle against.

Caught in this double bind of an impossible schedule and increasing costs, we have decided that in order to stay alive and stay on time, we need to give ourselves breathing space. We have therefore, decided, with effect from this year, to become a quarterly publication.

Our new rates will be as follows:

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Readers with currently valid subscriptions for 1 year (6 issues) or 2 years (12 issues) will get all the issues due to them until their subscriptions expire.

We hope, with this change, that delays will be a thing of the past. We'd like to thank you for your support, loyalty and infinite patience. As we've said before, all odds are against us. Except you,

The spirit of DCM...

"I do not want my house to be walled in on all sides and my windows to be stuffed. I want the cultures of all lands to be blown about my house as freely as possible. But I refuse to be blown off my feet..."

Mahatma Gandhi

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THE EYE: Snapshots of our new home.
PLANTING SONG
(OSAGE)

I have made a footprint,  
a sacred one  
I have made a footprint,  
through it the blades push upward  
I have made a footprint,  
through it the blades radiate  
I have made a footprint,  
over it the blades float in the wind  
I have made a footprint,  
over it the ears lean toward one another  
I have made a footprint,  
over it the blossoms lie grey  
I have made a footprint,  
smoke arises from my house  
I have made a footprint,  
there is cheer in my house  
I have made a footprint,  
I live in the light of day

- The Osage are a Native American tribe. This is a song sung at a girl's initiation to womanhood to show her importance as a planter, cultivator, and harvester of corn.

MALAY SONG

Oh sacred padi
You the opulent,  
you the distinguished  
Our padi of highest rank  
Oh sacred padi  
Here, I am planting you  
Keep watch over your children  
Keep watch over your people  
Over the little ones,  
over the young ones  
Oh do not tire,  
do not fail in your duty

SONG OF THE THRASHER PADDY -  
(MANIPUR)

Ha Goddess
Toy Toy
Favour us with rice and wealth.
Toy Toy
Build a rock of paddy.

Pharoibi corn deity (Aanapuraa) is invoked with the above song for a good harvest. She is one of the important aspects of the Mother Goddess.

BOOK OF SONGS,
ODE 279

THE OLD TESTAMENT

Abundant is the year,  
with much millet and much rice;  
And we have our high granaries,  
With myriads, and hundreds and thousands,  
and millions  
(of measures in them);  
For spirits and sweet spirits,  
To present our ancestors,  
man and female,  
And to supply all our ceremonies.  
The blessings sent down on us  
are of every kind.

SANTAL TRIBAL SONGS

(1) In river ravine and field;  
On top of the paddy there is husked rice.  
There the geese have made their nests;  
When you cut the paddy, friends,  
Do not disturb their nests.

(2) The seeds which you planted  
In the field, father,  
These seeds,  
what kind are they?  
The rain will fall, father,  
And everything will become slushy  
Then only, daughter,  
will these seeds grow,  
And the rain which will fall  
drop by drop,  
Will take away my sleep, daughter!
PRAYER TO CALL THE SPIRITS OF THE PADI
(SARAWAK DAYAKS, MALAYSIA)

Una', woman who rules over the white padi,
Una', careful woman ruling over the padi,
each grain a bead,
old moon woman, intelligent woman,
prudent grower and thrifty keeper of the agang padi;
Sinah Une, generous woman,
who brings increase to the padi -
here is a padi field we have made.
We have completed the harvest.
Now we want to take the padi from out of our padi stores,
That is why we are calling on you two to come.
While we harvested the padi,
some of it fell on the low stumps of trees,
fell on the wide tap roots
and on the thin fibrous roots, fell on the branches,
fell on the dead leaves on the ground.
We ask you two to pick up the dropped padi
and bring it back.
Follow the path that has been cleared,
the path properly made with gulleys on either side,
follow the path that has been cleared
with the female type of grasscutter,
follow the path that has been cleared with parang knives.
Bring back the padi that has fallen aside.
Let it go into the corner,
go into the karai agong storage baskets,
go into the long gourd, go into the big round gourd,
always kept full to please you,
kept at the bottom of the storage shelf above the firewood,
go into the round gourd at the foot of the fireplace post.
Let a small amount be plenty for a long time,
so that only one padi stalk fills one small binin basket,
so that only one winnowing pan fills one big buan basket.
When we come back from pounding the padi,
we ask you two to help us pour it into the round gourds.
If we take a pinch of rice,
let it fill one small wide bahawan basket
and from there let it increase to one round gourd.
Then when we cook our rice,
one pinch of rice will fill one big ceramic cooking pot.
Then we will always be full and will always have plenty.

KSHETRAPATI (Lord of the Field)
(RIGVEDA IV. 57)

We, with the Lord of the Field as our friend and helper, obtain for our cattle and horses food in plenty,
that they may be sleek and well-fed.
May he graciously grant us his favour!

