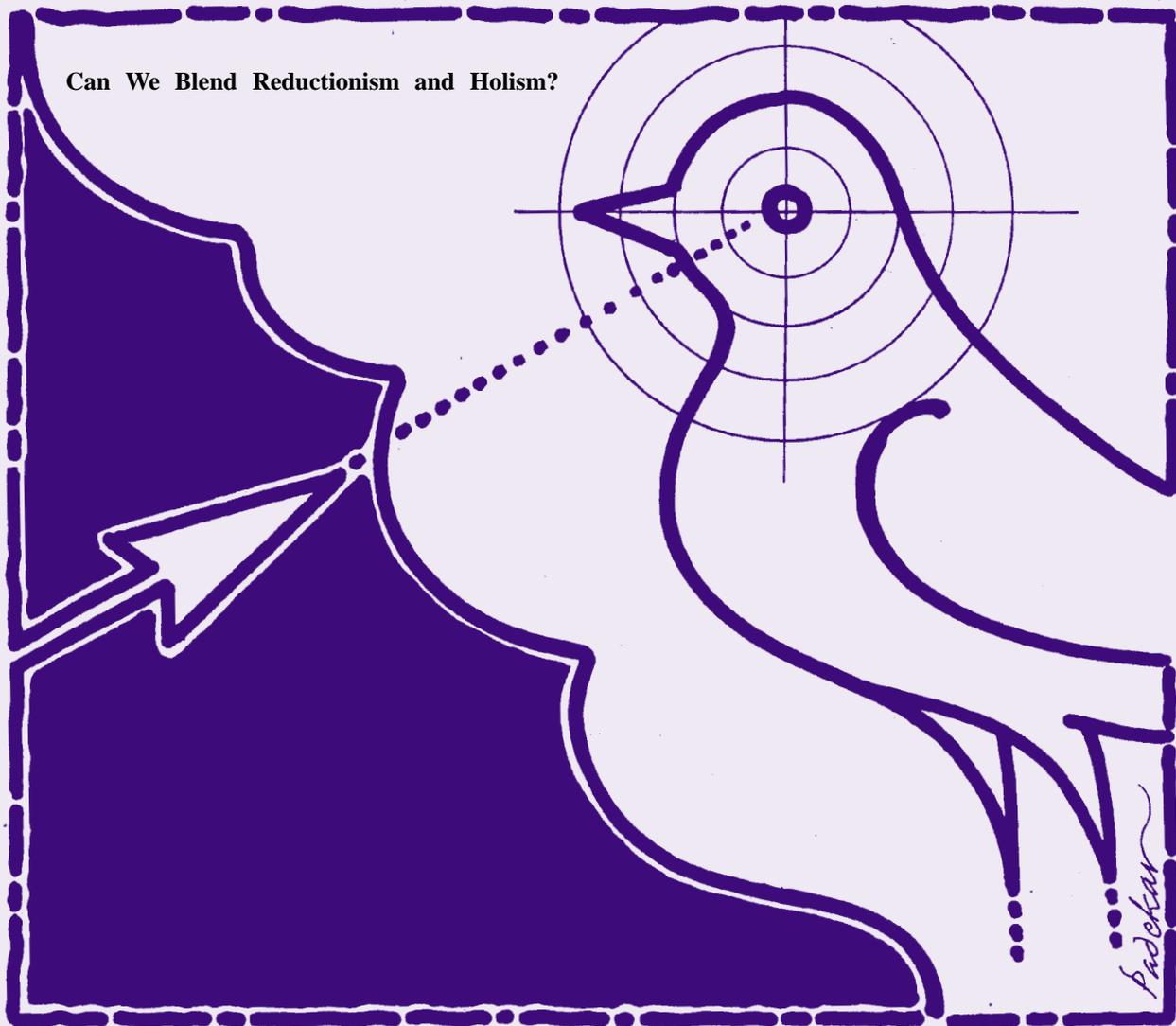


Honey Bee

Vol 7 No 1 January-March, 1996
(New Series Vol 2 No 1)

Can We Blend Reductionism and Holism?



**A Voice of
Creative Farmers, Artisans, Pastoralists
and Other Grassroots Innovators**

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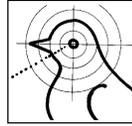
Honey Bee stands for

(a) People to people networking in local language, like cross pollination by bees, and

(b) Assurance to providers of knowledge that they would not be impoverished because of sharing the knowledge, just as flowers do not complain when pollen is taken away.

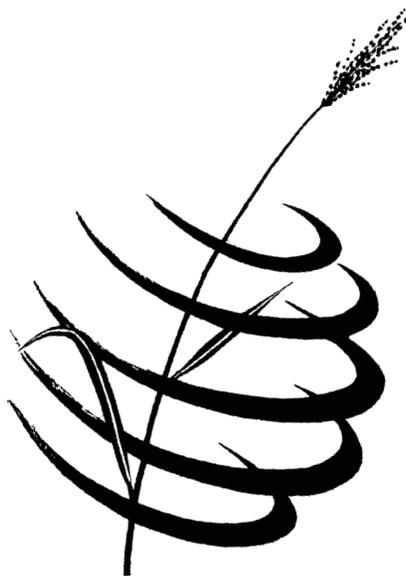
Cover Story

Eye of the Bird: Is Specialization Possible without Reduction?



In ancient India, there was a famous Guru (teacher) called Dronacharya. He taught princes and kings the art of archery at his ashram, a school situated deep in the forests. The five sons of King Pandu were his choicest students. One day, he decided to test the skills of the five brothers. He hung a model of a bird on a branch and asked each of them, one by one, to take aim at the bird and tell him what they saw. The eldest brother, Yudhishtar, said that he saw the entire cosmos of which the earth was a part, then a tree which was a part of the earth, and finally a bird hung on the branch of the tree. Dronacharya asked him to sit down. The next brother saw the earth, tree, branch and the bird. The Guru told him to sit down. Then came the turn of Dronacharya's favourite student Arjun, the hero of the Bhagwad Gita, a part of the ancient epic poem, Mahabharat. Arjun could see only the eye of the bird, and nothing but the eye. He became the best archer of his time, surpassed only by the tribal, Ekalavya, who was not admitted by Dronacharya to the ashram since he was a commoner.

Seeing just the eye of the bird reflects an extreme reductionist attitude just as seeing the whole cosmos shows a holistic perspective. We need both perspectives, the reductionist as well as holistic, and not just the holistic one, as many environmentalists claim. Any theory building requires drawing boundaries in order to 'reduce' the phenomena being studied. On the other hand, we need a holistic view so that the inter-connections between the different parts of nature can be seen. Sustainability requires balancing these two ends of the spectrum.



*Proposed Logo for SRISTI:
Comments are welcome!*

A Sufi Tale

*O Mountain! High and
mighty reaching into the skies*

*How you seem absorbed in
self regarding.*

*Although only a small bird;
yet I am free*

*To dance on a flowerhead,
while your feet are in chains*

Source: Quatrains (Persian) Baghdad: Al-Maarif Prer 1975: 52/3, in Idris Shah, 1978, **Learning How to Learn**, London: Penguin Books.

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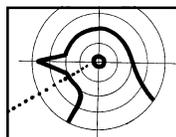
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Editorial



In Defense of Optimal Reductionism!: Science, Sustainability and Society

Scientific pursuits in different disciplines have at least one common goal and that is to uncover the order existing in nature. If nature behaved erratically, would conditions of generalizability, replicability and refutability hold? This pursuit has guided the inquiry and search for patterns among all communities of the world and at all times. The pace, pattern, and process of inquiry has varied in north and south and in the pre-industrial revolution period and afterwards.

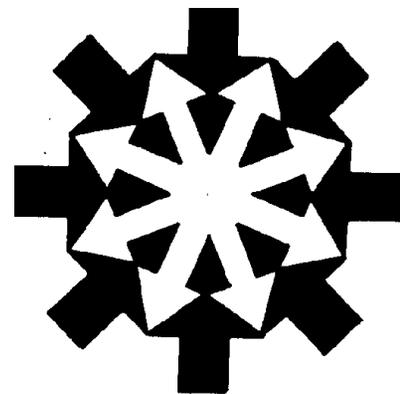
Models of how nature works were, at times, so 'comprehensive' that the individuals or groups concerned did not even try to change anything drastically, lest the ripple effect create chaos. K M Munshi (*Gospel of Dirty Hand, 1952*) pointed out the difference between communities which 'progressed' and which did not. Some communities were overawed by nature. They retreated more and more into adjusting to the constraints imposed by the natural order. So much so, that many of these tribes vanished or became totally isolated from the rest of society. Others tried to overpower nature such that the basic balance itself was violated. Those civilizations also vanished or introgressed. The challenge thus is to recognize how much disturbance nature will accommodate without losing the very basis of life and its continuity.

One way this challenge has been understood is through the struggle between reductionism and holism. If we try to understand the secrets of nature by breaking a system into its parts and assuming that other parts (not being studied at a time) are not changing i.e. are constant, then we have used a reductionist approach. It is obvious that other things do not remain really constant and yet the degree of change in one parameter can be shown to be related to another. Theories can thus be built only through reduction.

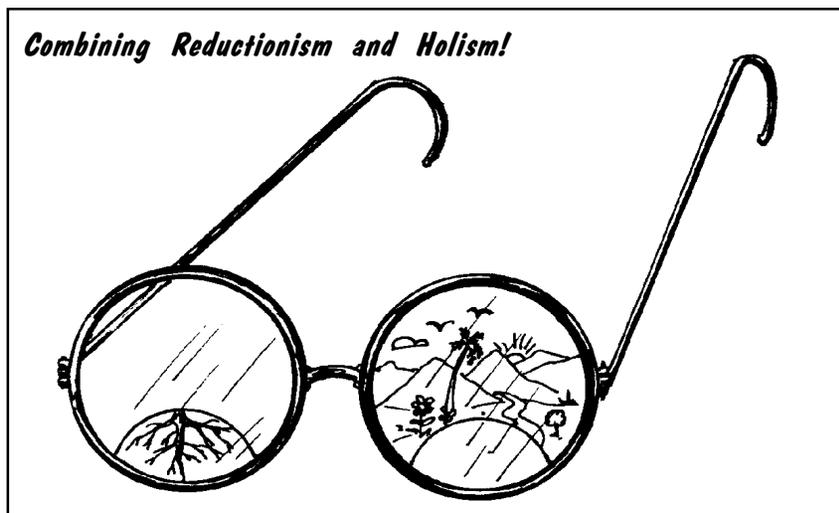
If everything was related to everything else and all causal connections had to be studied at the same time, no causal statement can ever be made.

If system-wide effects of any change are not studied and monitored properly, it is unlikely that we would be able to make the systems sustainable. That is the reason why many of the ill effects of our actions are understood only when the problems become very serious. Global warming and the ozone hole are two such examples. If we do not follow a holistic approach, more and more such problems will become apparent and life will perhaps not continue at all!

How do we balance the reductionist approach with Holism? The cover story shows that specialization is not possible without reduction. Every society has produced specialists of various kinds at all times in history. We would not witness the Taj Mahal, Ashoka Pillar or location specific agricultural implements etc.,



Combining Reductionism and Holism!



if there was no attempt by anyone to specialize. Reductionism also helps in targeting. One can develop a drug that affects only a particular part of the body. The smart drugs can go inside the body and perform an action at the exact site of disorder and not just in the right organ. The holistic medicine on the other hand tries to make the system itself robust and able to correct the disorder slowly and steadily. Both the approaches have limitations.

The Honey Bee approach recognizes that without blending the holistic and reductionist perspective, we cannot generate sustainable solutions that are productive, efficient and durable. Thus, soil fertility will have to be

restored when high levels of production impair or deplete it. Pests will have to be controlled when we disturb the traditional cropping systems and new crop varieties or animal breeds are introduced in a region. Even in the traditional systems, pest problems can arise and cause excessive damage if no control is attempted. However, while doing so, we have to recognize that all the micro and macro nutrients have to be combined in the right proportion along with organic matter to make the system healthy. Soil health is in fact supposed to be linked with plant health. Further, the pest-predator relationships also need to be monitored and kept in balance.

The issue is: should solution be such that it becomes a more serious problem after a while? Should we use only chemical fertilizers or pesticides such that ability of nature to renew itself is impaired threatening the prospect of sustainability.

We realize that we can commit the same mistake that we are trying to correct if we only follow the reductionist approach in developing herbal products delinked from their ecological and social context. Herbal pesticides, even based on farmers' innovations will not solve the problem entirely unless we also situate these solutions within eco-ethical and socio-ecological context. Thus, the approach of allowing nature to work itself and heal itself will have to be combined with aided solutions. The combination of reductionist and holistic approaches will have to be developed for each situation. In this search, the so called contradictions between western and eastern sciences are meaningless. Each culture is capable of destroying nature and itself in the process, given an opportunity. It is true that different cultures and civilizations have oriented their search for understanding patterns underlying natural variation in different aspects of nature. But experimentation, trial, error, careful observations, and derivation of viable theories have been the goal of every community. How else can we explain more than five hundred examples of farmers' contemporary innovations as well as traditional knowledge published in Honey Bee so far?

A Regret:

We regret that we are not as regular as we should be in publishing Honey Bee. This issue is reaching you very late. But let me assure you that by the end of this year, we will be regular. Please keep sending your contributions on various aspects of creativity and innovations at the grassroots. I look forward to seeing some of you at the forthcoming International conference on the subject next January.

Anil K Gupta

Are You Joining Us?



Conference on Creativity:

Readers may recall the earlier announcement about the International Conference on **Creativity and Innovation at Grassroots for Sustainable Natural Resource Management** being organized at IIM-Ahmedabad, January 11-14, 1997. We have accepted more than 140 abstracts of which about 47 are from abroad. Session on heuristics of innovator, native American knowledge systems, tree and forest based innovations, combining sacred with secular institutions and farmers innovations etc., are among the very well represented themes. Last date for receiving abstracts has been extended till August 31, 1996. Even if you receive this issue late, please write to us at editorial address. 

Puka suytu versus *Solanum tuberosum*: How Scientific are the Scientific Names?

Grimaldo Rengifo Vasquez

How is the peasant affected by the fact that the potato is named "Solanum tuberosum" by the scientific community? Grimaldo Vasquez of Lima, explains why it makes a world of a difference to the farming community. This article was communicated to us by Jorge Ishizawa of PRATEC, Jr. Horacio Urteaga 1818, Lima, 11, PERU, Telefax: 51-1-4639545. It is dedicated to the memory of Eduardo Grillo.

In a recent meeting of agricultural researchers which took place in Ayacucho, Peru (National Conference on Andean Crops, September 1995) a scientist working at the IPC (International Potato Center) with headquarters in Lima, confronted an agronomist who defended the wisdom of her Andean community. The scientist who was not happy with her criticism of modern science, wanted to know from her whether the scientific name that a researcher gave to a particular ecotype actually affected the peasant mode of life. He was of the opinion that it did not. Science could only help and never obstruct peasant life, he felt.

The scientific name is a concept which carries a particular conception of the world which is different from the Andean one. This naming is not neutral, and in our opinion, affects peasant life in two ways. The first is that the scientific name hides peasant nurturing relegating it to the background if not obliterating it altogether.

From then on a potato is not called by the name that makes reference to its qualities and attributes that a given culture appreciates in the nurtured potato, e.g. *puka suytu* (in *Quechua puka* means red and *suytu* means elongated), but by a generic and universal concept which makes reference to properties that are objective and recognizable by the scientific community. The new language serves as a medium of communication among persons of science but not among the peasant nurturers themselves.