Lord of the Field, like a cow yielding milk,
pour forth for us copious rivers of sweetness,
drinking honey like nectar and pure as pure glyc.
May the Lords of the Law grant us mercy!
Sweet be the plants for us, sweet be the heavens,
sweet be the waters and the air of the sky!
May the Lord of the Field show us honey-like sweetness,
May we follow his furrow unharmed!
In contentment may men and oxen both plough,
In contentment the ploughman, cleave the furrow,
in contentment the yoke be securely attached
and the ploughman urge on his oxen!
Ploughshare and plough, to our chant be propitious!
Take of the milk you have made in heaven
and let it fall here on this earth!
Susipicuous furrow, we venerate you.
We pray you, come near us to prosper and bless
and bring us abundant harvests.
May Indra draw the furrow,
may Pusan guide well its course!
May the yield us milk in each succeeding year!
In contentment may the ploughshare turn up the sod,
in contentment the ploughman follow the oxen.
celestial rain pour down honey and water.
Ploughshare and plough, grant us joy!

Acknowledgements:
2. Song of the Thrashing Paddy: Dr. Kirri Singh, Folk Culture of Manipur.
3. Malay song: Rice in South East Asia, Cultures and Landscapes, J.M. Piper.
4. Santal songs: Compiled by Bula Imam.
5. Sarawak Dayak Prayer: The Honey Tree Song by Carol Rubenstein.

Manoj Kothari, our illustrator here, is a Mechanical Engineer from I.I.T. Bombay, now studying Design at the National Institute of Design, Ahmedabad.
For Whom
The Bell Tolls

Meenakshi Devi Bhavanani

We often request our readers to write in their own personal feature. It could be a solitude-musing, a humorous anecdote, l'affaire de coeur, an insightful experience or a long drawn out sigh. It could be sheer fantasy or frill-less, gut searing truth. That's quite a long rope, isn't it? The author of these two simple little (and rather different) pieces has taken a bite out of daily living and sent in her own observations. No recipes here, just some ingredients.

Her newly developed arrogance was irritating. There is nothing more obnoxious than someone else’s success. She never let us forget that she was the chosen one. It was she who had been selected by the Festival Committee to perform at the opening function of the State’s annual cultural extravaganza. The Governor himself was to inaugurate. Other political and official luminaries would grace the occasion. All these VIPs would be sitting in the audience to witness her Bharatanatyam performance. No wonder she was so proud.

Our friend was good, but not better than the rest of us, her fellow students at the dance academy. Her father, however, was an important bureaucrat. The criteria for merit has many facets. We girls are human. The pangs of jealousy which we felt were like the sharp arrows of Mammatha, which we showed so skillfully on stage. These arrows hurt, but we tried to be happy for her. Too much pride here, that was the rub. She spoke of nothing else for weeks... and then her new jewels and the new costume made specially for this day... the big-name musicians coming only for her.

Mere mortals that we were, we trudged our way through those monotonous days, while she floated cloud-high. And then the day came. We were all there, her fellow students sitting in the twentieth row. That’s as close as we were allowed. The first twenty rows were resplendent with the VIPs. We came at five o’clock, a whole hour early, to claim our seats. Our friend, the star of the day, had been getting ready since one o’clock. We felt her excitement in the dressing room when we went to wish her good luck.

The Governor arrived half an hour behind schedule and there was a flurry of activity caused by men in liveried white and decorated police officers with sten guns. In fact, they swarmed all over the place. The lamp had to be lit, honours done, speeches made. It was the opening night after all. Another ninety minutes... we started to worry for her. Seven hours all trussed up in her silk costume in the south Indian heat. The hall oozed with people, creating all round claustrophobia. Finally at eight, two hours late, the chairs, tables and plastic flowers were cleared away and the musicians entered in their white dignity. We started to relax as instruments getting tuned replaced the plati

Suddenly those twenty rows exploded and broke into shards. The white liveries flashed in brass, the sien gunners took up positions and the military cleared the path.

"... Whose show is it anyway...!?!"
then the main piece, the varnam. Her performance was at peak inspiration. We did wonder, a little ungraciously perhaps, whether the Governor, the Chief Minister and his cabinet in those first twenty rows, were the ambrosia she needed.

Suddenly those twenty rows exploded and broke into shreds. The white liveries flashed in brass, the tent gunners took up positions and the military cleared the path. The Governor, who sat in the middle of the front row stood up waiting to leave. We were horrified as we saw him walk out and along with him, the entire parade of dignitaries, ambulance and clattering.

It was a full ten minutes before we could see her again. She continued to dance valiantly. But what was that expression in her eyes? That *bhava* was certainly not in her repertoire of Krishna and the *nayika* which she was doing then. The lights were strong but not strong enough for her not to notice the exit of the heavy brigade.

The *rasa* she was meticulously building was shattered and her concentration lay in pieces around the stage. She could suddenly sense the unbridgeable gap between her and her audience who began to shuffle, yawn and look at their watches. What’s more, they began to leave in thin little lines, pushing chairs as they did.

She continued with the varnam, then with two padams and a *tilana*. But her hopes descended as did the curtain when it finally came down. The applause echoed hollowly in the now half empty auditorium. A great betrayal had taken place and her pride certainly went before the fall. John Donne, was it, who said, “Ask not for whom the bell tolls. It tolls for thee.” We shank out of the hall.

**Jurassic Park**

I must be one of the very few of India’s eight million people who have not seen *Jurassic Park*. Why should I spend my hard earned money? I can have that same experience, for free, everyday of my life.

Riding my sparkling Kinetic Honda through the concrete jungles of Pondicherry, I am assaulted by ferocious pre-historic sounds. Anguished squeals, mighty beats from deep-throated predators, high pitched protests from the smaller two-wheeler...the jungle’s cacophony suffocates me.

The only difference this jungle is grey and its denizens are made of steel, iron and tin. But the motivation is the same: eat or be eaten.

No hot chase by a *Tyrannosaurus Rex* could compare with the chilling thrill of a Pondicherry Public Transport bus breathing down my neck...one un-guarded moment and the monster looms skin-close behind me, squinting fire and smoke...a huge and terrifying presence. Hungry and greedy for space, its steel lips touch my bumper and give it a nudge, pushing me into line. No apologies in the jungle, only snarling. I escape from the claws of one frightening monster and find myself nearly in the clutches of another. A pre-historic lorry throttles its way up front and gleefully kisses and squirts black smoke into my ears and mouth. I am momentarily stunned and before I can be devoured, I squeeze through a small space left by a mating couple very preoccupied with their courtship ritual.

Am I safe at last? No. My finely tuned senses warn me just in time to take cognizance of the sleek racing model, which, though not carnivorous, has a gut urge for speed and tramples unsuspecting creatures that stray into its path. Years of evolution and selective conditioning have enabled both me and my vehicle to shrink in size, by as much as six inches, as a defence mechanism. In many a brush with death this singular skill has saved me.

This jungle is not lovely, dark and deep. It is more ominous than Spielberg’s world of sweet and lovable dinosaurs. This jungle is noisy, uniformly grey and hot. I think of my biology lessons in school. We were taught that dinosaurs became extinct because their brains were too small and feeble to control the enormous power and surge of their bodies. They were thus destroyed by their own power. I see the small, listless eyes of the lorry driver staring at me through his cabin window and understand the immense power and speed now available to his under-developed brain. Extinction...!

Moona Devi Bhavanani is of American origin but is now a naturalised Indian citizen. She has dedicated her life to Yoga and Bharatanatyam and is the Director of the Yoganjali Natayalam in Pondicherry. She is very active in the international yoga community and has written extensively on India and its culture. She has been the editor of the English journal, Yoga Life for the past twenty five years. She was awarded the title *Yogamani* by the then President of India, Shri Zail Singh at the World Yoga Conference held in 1986.
Panchatantra

It is said that an ounce of sense contained in the Panchatantra is better than a ton of scholarship. Most of us are familiar with it from our childhood as ‘once-upon-a-time’ stories and have read them in abridged forms or in comics. Rarely have we encountered a literal translation in verse form. Indeed, these wise verses, often epigrammatic in style, go to make the real character of the Panchatantra. The stories are charming when regarded as pure narrative, but it is the beauty, wisdom and wit of the verses which lift the Panchatantra above the best story books.

The Panchatantra is a ‘niti shastra’ or textbook of ‘niti’. The word ‘niti’ roughly means the ‘wise conduct of life’. It is witty, mischievous and profoundly sane. The word, ‘Panchatantra’ means, the ‘Five Books’, the ‘Pentateuch’. Each of the five books are independent, consisting of a framing story with numerous, inserted stories, told by one or another of the characters of the main narrative. The device of the framing story is familiar in oriental works, as in the Arabian Nights. The large majority of the actors are animals, who have, of course, a fairly constant character. Thus, the lion is strong, but dull of wit, the jackal, crafty, the heron stupid, the cat, a hypocrite. The animal actors present far more vividly and shrewdly, undeceived and free of all sentimentality, a view, that piercing the humbug of every false ideal, reveals with incomparable wit, the sources of lasting joy. And this is how it happened...

I

In the southern country is a city called Maiden’s Delight. There lived a king named Immortal Power. He was familiar with all the works dealing with the wise conduct of life. His feet were made dazzling by the tangle of rays of light from jewels in the diadems of mighty kings who knelt before him. He had reached the far shore of all the arts that embellish life. This king had three sons. Their names were Rich-Power, Fierce-Power and Endless-Power and they were supreme block-heads.