Through this objectification, peasant wisdom is replaced by a concept which emerges (in some cases bearing the name of the scientific "discoverer") to make reference to a newly discovered reality which transforms the potato into an available resource which can be appropriated, patented and sold.

The new term makes reference to and highlights "new" characteristics. Through this it makes appear something that was not previously identifiable by science and hence cuts its relation with the culture in which it emerged. From a living being which nurtures and is nurtured by a concrete community, it becomes through articulation of the new name, a universal resource ready to be managed. In this context, peasant nurturance becomes a datum of reality and the peasant becomes a simple "informant".

The second way in which scientific nomenclature affects peasant life is when the technician provided with this new scientific knowledge works in the peasants' plots. The new knowledge implicit in the seed which he/she brings is considered superior to the kind of knowledge associated with the local ecotypes. This superiority is established by virtue of the fact that the technician's seed has gone through the approved scientific protocols. As a corollary, local ecotypes are considered. They are generically named "under exploited minor crops", "less productive crops", or "unimproved crops", etc. As if this was not enough, the so called "improved" variety is projected with the help of marketing and media experts, as being



PRATEC: Opening a Lonely Furrow

Today when the search for alternative technological paradigms is on all around the world, it is gratifying to know how sustained efforts of some trained scientists and social workers in the Andean region of Peru have succeeded in influencing the mainstream significantly. They offer courses on Andean technologies, farming systems and knowledge systems accredited to the universities of Ayacucho and Cajamarca, Peru. PRATEC members have also taught in Ecuador, Bolivia, Chile etc. They do not confront western knowledge all together but draw upon it wherever it is useful, as do the peasants. Each founding member of PRATEC was a prominent member of a mainstream organizations before they set up PRATEC. Grimaldo Rengifo Vasquez resigned as a Director of Peruvian Development projects. Eduardo Grillo quit his post as Director General of the Governments' Agricultural Statistics and Research Bureau. Julio Valladoliid was a Professor of Agronomy at University of Ayacucho. PRATEC echoes the spirit of SRISTI very closely and we hope to have more contributions from them in the future. :Ed

"miraculous". In this way the objective of the scientific community seems to be transforming local life, stimulating erosion and loss of not only local wisdom, but also of the ecotypes which make possible the culture of nurturance of the potato. Thus it is not naive and innocuous to call our potatoes *Solanum tuberosum*. 

Patents on Neem-III: Losers, Gainers and Onlookers

While the debate on patenting of neem continues, news about the patenting of products by two Non Resident Indians on another plant product viz. turmeric ('haldi') powder used traditionally for local medicinal formulations in India has underlined the need for addressing the issue of people's rights over traditional knowledge once again. In this issue two legal experts, David Downes and Shayana Kadidal join the debate.



David: Your statement that "every farmer in any part of the world being free to use neem in whichever way s/he wants", needs clarification. Technically, farmers are **not** any longer free to use neem absolutely in **any** way they want, in that they cannot produce and market the patented product which is derived from neem. Patents do not in any way restrict the farmers' rights to use neem in traditional ways, or to develop or produce products or processes using neem that are different from the patented products or processes.

**How free
are farmers
to use neem?**

Anil: You are right about the restriction on farmers' use of patented process. However, there is another side to this restriction. Normally, any company holding a patent will file infringement suit only against someone from whom the company can claim damages. No company will gain anything by filing such a suit against a small farmer. The cost of filing suit will be much more than any damage that could be recovered. Though, I do feel if the process is such that small farmers can use it at their farm, they should have the freedom to do so - a kind of farmers' exemption.

David: Is the application of neem derivatives known for certain to be environmentally sound? Or, can we only say that it is less environmentally **unsound** than chemical pesticides, and if applied properly is unlikely to have adverse impacts? (Do we know how to define "proper" application?)

**How safe
is it?**

**Insects can't
develop resis-
tance to neem
products eas-
ily**

Anil: *BOSTID* study on Neem (Washington: National Academy Press, 1992:5-8) observed: "Whatever the mixture or formulation, neem-based products display several remarkable qualities. For example, although pests can become tolerant to single toxic chemical such as malathion, it seems unlikely that they can develop genetic resistance to neem's complex blend of compounds-many functioning quite differently and on different parts of an insect's life cycle and physiology. Certainly they won't do so quickly. Several experiments have failed to detect any signs of incipient resistance to mixture. For example, even after being exposed to neem for 35 successive generations, diamondback moths remained as susceptible as they had been in the beginning".

David: In general, it is rarely safe to say that a biological resource is bound to be inexhaustible. Thus, I would caution against statements which conclude that commercial collection of neem seeds cannot possibly harm neem trees. Are there other threats to neem trees that could combine with seed collection to intensify the impact? Do we need to give farmers incentives to plant and maintain neem trees, to ensure that over collection (combined with other threats) does not harm their reproduction?

**Will increase
in demand not
increase
supply?**

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Washington DC 20009,
USA*

Anil: As I have explained in the previous article on Neem (HB Vol 6(3):6 & 6(4):6), due to low dormancy, seeds can not be stored easily for long time without damage. Soon after the rains, these will germinate and die out. There is practically no risk of neem being over exploited due to collection of seeds or leaves because it is easy to grow and that too on degraded lands or light dry soils. Market incentives in the form of good prices for neem seeds and other products should be useful incentives besides availability of good seeds as well as access of poor to the lands. For conservation of diversity of germ plasm and knowledge of people, an international fund (contributed by the national and international users of neem knowledge) for research in value addition, in situ and ex situ conservation, biotechnological propagation

of candidate plants, etc., is certainly called for.

David: Some argue that Grace doesn't deserve the patents because they are for merely 'trivial' improvements on traditional methods. Perhaps one response is, if the improvement is 'trivial,' then Grace gains nothing — and others lose nothing — from Grace having the exclusive right to use the improvement. Thus, farmers are not harmed by such patents. If, on the other hand, Grace's innovation is **not** trivial, then they should gain some protection for their investment in an innovation for the same reason that informal innovators deserve protection for their creativity.

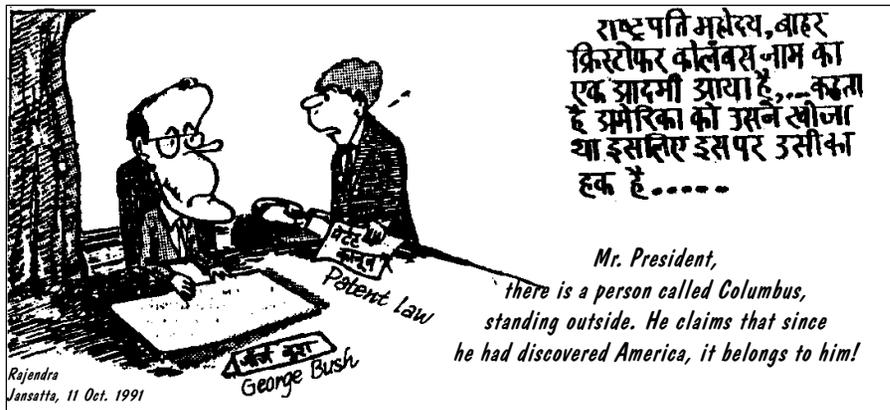
**Trivialising
patent or
patenting
trivia!**

**New
knowledge
needs
protection**

Anil: Basic objections are two fold: one, the protection sought is too wide i.e. for a large number of solvents, two, many of these solvents have been tried by others in the past. Hence, both novelty and broadness are being questioned. My own view is that innovation by the company which does add new knowledge should receive protection in so far as that company also agrees to share part of the profits with the proposed international fund. After all, they did not stumble upon this knowledge by chance or entirely through their own effort. Protection of IPRs of the corporation has to go hand in hand with that of the peasants.