Now when the king perceived that they were hostile to education, he summoned his counsellors and said: “Gentlemen, it is known to you that these sons of mine, being hostile to education, are lacking in discernment. So when I behold them, my kingdom brings me no happiness, though all external thorns are drawn. For there is wisdom in the proverb:

Of sons unborn, or dead, or fools,
Unborn or dead will do.
They cause a little grief, no doubt;
But fools, a long life through.

and again:

To what good purpose can a cow
That brings no calf nor milk be kept?
Or why beget a son who proves
A dance and disobedient?

Some means must therefore be devised to awaken their intelligence.”

And they, one after another, replied, “O King, first one learns grammar, in twelve years. If this subject has somehow been mastered, then one masters the books on religion and practical life. Then the intelligence awakens.”

But one of their number, a counsellor named Keen said: “O King, the duration of life is limited, and the verbal sciences require much time for mastery. Therefore let some kind of epitome be devised to wake their intelligence. There is a proverb that says:

Since verbal sciences have no final end,
Since life is short, and obstacles impend,
Let central facts be picked and firmly fixed.
As swans extract the milk with water mixed.

“Now, there is a Brahmin here named Vishnusharman, with a reputation for competence in numerous
THE STORY OF THE LAST EPISODE...

Victor the Jackal sought to further his case against Lively the Bull. Warning his master Rusty the Lion against the danger of employing strange, new servants, he related the tale of Fierce-Howl. This famished jackal wandered into the city one day. The city dogs snarled at him so dreadfully that he ran into a dyer’s house and fell into a vat of indigo. Later, he crawled out and escaped to the forest. Here, all the animals were terrified at his exotic, blue form. Fierce-Howl, seeing an opportunity in this, told them he had been anointed as their new leader by the god Indra. All the animals paid obeisance to each of them, he appointed duties, but to his brethren, the jackals, he gave a cuffing and drove them off.

Helmetthus in regal glory, served by the jungle’s denizens. Until one day, when a pack of jackals went by, howling. Forgetting all, he leaped up with tears of joy and howled piercingly. The other animals were outraged—this ‘leader’ was a mere jackal! They fell upon him and tore him to pieces.

Having planted the seed of doubt in Rusty’s mind, Victor went to visit Lively. Here, he told Lively that Rusty was planning the latter’s death. Rusty, he said, was whimsical like all kings and had taken a sudden dislike to his former companion. Lively fell for Victor’s lies and became deceived. He took the blame upon himself for making advances to a false friend.

Harsh talk, untimely action, False friends— are worse than vains. The swan in lies sleeping. Was by the arrow slain.

And to illustrate his words, Lively told Victor the story of:

PASSION AND THE OWL

PASSION AND THE OWL

Within a certain forest was a broad expanse of lake. There lived a king-swan named Passion, who spent his days in a great variety of pastimes. One day death, fatal death, visited him in the person of an owl. And the swan said: “This is a lonely wood. Where do you come from?” The owl replied: “I came because I heard of your virtues. Furthermore,

The clouds were bare that Vishnu’s hand Has purified.
For contact with the righteous lends
A noble pride.”

After this address, the swan gave his assent, in the words: “My excellent friend, dwell with me as you like by this broad lake in this pleasant wood.” So their time was spent in friendly diversions.

But one day the owl said: “I am going to my own home, which is called Lotus Grove. If you set any value on me and feel any affection, you must not fail to pay a visit to my guest.” With these words he went home.

Now as time passed, the swan reflected: “I have grown old, living in this spot, and I do not know a single other region. So now I will go to visit my dear

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discovered him, there was the poor creature crouching in an ugly hole, for he was blind in the daytime. But Passion called: "My dear fellow, come out! I am your dear friend the swan, come to pay you a visit."

And the owl replied: "I do not stir by day. You and I will meet when the sun has set."

So the swan waited a long time, met the owl at night, and after giving the conventional information about his health, being wearied by his journey, he went to sleep on the spot.

Now it happened that a large commercial caravan had encamped at that very lake. At dawn the leader rose and had the signal of departure given by conch. This the owl answered with a loud, harsh hoot, then dived into a hole in the river-bank. But the swan did not stir. Now the evil omen so disturbed the leader's spirit that he gave orders to a certain archer who could aim by sound. This archer strung his powerful bow, drew an arrow as far as his ear, and killed the swan, who was resting near the owl's nest.

"And that is why I say:

\begin{quote}
Harsh talk
untimely action...
\end{quote}

and the rest of it."

And Lively continued: "Why, our master Rusty was all honey at first, but at the last his purpose turns to poison. Ah, yes! He compliments you to your face:

\begin{quote}
His whispered slanders never stop:
Avoid a friend like that. He is
A poison-jug with cream on top.
\end{quote}

"Yes, I have learned by experience the truth of the well-known verse:

\begin{quote}
He lifts his hands to see you standing there:
His eyes grow moist; he offers half his chair;
He hugs you warmly to his eager breast;
In kindly talk and question finds no rest;
His skill is wondrous in deceptive tricks;
Honey without, within the poison sticks;
\end{quote}
What play is this, what strange
   dramatic turn,
That every villain, like an actor,
   bears?