David: You state that "any synthetic analogue of a natural product is patentable because it does not exist in nature in that form." If, by analogue, you mean an identical compound, then I am not sure that the proposition is correct. A **purified** form of a natural compound can be patented, whether the compound's structure itself results from natural or artificial processes. A process for synthesizing a naturally occurring compound can be patented. But the **compound itself**, in a general sense, cannot be patented if it occurs in nature. Isn't that right?

**Can synthetic
analogues
be patented?**



Anil: I agree though it needs further clarification.

David: You offer some good criticisms of problems in Indian agricultural policy that relate to the neem controversy. It would be very useful if you articulate explicitly the **positive** steps government could take to revise policy to encourage a shift **away** from chemicals and to encourage domestic R&D in both the formal and informal sectors in India."

Government must make the popularization of herbal pesticides an integral part of future agricultural growth policy. There already exists a fast track for registration of neem based pesticides but the subsidies on chemical pesticides continue, just as many pesticides banned in the west continue to be marketed in India. The existing laws are proving to be the major barrier in the development of eco-friendly herbal pesticides. *Indiara* a non-toxic herbal pesticide developed by Mr. Sukhatme in Pune about ten years ago has been successfully tried in many countries, but was not registered by the Indian government for reasons best known to itself. The policy bias in favour of chemical pesticides does need to be tempered.

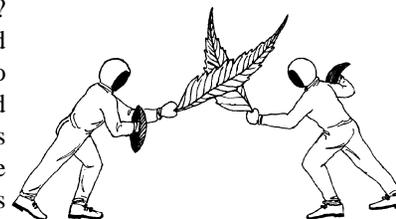
Anil:

**Pesticides
banned in
west are
still sold in
developing
countries**

**What is
prior art?**

Shayana: The patent reexamination petition, signed by FET (Foundation of Economic Trends) and many others, contends that there is prior art, in the form of articles published in several Indian journals, which disclosed the idea that aprotic solvents help preserve the pesticidal effects of neem oil. I don't really make a claim about these contentions... the issue of when a printed publication that is not readily accessible in the US constitutes prior art is very muddled. What I do claim is (1) that under US patent law, the unpublished or unpatented prior activities of Indian users, be they indigenous users or corporations, are not recognized as preempting such a patent, whereas if, e.g., prior unconcealed use of the idea had occurred somewhere in the US before Grace's invention, such use, if properly proven,

would void the patent; and (2) since one cannot patent agricultural or pharmaceutical inventions (neem relates to both fields!) in India, as in many underdeveloped countries, it is likely that anyone who invented such techniques for neem preservation would just keep them secret. (Why publish a commercially valuable idea that cannot be patented? perhaps to inform other users - farmers etc.- but would this be done on paper or by word of mouth? Would publication ever occur in a journal that reached the US, as it must to constitute prior art?) As regards the “printed publication” issue in US patent law, I should just add that whatever rules there are on paper concerning this subject, American courts have often found ways to disregard printed sources which judges have found too obscure to qualify as prior art. But again, I don’t really make any claims about whether petitioner’s claims are factually true or not. However, the typical patent receives only about 10-12 hours of examination, which is hardly enough time to go digging into university libraries to try to find articles in less well-known foreign agricultural or scientific journals. The thinking is that the really valuable patents will end up in litigation, and all the facts about possibly invalidating prior art will come out in detail then.



Are patents not adaptable to the ethics and excellence of peasants?

While my contentions are limited to the idea that the US exclusion of some foreign prior art - specifically “prior use, knowledge or invention”, which are valid prior art if they occur within US borders -is sort of irrational in today’s world, and leads to messy situations, I don’t really make the claim in this paper that, under current US law, the Grace patent is invalid. Certainly, if the FET contentions about the idea being in US printed publications are true, then the patent may very well fall on reexamination—in fact, most patents issued from the PTO fail when subjected to closer inspection. This aside, though, I must say that as a former chemist I find the patent discloses the simplest of inventions, and though it might not be “obvious” in light of US-admissible prior art, might fail as “obvious to try” under the stricter European standards applying that doctrine. It is true that commercialization in India might not suffer from a lack of patentability there. However, the US promises to be the largest market for neem based pesticides, because of the environmental cache of the product (all-natural/ biodegradable/ clean-kill (eg. not an instant kill like pyrethrins which leave insect corpses around one’s lovely garden)), and its current expense. If access to this market is limited to one company, Grace, the resulting monopoly will not benefit those trying to sell neem seed.

Anil: The doctrine of prior art does deserve to be modified as should many other provisions of modern patent law. I was told by Chris Blanch of Franklin Pierce Law Centre some years ago that a particular patent was upheld when questioned on grounds of availability of a thesis in a library because the thesis in question had not been cataloged. Thus, it was not considered reasonably accessible. My contention is that if we follow the same principle, then much of the traditional knowledge is patentable in US and elsewhere because it is not reasonably accessible to any outsider. As evident in the case of the patent on the application of turmeric powder for healing of wounds, the limits of credulity have been surpassed. In the meanwhile CSIR (Council of Scientific and Industrial Research, India) has filed objection to this patent. Surely, such disputes clearly demonstrate the need for greater transparency on the subject of the precise espousal of rights that knowledge of people bestow on local communities and individuals. Turmeric has been used for centuries for its healing properties and the library of any pharmacy college will have dozens of references on the subject. The efforts of this kind could have four implications: i) Governments in developing countries may attach urgency to patent bill reforms so that they can take corrective steps. ii) they could take this issue up in WTO as a dispute. The issue also needs to be raised at third COP of CBD. iii) reject the application if patentee of such patents were to ever seek recognition under Indian patent laws. iv) campaign for explicit position under TRIPs on the patentability of traditional knowledge in public domain. However, the developing countries have more to lose by blanket ban on such a rich source of knowledge of people. Instead, we should plead for a global registration system for innovations and at the same time insist on redefining what may constitute prior art as argued by Shayana.

Shayana is a chemist and also an expert in patent laws. He can be contacted at 77 Sejon Drive, Sayville, NY 11782, USA.

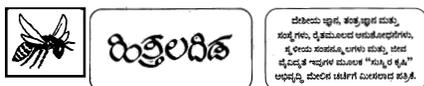


Anil can be contacted at Editorial Address

Coconut, Calving and Conserving Seeds: *Hittala Gida*



The following three pages carry practices published in various local language versions of Honey Bee. This is in line with Honey Bee's goal of generating a platform for promoting exchange of knowledge across languages and cultures.



Hittala Gida (Kannada version of Honey Bee) Editor, Dr T N Prakash

The following practices have been translated from **Hittala Gida** Vol 1(2), by K R Babu, A Raghavendra Rao and Jayanti Rajgopal.

1 Inducing cows into heat

Shantharam Siddi of Uttara Kannada recommends that such cows should be fed with sprouts of 'munduga' (valindivu). A kilogram of the sprouts fed every day is enough to bring a cow into heat early.

2 Preventing Abortion

Aasesarada Narsimha Murthy of Uttara Kannada district says, "If you see to it that the pregnant cow does not eat 'banifoo' leaves, then she is saved from abortion".

3 Increasing Milk Yield

Narayana Siddi from Chittinahalli village, Uttara Kannada district claims that one kg of tubers of 'byne' plant can increase milk yield if they are cooked and fed to the cow for nearly one month every day after calving.

4 Facilitating Calving

Shantaram Siddi adds; "For an easy and timely delivery, feed the cow with nearly one kg of sugar cane trash.

5 Treating Prolapse

Mr S S Kamat of Karwar suggests, "If the uterus comes out during delivery, push the uterus inside slowly after applying extract of touch-me-not (*Mimosa pudica*) plant to the hands. The extract is prepared by crushing two to three handfuls of leaves of touch-me-not plant.

6 Preventing Intestinal Worms

According to Nekkare Ramchandra Shastri of Adyanadka village, Dakshina Kannada district, about 100 g of raw papaya seeds should be powdered and mixed with one litre of water and fed to calves to make them immune to worms in the stomach.

7 Tick Control

Moved by the suffering of cows and calves from ticks, Narasimha Murthy of Uttara Kannada sought and found a solution. He reports that spreading the leaves, flowers and stems of *Lantana camara*'s on the floor of the cattle-shed is an effective way of driving the ticks away.

All the above practices were documented by V K Arunkumar.

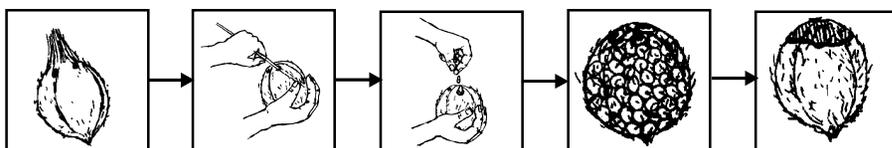
8 Storing seeds within coconut shells

Fully grown coconuts with unripe kernels are selected and soaked in water for about two months. Afterwards, they are dried well in the



Lantana camara

sunlight. The interior of such a dried coconut is cleared by a rod inserted through the eye of the coconut. Vegetable seeds are put in through the hole. The hole is then closed with pith of coconut and covered with lime. Usually, these coconuts are stored on a shelf inside a kitchen, where it is difficult for mice and other pests to damage them. Thus seeds can be stored up to two to three years. The coconut shells can be used for several years, sometimes over generations. This practice is being used in the areas in and around Mangalore (on the border of Karnataka and Kerala).



Transgenic Marriage, Cough Balls and Organic Jaggery: *Nam Vazhi Velanmai*

Following practices are reproduced from *Nam Vazhi Velanmai - Tamil version of Honey Bee*. For further details please contact Mr **P Vivekanandan**, Editor *Nam Vazhi Velanmai*.



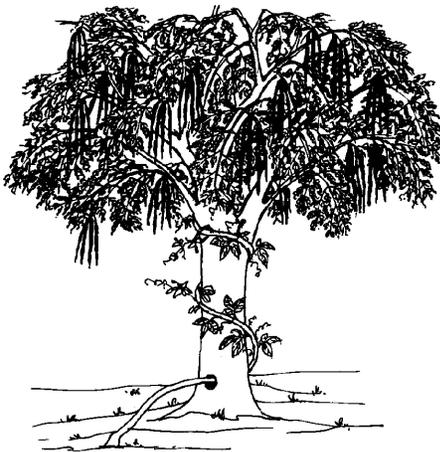
1 Seed Treatment

Before sowing, seeds of cereals and pulses are immersed in water mixed with cattle urine and powder of *Acorus calamus*. The seeds which are floating on the surface are thrown out since it indicates poor quality. Dried healthy seeds are used for sowing in drylands. It is believed that this treatment develops drought resistance in the plants. This practice is noticed in some villages adjoining Dindigul in Tamil Nadu.

Comm: Dr S Ramasamy, Madras Fertilizers Ltd, Tamil Nadu

2 Marriage of 'Avarai' and Moringa

During the rainy season 'avarai' (*Dolichos lablab* -a pulse crop) seeds are dibbled underneath Moringa trees. The growing vine is made to pass through a hole made about one foot above the ground level in the moringa



tree as shown in the figure. Thereafter the hole is plugged with cow dung and kerosene mixture. Due to this the 'avarai' yields well. It is a traditional practice followed in this village and other surrounding regions.

Comm: Shri Karippiah, Vill: Kebling Amapatti, Dist: Kamaraj, Tamil Nadu

3 Storing Hay

Dry sorghum and maize straw are arranged in a stack for prolonged storing. While stacking the hay, common salt is sprinkled over every layer of straw as it is arranged. Approximately ten kg of salt is used for storing straw harvested from one acre.

4 Coconut Pest Control

Neem oil and kerosene are mixed in equal quantities and sprayed on Coconut trees to control the black headed caterpillar and Rhinoceros beetle.

Some farmers put plants of 'kolunchi' (*Tephrosia purpurea*) in the primordial region of coconut trees to prevent attacks by the Rhinoceros beetle. Farmers also grow 'karpooravalli' *Coleus armaticus*, a medicinal and aromatic plant, in the coconut orchard. They believe that the strong odour of this medicinal repels the rhinoceros beetle. (See HB Vol5(2): 17 & 5 (3):8 for other ways of controlling this beetle. :Ed)

Thavasi Perumal, Peyodu, Santhapuram Post, Kanyakumari 629 201, Tamil Nadu.

5 Jaggery Making

At the time of crushing sugar cane, we also put five or six 'desi bhendi' (*Hibiscus spp*) plants into crusher for

Herbal Pesticide from Grass oil

The palmarosa grass is widely grown by many farmers in Tamil Nadu. Its oil has export value and it fetches a good income. It has been found that the water left-over in the condenser after the oil is distilled from the Palmarosa grass, can be cooled and used as an insecticide against sucking pests of chilli & cotton.

Comm: L A Ravindran, 24/1 NGO Colony, Srivilliputhur 626 125, Dist: Kamaraj.

every one 'koppalai' (a vessel which holds around 100 litres of juice) of cane juice. This helps to precipitate and separate out all impurities. When this is done, no soda needs to be added. (A similar practice was once very common in Gujarat and is still practiced in Western Uttar Pradesh for making jaggery on the farm. The *Hibiscus spp* grows wild on common lands in Gujarat. It is amazing that how the practice of using it as a clarifier agent has spread from North of country to South or vice versa: Ed)

R Krishnasamy Gounder, Uzhavagam, Ganapathy, Coimbatore - 641 006.

Following practices are collected from an indigenous veterinary medicine expert, Mr Ayyathurai Konar, (Vill: Kottamalai Athur, T. Krishnapuram - 626 535, Dist: Madurai)

6 Snake Bite

Leaves of 'adithinapalain' *Aristolochia bracteolata* are pounded and mixed with equal quality of fresh butter. It is given to the animal who becomes victim of snake bite or other poisonous creatures to reduce the poisonous effect.

7 Cough and Asthma of Animals

Fruits of 'kallathikai' (*Ficus tinctoria*) 'seeragam' (*Cuminum cyminum*) and garlic are pounded together and made into small balls. These are administered to the animals in the morning for three days to relieve cough and asthma diseases. 

Bahupushpikaran: How to Stimulate Profuse Flowering

Vallabhbhai Gothi

Mr Vallabhbhai Gothi (203, Mafer Apartment, Saru Section Road, Jamnagar-361008) and Dr Girdharbhai Atara (Professor at Ayurveda College, Jamnagar) have been pursuing research on the practices mentioned in Vrikshayurveda (an ancient Indian script), on the fields of followers of Swadhyay Parivar. The Swadhyay movement is a socio religious movement mainly in Western India. This article is translated from *Lok-Sarvani* (Vol. 1(1): 4), Gujarati version of Honey Bee.