At first roguish, friendship glitters
   bright;
With service, flattery, delight
   Thence, in its middle journey: short
Gay flowers of speech that fail to fruit;
   Its final goal is treason, shame
Disgust, and slanders that defame:
   Alas! Who made the cursed things?
   Its one foul purpose is to sting.

And again:
They bow abjectly, leap to greet
   You with their speech seductive—sweet;
Pursue and hug you day by day;
   Of deep devotion make display,
All praise your virtue, never one
   Finds time to do what should be
done.

"Woe is me! How can I, a creature
   herbivorous, consort with this lion
who devours raw flesh? There is wisdom in
   the saying:

Where wealth is very much the same,
   And similar the family fame,
Marriage or friendship is secure:
   But not between the rich and poor.

And there is a proverb:
The sun, already setting, shows
   His final flaming power
And still the honey-thirsty bee
   Explores the lotus-flower,
Forgets that it will prove a trap
   That shuts at set of sun
Ambition, thirsting for reward,
   Is blind to dangers run.

Abandoning the lotus-bloom
   With all its sweet content,
The jasmine’s natural perfume
   And luxury of scent,
The water-bees seek toilsome food
   On ichor-sipping bent:
So men reject the easy good
   In rogues or confidants.

The bees that, too adventurous,
   A novel honey seek
In springtime ichor glistening on
   The honey-greedy bee—poor fool!—
Deserts the flowing lotus-pool
Where danger is not found, to sip
The springtime ichor-rills that drip
   From elephant foreheads; does not
fear
The flapping of that monstrous ear.
So, by his nature, greedy man
Forgets the issue of his plan

“Yes, by entering a vulgarian’s
   sphere of power, I have certainly for-
feited my life. As the proverb says.

All who live upon their wits,
Many learned, too, are mean.
Do the wrong as quick as right
   Illustration may be seen
In the well-known tale that features
Camel crow; and other creatures

“How was that?” asked Victor, And
Lively told the story of
UGLY’S TRUST ABUSED.
(To be continued...)

In 1924, Arthur W Ryder, the
well known American oriental
scholar translated the
Panchatantra from Sanskrit to
English. It is one of the best of
existing translations in any for-
ign language. The text here
translated, dates back from the
year 1199 A.D. We are happy to
serialise and present the
Panchatantra interspersing
verse and prose as translated by
Ryder and published by Jaco

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THE EYE VOL II NO 1
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Story-Writing Competition

In our last issue Vol II, No. 6, we had announced a story writing competition based on the illustration by Premola Ghosh. This is our best entry, a poem by Jyoti Raghavan. Congratulations!

And they came to the village ....

Circa 1990 and odd
The rural landwagon brought them all
And they came to the village
to narrate
In mocking, cynical and witty ways
Their beastly tales imposed by urban days.

From the jungle to the urban zoo
These Orwellian protagonists had much to rue
The city had robbed them of delight
And brought absurdity to their lives
Entrapped in cages, in circuses and zoos
Their life amidst concrete was none too bright
A hapless and a sorry plight.

And now they came to the village
In sahib and munchahib style
To search for the elusive Malgudi of Narayan’s dreams
For the Swamys and Painters of signs
But why this journey back to the roots?
Or should we say, grassroots?
Ethnic is chic - its the urban pastime
Can we jungle beasts be left far behind?

Oh Bengalis, Rays, Adivos unite
For we are journeying through your slice of life
Of mud and thatch, poverty and plight
Which the elite feast on and simply delight.
For the gist of their seminars at the IIC
Needs sylvan aromas to bring dollars for more such jamborees.

Behold! there are still leaves on trees
The Sunderial Batangunas would chipko to these
Pollution still seems a far cry
But our urban cavalcade would fill the skies
For when we leave these rural settings
Our urban imprint would of course be
Smog-filled dressings.

So through those in-tech urban accessories
The Konika, Cannon, Kodak gadjetties
We search for the roots of our civilisation
In these primeval rural fortifications
Its our Discovery of India, not of the Nehruvian kind
But only that of the pretentious, modern mind
For we have to keep up with today’s jholah-wallah Joneses
Of being avant-garde in all our approaches.

Development is far from sight
Liberalisation is yet to push forth its might
The village ambience still remains
Untarnished, pristine and innocent, far from stained
For the urban demi-Gods are yet to conquer
But when they do - they will wreak disaster.

Our jungle days were hale and hearty
Much like the village - far from anarchy
Survival of the fittest was the credo
But that challenge was better than zero
In urban lingo this is all gibberish
But is it that what urbanites accomplish.

And now to the finale of our journey
We came, we saw, but could not conquer
We waited for a Godot but he never came
Absurdity of existence
That’s the name of the game
Time for us to retire
To the din and noise of urban decay
Our excursion into rural discovery
A mere exercise in artless prosody.

Jyoti Raghavan
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New Delhi - 110017
MONOGRAPHS ON VRKSHAYURVEDA

K. VIJAYALAKSHMI
SHYAM SUNDAR
P. RAM MANOHAR

Published by
Lok Swasthya Parampara
Samvardhan Samiti

Price Rs. 30/- per monograph.

Rajpreet Singh

• An Introduction to Indian Plant Science
• Plant Propagation Techniques
• Pest Control and Disease Management
• Nomenclature and Taxonomy

Lok Swasthya Parampara Samvardhan Samiti is a network of individuals, groups and organisations committed to the cause of the revitalisation of indigenous systems of health care. Their major objective is to reconstruct Lok Swasthya Parampara and restore the role of these in the self reliant model of public health care in Indian society.

Amongst other means employed to this end, they design, disseminate and promote preparation of science and education materials on indigenous health sciences. After a series of eight monographs on Lok Swasthya Parampara they have brought out four monographs on Vrksayurveda. Two on Mrgayurveda are to be produced.

Vrksayurveda is the term employed to denote a body of knowledge in ancient Indian texts that dwell on the study of plants. The word itself is also the title of a book by Surapala. The introduction of the first volume briefly explains how important plants have been in Indian life, the understanding of plant life in earlier times and the documentation of this knowledge. Morphology, anatomy and physiology of digestion (assimilation) of the water (watery food materials) which is absorbed through the roots of the trees (and conveyed to the leaves). And it is on account of the assimilation of this watery solution that the plants undergo development and become graceful. The circulation of (water) in trees is caused by adrishtam (adrishti means unknown, stands for unknown cause, or unexplained nature). Soil classification, tests for productivity and suitability of soil for certain crops are discussed in the next chapter. The remaining chapters are all discussed more clearly in the ensuing monographs. A brief outline follows.

Plant propagation and its several methods that are highlighted in ancient texts like the Rigveda and Arthashastra are the focus of chapter four. Methods and rule for seed collection, storage and sowing are discussed.

Plant Classification and Nomenclature are the topics of the next two chapters. Examples of classification under two different principles, botanical and medicinal are given. Manu, Charaka, Susrutha and Amara provided classifications under the first principle and Charaka and Susrutha under the second. In the chapter on Nomenclature along with the Sanskrit names, their meanings are given for all examples. To anyone with a knowledge of some Indian language most of the names immediately convey some information about the plant.

Plant well being through nutrition, how to enhance certain plant growth processes by special preparations, rules for watering and preparation of kunapajada (artificial liquid manure) are covered in the chapter on plant nutrition. Preparations for treatment of pests and disease management are detailed for a few problems. In the same chapter, on pest and disease management, the concept of Vrksayurveda as plant medicine, is also briefly described. The basic concepts are the same as that of Ayurveda. The Ayurvedic concepts that are outlined for the reader in Appendix I helps link the two. The appendices on resource materials, plant names and the resource books on Vrksayurveda are useful additions.

The second monograph, that on Plant Propagation, deals with vegetative plant propagation, seed collection, storage, preservation and sowing. Rules for all these steps are given with some explanation. Time for sowing and preparing land for planting are two which receive special attention. Methods to promote seed germination in general and some for selected species are given. The preparation of seed beds, rules for sowing and watering and the rituals associated with these events are described. Due to the importance of rice as a staple in the diet, two chapters are devoted to giving details of the steps involved in its cultivation and the
genetic diversity of rice harboured by Indian farmers. Classification of rice according to season and soil and their resultant culinary and digestive traits are mentioned. Two of the chapters have informative and interesting sections on folk sayings to do with agriculture.

The volume on Nomenclature and Taxonomy, besides being a more comprehensive version of the chapters in the first volume that deal with the same topics also reads better and thus the understanding one gains is far more complete. The first chapter deals with source materials. The continuity in time, ancient to present, of this aspect of Vrikshayurveda is shown, as are the links between the periods. Regional nomenclature, its contribution and correlation to the more formal Sanskrit based shastric systems is dealt with in a separate chapter. The chapter on shastric nomenclature is long and well worth reading. It talks of the origins of the system and the criteria for creating names. Each plant is referred to by many names, each name being indicative of a particular feature or attribute. However, each plant was formally identified only by a unique set of selected names. Names given are based on various criteria - morphology, place of origin, properties of plants, pharmacological action and mythology being some of them. The problems of the system and suggestions to resolve it are also written about. At the end, the descriptions of a few plants according to the nomenclatural system are shown. Names according to svāra (morphological and soil related) and guna (properties of the plants are given. The beauty of the names used and the accuracy of the resulting description testify to the thought that has gone into the system. The taxonomy is dealt with in the last chapter. Ten different systems, falling into eight categories, are explained. The eight categories are botanical, (namely vanaspafi, vriksha, viruddh, vishadhi), panchabhautic, tridoshis, rasa, vayu, aap, natural, therapeutic and dietetic. The systems are well explained and suitable examples given.