Several years ago Dr. Atara had come across verses in the texts of Vrikshayurveda which described the use of buttermilk as a growth stimulant especially for stimulating profuse flowering (*Bahupushpikaran*). One such verse is reproduced below:

ऋषिद्रज्बुच धृल्लह्य हलह्य
द्रचवहाधस्रउंरह्यपक
णवसज्चउंरह्यदुज हलह्य चियज
कमनृश ह्य
धृधह्यचधस्रत्रगवसज्, कमशभयज र्थे उंरह्य
कमकम उंरह्यसह्यज उंरह्यणद्रवयक
त्रपधह्यधउं

In 1993, Mr Gothi encouraged Shri Bavanjibhai Rathod of Satapar village to take up an experiment on the use of butter milk. Bavanjibhai sprayed butter milk on a twenty-five-day old rainfed crop of groundnut (variety Gujarat-10). To his surprise he found a spectacular effect on the growth and yield of the crop. The yield of pods was higher by about 250 kg/acre while fodder yield was almost thrice

compared to the control. These results inspired Bavanjibhai to make a complete transition to organic farming. Jamanbhai Vadi of Khengarpur village tried butter milk on cotton and sesamum crops. He observed that spraying of buttermilk helped both the crops to survive the water stress period of 47 days caused by delay in the last spell of monsoon rains. Jamanbhai could get some yield in the treated plots while all the crop in the other fields failed completely due to dry spell.

Similarly in Batipur village, Mahendrabhai and his brother tried buttermilk on their two acre cotton field. To deal with pest problems they decided to spray extracts of tobacco and neem leaves instead of chemical pesticides. In the control plot chemical pesticides were used for pest control. The yield of cotton was almost thrice in the plot treated with buttermilk and botanical pesticide. The cost per acre was Rs. 50/- only, which was the cost of tobacco leaves. In contrast the cost of chemical pesticides was Rs. 5000



લોકસર્વાણી

Lok-Sarvani Improves Farmers' Yield Sustainably

We have just received a letter from Mr. Manilal C. Chavda, a farmer of Trasand village in Dholka, Ahmedabad district, Gujarat. After reading about the growth stimulating properties of buttermilk in *Lok-Sarvani*, he decided to test the idea on his farm with extremely satisfying results. Excerpts from his letter follow.

“I am a marginal farmer owning 6.5 'vighas' (1.5 ha.) of land. Last year I cultivated about two vighas of castor. As per the information given in your journal I sprayed about two liters of buttermilk at the flowering stage in one vigha of the crop. The plot in which I had sprayed buttermilk yielded about 50 'maunds' (1000 kg) of castor while the untreated plot yielded only 400 kg.”

“I had also cultivated fenugreek crop in one 'vigha' of land. In this crop I sprayed buttermilk twice at the time of flowering at an interval of twenty days. I got a yield of 220 kg as compared to the neighbours who got only 180 kg from three 'vighas' of land.”

“I also used this growth stimulant on two 'vighas' of wheat with very good results. I got a yield of 60 'maunds' (1200 kg) from those two vighas.”

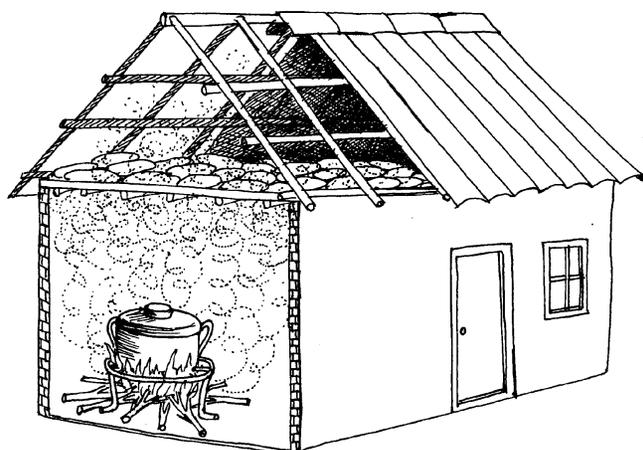
Making Mango Tree Bloom

Approximately 100 g leaves of each *Ficus religiosa*, *Ficus benghalensis*, *Ficus hispida*, *Glycyrrhiza glabra* are boiled in mixture of 1 litre of Milk and 8 litre of water till the volume of the entire mixture get reduced to 1 litre. This liquid is applied 4 times as soil manure to the Mango tree at the interval of 10 days.

Source: Vrikshayurveda quoted by Dr K Vijayalaxmi and Dr Shyamsundar CIKS Madras, Comm: P Vivekanadan.

Ceilsmo Storage of Yam

G. O. Chukwu



Yam is an important carbohydrate staple food in sub-Saharan Africa. Nigeria supplies about seventy per cent of the world's yam. Ethnocentric attachments to yam are high in Nigeria particularly in the southeast agro-ecological zone. Most of the ceremonial yams (large tubers weighing five to ten kg) are produced in the lowland and alluvial flood plains of the forest and derived savanna areas.

In Anam, a flood prone area of Anambra state, yam is the principal crop. These are cultivated without the use of inorganic fertilizers. Harvesting starts as early as April-May in order to avoid damage caused by floods. Thus most of the yams are harvested at a stage when they are physiologically immature and contain about 70 - 80 per cent moisture. Because of the high moisture content they are prone to rot.

To deal with this problem, the Anam farmers have developed a suitable method of storage referred to as the *Ceilsmo method*. Not only does the method prevent rotting but it also enhances the breaking of dormancy. The *Ceilsmo method* consists of spreading out the freshly harvested tubers on the ceiling of a kitchen or a living room where cooking with firewood is done (see figure). The smoke from the fire-place serves as a fumigant. The fire also increases the room temperature and relative humidity near the ceiling where the yams are stored. It is hypothesized that this increases the rate of biochemical reactions and hastens curing of the yams. Seed yams can be stored in this way for three to four months.

(Abridged version of article sent by G. O. Chukwu, National Root Crops Research Institute, Umuhia, Nigeria) (A similar storage method has been reported earlier in Honey Bee (1993, Vol 4(1):11) for storage of maize cobs/onions. :Ed.)

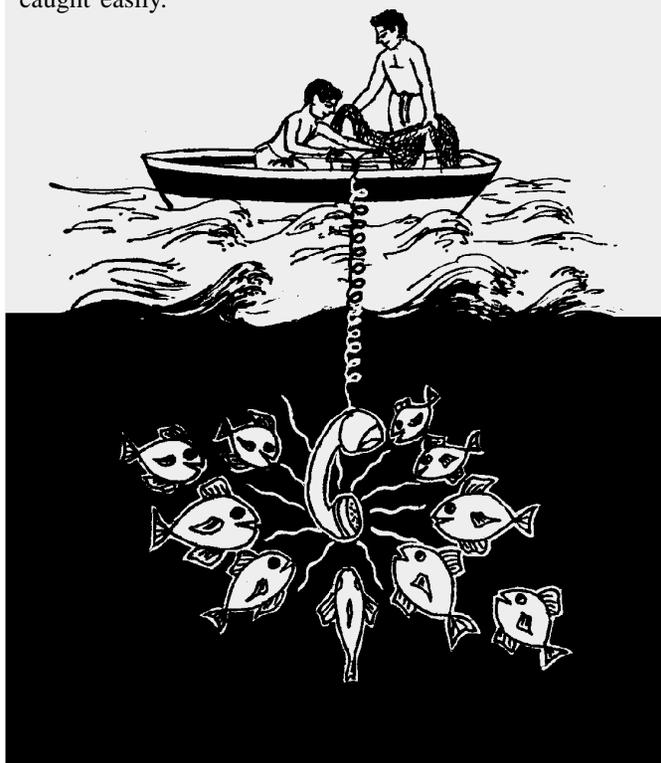


Indigenous Use of Modern Technology: Sonar Traps for Fishes

If your telephone handset disappears one day, what will you imagine? Some one has played a prank on you or that it might be sold by a petty thief in a local flea market. Would you ever imagine these handsets being used as fish traps? We came across a news item to this effect in a local newspaper recently (Mid Day, June, 1996).

It is not unusual for crazy people to try out new things and improve their livelihood prospects. Some of these trials become the harbinger of new ideas and products. It is true that many of these innovations may not be sustainable. For example when fishermen use dynamite to kill fish, not only the young fish die, but the coral reefs are also damaged. However, fisherman in a Malaysian village were very imaginative and perhaps not so insensitive to the sustainability of their practice.