To keep plants free of disease and cure infections when they occur, is an important part of farming. The fourth monograph deals with this topic. The authors explain the conceptual treatment of disease according to Vrikshayurveda. Like Ayurveda, the analyses of plant function and composition are conceptualised in terms of pancha mahabhoota siddhanta and tridosh vichara. Diseases are treated as being endogenous and exogenous to the plant. The endogenous ones are those symptoms arising from a disequilibrium in the doshas while the exogenous ones are due to worms, parasites, insects, fire etc. The symptoms and disease treatment for each type are dealt with in the second and the third chapters. For each treatment, the rationale is explained in terms of Vrikshayurveda’s principles. The longest chapter is on farmers’ practices to control pests. The methods used are divided into five types - botanical, mechanical, agronomic, biological, those based on animal products and others. The information contained is very interesting as it presents simple low cost methods that could easily replace expensive pesticide use. Methods to control pests from spring to autumn are detailed. These practices in many cases are based on Vrikshayurvedic principles and in other cases represent farmers innovations. Plant nutrition is dealt with in the last chapter and besides the general preparations for healthy plant growth, specific preparations are given for manco, pomegranate, plantain, grapes, plums and others. The appendices on drugs, plant names and Ayurvedic principles provide useful supplementary information.

The series of four provides information in an easily understood form on a topic that needs a lot of dissemination. Additionally, the information is in an area much discussed but in which the ‘nuts and bolts’ are not well documented. Usually one comes across information of this nature in scattered bits. Condensing it all into four monographs could not have been an easy task. The organisation deserves to be commended for this work. Keeping all this in mind the series would have gained more by better editing. As such I would suggest that LSPPS considers producing a re-edited version of volume one which contains the widest range of topics covered.

PIONEERS OF CHANGE

EXPERIMENTS IN CREATING A HUMANINE SOCIETY

JEREMY SEABROOK

ZED BOOKS LTD., 57 CALEDONIAN ROAD, LONDON N1 9BU

Published by
New Society Publishers

Poonima Narayanan

When Jakob von Uexkull - translator, journalist, philatelic and idealist - approached the Nobel Foundation in the late seventies to set up a prize for environment, his offer drew a blank. Undeterred, he sold his Middle East stamp collection to a museum in Saudi Arabia for US$100,000 and set up the Right Livelihood Foundation. The award, in recognition of pioneering efforts in the fields of peace, sustainable development, environmental integrity and human rights is better known as the Alternative Nobel Prize.

The Foundation has recognised over forty individuals or groups from fifty countries - activists, researchers, social workers, who through their work, prove that there are simple, practical alternatives to current, mainstream thought which continues to accept Western patterns of development as the norm, while blindly ignoring the enormous human, social and environmental costs that have had to be incurred by the West in following such systems of ‘development’. This book is about the work of the Right Livelihood Award winners and their vision of a more humane future.

Jeremy Seabrook, who has interacted personally with many of these individuals, speaks optimistically in his introduction of the emergence of a new worldview that ‘makes visible all that
has been suppressed...in the existing ideology...focusses on the empowerment of those whose work has been traditionally devalued (farmers, women) and concerns itself with the maintenance of real, living diversity at every level.' He has featured the work of some of the Award winners under these broad concepts.

While the stories of the Right Livelihood Award winners are absorbing in themselves, the readability of this book is due, in no small measure to Jeremy Seabrook's journalistic talents, not to mention his own passionate conviction of the need for alternatives. One has the feeling of watching a well-made documentary film, where the thoughts and achievements of the characters are highlighted and given a broader dimension by the filmmaker's sensitive, insightful commentary.

Protecting Diversity is the theme of the first, and perhaps, the most fascinating chapter. Cary Fowler and Pat Mooney of RAfil (Rural Advancement Fund International), USA, research the socio-economic impact of new technologies on rural societies, and have been responsible for proposing a compensation mechanism for the Third World and a conservation mechanism for genetic material - 'farmers rights to balance `plant breeders' rights.' In the area of biodiversity, the author documents the work of Survival International, an 8,000-member organisation working in sixty countries to protect a different awareness of tribal peoples as members of complex and viable societies rather than 'objects of study, the exotic showpieces of tourism or potential converts to another religion.' Bill Mollison, who grew up with Aborigines in a remote Tasmanian port is the originator of permaculture, a system that brings together agriculture, architecture, and ecology with modern money management and legal systems for communities. Yet another way of defending the cause of diversity is in the vital area of human rights. Theo van Boven, Director of the UN Division of Human Rights (1977-1982) redefined the concept of human rights to include people's right to development. While Dr. Inge Kemp Genelke set up Amnesty International's first medical group in Denmark to conduct investigations into torture and its impact on victims.

Making Visible, the objective of the next chapter 'involves making visible the value and beauty of marginalised cultures. It means making visible the...

...just as the shining imagery of the West is projected across the world, detached from the human, social and environmental costs it involves, so, in exchange, what comes back to the West are the scenes of desolation...of the South, shorn of any of the humanising influences of community and custom...the noses of the poor press constantly against the windows of the TV screens of the West. It is extraordinary how images can serve to block perception: and the creativity and hopefulness of the poor remain invisible to the troubled, though largely unresponsive rich.'

The unseen connections between 'growing city and degraded rural hinterland' are graphically and movingly traced as the background to the birth and achievements of the Chipko Movement - Right Livelihood Award Winner 1987. The other Award winner featured under Defending the Biosphere is Helena Norberg-Hodge who set up the Ladakh Project in 1978 to counter the destructive forces set in motion by Western influences and to 'make visible...the strengths and values that humanity needs from traditional, renewable ways of living.'

In Counting the Real Costs: The Western Model, Mirages and Miracles the author critiques the much touted economic success of the Pacific rim countries of Taiwan, Korea and Singapore - particularly relevant reading for us in India in the era of liberalisation. Walden Bello of Food First, another Award winning project says their rapid development is inappropriate and cannot be repeated. The way out for other Third World countries is to evolve fresh, `radical models of growth' and strike a sane balance, rather than getting swamped into an endless debate over development versus environment.

While the present world system holds out the lure of purchasing power to all who would comply with its demands, the notion of `popular empowerment', another important aspect of the alternate worldview, goes far beyond to mean a dynamic and continuous engagement of people in the shape and direction of
their society in such ways that they can feel and experience their influence upon it.' For individuals to become so empowered, many changes need to happen. Leopold Kohr, originator of ‘small is beautiful’ believes that small communities, rather than a global market will inculcate a desire among people for greater local involvement. Mike Cooley, author of the book, Architect of Bee: The Human Price of Technology says that the prevalent, blind faith in the power of technology has led to people losing faith in the value of their own skills and creativity - an inevitable consequence of highly centralised production processes. Cooley works with many institutions and groups to develop ‘ecologically and socially desirable products.’

The title of the last chapter is self-explanatory - Towards A New Paradigm. This is about methodologies that are evolving in worldwide initiatives for alternate economic and political systems - the Green Movement, regeneration of small and medium-sized i.e human scale, communities, the taming of unbridled consumerism and the post-Cold War restructuring of Central and Eastern Europe. There is a postscript on the Earth Summit at Rio in 1992, when it seemed, for a fleeting moment, that the world’s leaders had finally accepted the need for a ‘profound, radical change in the way we measure wealth, development and well-being’. That moment has passed. And while it is now back to business as usual for most countries, the projects and efforts of these pioneers of change remain, not so much voices in the wilderness, but as ideas whose time will come, sooner than later.

For those who wish to make contact with the Right Livelihood Award winners and projects, there is a helpful list of addresses at the end of the book.

While there is some overlapping, inevitable maybe, this is, finally, a fascinating book, fairly bursting with new visions and ideas (too many, perhaps!!) Above all there is a sense of hope and direction, grounded in the living examples of these very real heroes.

CONSERVING LIFE
IMPLICATIONS OF THE BIODIVERSITY CONVENTION FOR INDIA
ASHISH KOTHARI
Published by Kalpavriksh, New Delhi
Price Rs. 50/-

Sharon LaPalme

KALPAVRIKSH
1994

Every issue at the forefront of national or international debate does not come without a deluge of techno-speak and confusing, vague concepts. Biodiversity conservation is no exception. You trip over terms like ex-situ, in-situ and germplasm, stumble on PBR’s and IPR’s, and scratch your head over a concept like ‘common global heritage’. Rather than get confused, read Ashish Kothari’s well written book. The Convention of Biological Diversity, the result of four years of debate by United Nation members, is now international law with far-reaching provisions on the scientific as well as political factors involved with biodiversity conservation. Ashish begins with a well-organised overview to present some of the main issues prompting the international concern over biodiversity, the extension of patent laws to plants and animals; how to award informal innovations in biodiversity use (i.e. by farmers, fisherfolk, traditional healers, artisans, and women); and the story of one Himalayan village successfully regenerating forest land and traditional crops and cropping methods. Throughout these chapters, he constructs how conservation must be linked to greater resource control by local communities, the revival of traditional systems, and the involvement of people in all levels of decision-making. Besides just informing, Ashish proposes an outline for a regional biodiversity pact among Asian nations that would address many of the concerns specific to Third World countries. Readers will also find a list of other Indian individuals and organisations who are involved with the Biodiversity Convention. A must for any concerned citizen.