The telephone department, Malaysia was very worried when the handsets from public telephones started disappearing one after another. On investigation, they came across a mind boggling innovation. Fishermen in a coastal village took these handsets and attached the same to two long wires. These handsets were lowered in the water and the loose ends were attached to a battery with a switch. When the connection was made to pass the current, a shrieking sound came out of the handsets. This sound attracted the fish which were caught easily.



Survey of Innovations Part XV

Collaborating Institutions

- ◆ Mahila Gram Vidyapith, Nardipur
- ◆ Gram Bharati, Amrapur
- ◆ Sabar Gram Vidyapith, Sonasa
- ◆ Lok Niketan Vidyapith, Ratanpur
- ◆ Lok Bharati, Sanosara
- ◆ Nootan Bharti Vidyapith, Madanagadh
- ◆ J C Kumarappa Gram Vidyapith, Gadhada
- ◆ B M Shah Gram Vidyapith, Zilia
- ◆ Nootan Gram Vidyapith, Thava
- ◆ Banas Gram Vidyapith, Amirgadh
- ◆ B R S College, Dumiyani
- ◆ Gandhi Gram Vidyapith, Vedachhi
- ◆ B R S College, Shardaagram
- ◆ Shree Saraswati Gram Vidyapith, Samoda
- ◆ Gujarat Agricultural University
- ◆ Dept of Rural Development, Govt of Gujarat
- ◆ Dept of Education, Govt of Gujarat
- ◆ Jai Research Foundation, Vapi
- ◆ L M Pharmacy College, Ahmedabad
- ◆ Bharatiya Agro-Industrial Foundation
- ◆ Department of Agriculture & Horticulture, Adult Education, Rajasthan Government
- ◆ Sandhan, Jaipur, Rajasthan

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Through this column we have been communicating selected traditional as well as contemporary innovations and practices of Gujarat state. As the Honey Bee philosophy has been spreading in other states, we have decided to use this column to reflect the creativity and innovations at the grassroots in these states as well. In this issue we carry some intriguing practices from the state of Rajasthan.

Inspired by the success of the Rural Development Department, Gujarat Government, the Rajasthan Government decided to organise a state wide competition for scouting of innovations. The leadership was provided by Mr. M. L. Mehta, Chief Secretary, Rajasthan Government who has been a staunch supporter of the Honey Bee philosophy and is also a member of SRISTI's Advisory Committee. Departments of Agriculture and Adult Education were made the hub.

The process began with a two day workshop organised by the Rajasthan Government in collaboration with IIM-A and SRISTI during December 17-18, 1995. The purpose of the workshop was to develop a strategy for scouting innovations. Outstanding village level extension workers, agriculture officers, livestock workers (*Gopal*), informal teachers (*Shiksha Karmis*), school teachers, health workers (*Sathins*), agricultural scientists, innovative farmers etc., were invited. Top level policy makers of various programmes and schemes in the state including the chief secretary, secretary and directors of education and agriculture etc., also attended the workshop. SRISTI was invited to share its experiences and provide methodological inputs.

Soon after the workshop, the Rajasthan Government announced a state wide contest for scouting of innovation among farmers and grassroots functionaries. Wall posters were prepared and sent to most village panchayats in the state. A special monitoring cell was set up in the Department of Agriculture. An informal editorial committee was also set up to launch a local version of Honey Bee Newsletter in Marvadi language. The results of these initiatives are eagerly awaited.

In this issue, we present some of the innovative agricultural practices shared by participants in the workshop. As Rajasthan has predominantly arid and semi arid climatic conditions, problems of soil pests like rat, termite and white grub are very common. Hence, many of the plant protection practices are targeted at these pests. While the principles or processes are similar to the ones used by the farmer innovators in Gujarat, the materials used are often quite different mainly due to differences in local biodiversity. We invite readers to test these practices and send us their critical comments.

Innovations

7101

White grub control through lime

It is a severe problem especially in any monsoon crops. Kesharam Nehra, a farmer from village Pratap Pura, brings 40-50 kg lime and spreads it in the open for 2-3 hrs. Because of the moisture in the air it becomes granular and smooth. This lime is broadcasted in a field before the monsoon.

It is incorporated in the soil through ploughing immediately afterwards. This controls the problem of white grubs in the following monsoon crop. Some farmers melt lime in water and give it with irrigation water instead of broadcasting it. However this treatment is feasible only in irrigated crop.

Shri Sundaram Verma of Sikar district has made an interesting observation on the activity of the white grub. According

to him white grub prefers to stay near the moist layer of soil, hence it is always found in the upper layer of soil during the month of July. Any control remedy given during this period is found more effective. (Lime may affect soil pH which may influence availability of soil nutrients. : Ed)

Kesharam Bhagavanram Nehra, Tehsil: Laxmangadh, District: Sikar

7102.1

Rat control: Extract of *Ipomoea fistulosa*

Leaves of *Ipomoea fistulosa* ('videshi aak') are boiled in water and filtered. Sorghum grains are boiled in this extract and placed near the rat burrows. It is believed that rats die after eating it. (Readers may refer to plant protection practices based on this plant published in HB Vol 3(2):17 and Vol 4(2&3):19).

Shri Ramgopal, Tehsil: Zhalra Patan, District: Zalawad, Comm: Mr Ayubali, Agriculture supervisor, C/O Asst. Dir of Horticulture

7102.2

2 Cement, maize flour and sugar: Luring rats to death

Small quantities of cement and sugar are mixed with maize flour and placed near the rat burrows. It is believed that when a rat drinks water after eating this mixture, cement becomes hard in the stomach leading to the death.

Shri Ramgopal, Tehsil: Zhalra Patan, District: Zalawad, Comm: Mr Ayubali, Agriculture supervisor, C/O Asst. Dir of Horticulture

7103

Curing of tobacco

Farmers make small bundles of harvested tobacco leaves and keep them in logs for about 10-15 days to improve



its quality. Bundles of tobacco are layered on calotropis twigs spread on the ground. Again, calotropis twigs are kept and tobacco leaves are spread over it. Farmers are of the opinion that this system of making alternative layers of calotropis and tobacco leaves improves the quality of the tobacco during curing. These layers are kept for about 10 days, till a peculiar smell emanates from them indicating ripening of leaves.

Comm: Chaudhari Ramjatan Srisuvalal, Sharirampura, Tehsil: Shambhar Lake, District: Jaipur

7104

Enhancement of fruit setting in 'turai' gourd

'Turai' is a cross pollinated crop. Its fruit setting is directly affected by bees and other pollinating insects. Approximately 100 ml of honey is mixed with 10 litre of water and sprinkled over the 'turai' crop in the evening. This increases the pollination of flowers because of the increased visits by bees and other insects which are attracted by the smell of honey. Farmers believe that this practice helps in better fruit setting.

Prem Prakash Sharma, Agriculture Supervisor, District: Jaipur

7105

Carrot hates nematodes

Farmers broadcast seeds of carrot along with wheat seeds. Carrot plants are removed during first and second weeding once the wheat crop gets established. Many farmers of Jaipur district believe that carrot plants prevent the infestation of nematodes.

Comm: Prem Prakash Sharma, Agriculture Supervisor, District: Jaipur

7106

Anticipating sowing time for mustard

Mustard is sown as winter crop on a large scale in Rajasthan. The area under this crop has grown at a very fast rate in the last few years. If ants are observed going out of their burrows during noon time or soon after, it indicates the best time for sowing of mustard seeds in the field. Normally mustard is sown in the first fortnight of October just at the beginning of the winter. Farmers explain it by saying that presence of ants outside during noon time indicates a decline in the temperature because of onset of winter. Mustard is a very thermo sensitive crop.

Comm: Chaudhari Ramjatan Srisuvalal,

7107 Shambhar Lake, District: Jaipur

Cumin blight: Ineffective modern technology

Sukhdev Kumhar, could not control blight in his cumin field last year despite having used all the recommended insecticides. At last he experimented with an indigenous method. Approximately 5-7 kg branches of 'kheemp' (*Leptadenia pyrotechnica*) were kept in an open water tank. After a week, the filtrate was sprinkled over the crop. This resulted in about 80 percent control of the disease.

Sukhdev Kumhar, Tehsil: Bijay Nagar, District: Ajmer Comm: Suresh Kumar Jat, Agri supervisor (Horticulture), District: Ajmer



'Kheemp'
(*Leptadenia pyrotechnica*)

7108.1

Plant extract to cure leaf curl

Leaf curl is a viral disease and characterized by curling of leaves. The crop remains stunted. Some farmers prepare extract of 'kheemp' (*Leptadenia pyrotechnica*) and tobacco and spray it over the chilli crop for effective control of the disease.

Sukhdev Kumhar, Tehsil: Bijay Nagar, District: Ajmer Comm: Suresh Kumar Jat, Agri supervisor, District: Ajmer

7108.2

Maize as a border crop against leaf curl

Farmers of Kota district believe that this disease is spread by tiny insects. They grow maize around the chilli field to prevent entry of insects. Maize leaves can cause injury to the soft bodies of insects. Sometimes maize is grown inside the chilli field on the boundary of plots for the same purpose.

Prem Shankar Nagar, Tehsil: Sangod, District: Kota, Comm: Premswarup, Agri Supervisor, District: Kota

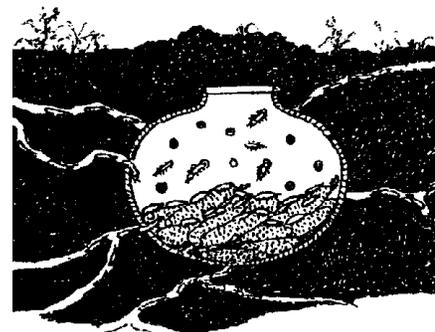
7109

Mixing organic and inorganic inputs to control pest

Twigs of calotropis are kept in the earthen pot and about 50 g urea is added to it. Approximately one litre of water is added and it is sealed air tight by plastering its mouth with clay soil. This container is kept in a manure pit for two months. By this time, calotropis twigs get decomposed and get mixed with water. The extract is filtered and used for seed treatment of wheat, barley and gram. Crops treated in this manner do not get affected by termites. The same extract may be poured into pots of ornamental plants, to protect them from various soil pests and increase the growth. This insecticide reportedly does not affect the earthworms adversely.

7110.1

Prem Prakash Sharma, Agri. Supervisor, Via: Achrol, District: Jaipur



Corn traps termites

Small holes of about one cm diameter are made all around in the earthen pot. Empty maize cobs ('sitto') are kept inside. It is covered with narrow necked earthen pot ('surai'). Several such pots are kept at various places in soil at the depth of about one meter and covered with soil carefully. Termites love empty maize cobs and hence get lured into the pot. After 3-4 weeks colonies are found in the pot. These pots are removed carefully and destroyed. Some farmers make small deep pits in the field at various places in summer and add cattle dung in it. The termites get drawn to these pits. After a few days the traps are removed and the termites are destroyed by spraying kerosene over it.

7110.2

Comm: Prem Prakash Sharma, Agri. Supervisor, Via: Achrol, District: Jaipur

Termite control: Herbal pesticide made in manure pit

Approximately five kg of calotropis and 'kheemp' (*Leptadenia pyrotechnica*) twigs each are cut into small pieces and put in an earthen pot or other container. About one kg. of salt and 10 litres of urine of either human or cattle are added to it. This container is closed air tight and kept in the manure pit for 15-20 days for decomposition. The suspension is filtered through cotton cloth and the filtrate is applied as an insecticide with irrigation.

insecticide is required for one ha of land.

Comm: Chaudhari Ramjatan Srisuvalal,



Loksanskriti Ma Pashuo

Can we conserve cultural diversity independent of the accompanying biological diversity? The question is answered in this outstanding book written in Gujarati by the renowned writer **Jorawarsinh Jadav** (2, Professors' colony Navrangpura, Ahmedabad - 380 009). It deals with the cultural significance of animals and describes eleven animals including the horse, camel, goat and donkey. A very interesting account of the historical background, evolution, mankind's relation with animals, the various breeds that used to occur in the past etc. has been supplemented with beautiful line drawings. Indeed the author has based most of his research for the book on the drawings available at the time and each illustration has a story to tell.

The part dealing with the horse is especially informative about the various indigenous breeds which used to exist earlier and which are now extinct or on the verge of extinction. Thirty six distinct breeds of Saurashtra have been described. Moreover detailed accounts of their colour, size, maintenance, decoration, gait and other facets of their life give an idea of the indigenous knowledge existing about horse breeds at the time. The book has even identified local horse experts. Today knowledge about horse breeds is vanishing even faster than the breeds themselves. Books such as *Loksanskriti Ma Pashuo* give us only a glimpse of the tremendous storehouse of indigenous knowledge we had and how rapidly it is getting eroded.

Stemming Erosion of knowledge: A Case of Horse Husbandry

Vijay Chauhan and Astad R Pastakia

Horses played an important role in the feudal system of agriculture in Gujarat. They were mainly used by the *Garasia* community which controlled most of the land and other natural resources. The *Garasia* landlords needed horses to supervise large tracts of land. Horses were most suited because they were very fast and could travel over rough and undulating terrain. Over time, the *Garasias* developed their own methods of managing and husbanding horses.

With the modernization and democratization of society after attainment of independence, the feudal system began to break down. The use of horses in agriculture also began to decline. As the horses begin to disappear from the farming scene, the fund of indigenous knowledge about their husbandry is on the verge of disappearing.

We give below three practices that ensure better performance of farm horses as told to us by Ganpatsinh Barad of Deshad village, Bharuch. We request readers in Gujarat to look for more practices so that the erosion of this vital knowledge can be checked.

1 Enhancing agility and energy

'*Khaskhas*' (*Vetiveria zizanoides*) seeds (750 g), '*ajmo*' (*Trachyspermum spp*) seeds (750 g), almond (150 g), sugar (750 g) are added to jaggery in the ratio of 1:1. Balls are prepared from the mixture and fed to the horse every day.

2 Increasing the blood supply

Various ingredients viz. '*methi*' (*Trigonella foenum*) seeds of (5.00 kg), '*kalijeeri*' (*Vernonia anthelmintica*) 1.50 kg), '*kalu*' (0.75 kg), turmeric (0.50 kg) '*hing*' (*Asafoetida spp*) powder (0.25 kg), black salt (0.25 kg), '*ajmo*' (*Trachyspermum spp*) seeds (1.50 kg),

dry ginger powder (0.25 kg) are mixed with jaggery in the ratio of 2:1. A ball is made out of the mixture and fed to the horse every morning.

3 Stronger legs: Longer leaps

Jaggery (50 g), one egg, '*ghee*' (25g), dry ginger powder (25 g) are mixed with jowar flour and fed to the animal every day. 

A Table Spoon of Seaweed a Day Keeps the Vet away!

In the US, many horses spend the winter on grass or alfalfa hay, which becomes less nutritious through the season. In pastures with degraded soils, micro-nutrient deficiencies (especially that of selenium) are not uncommon.

Horse managers have increasingly started using dry, powdered seaweed as a source of micro-nutrients for the animals. Horses fed with powdered seaweed acquire a "bloom" (glossy coat and aura of health), resistance to diseases and strength. People with excitable horses find that this treatment also calms down the animals.

Method of preparation: take seaweed (any type), dry it and grind to a fine powder.

Dosage: Add one tablespoon seaweed per day to the animal's feed. It may be sprinkled either on cut grass or over grain ration.

Source: Personal communication from Susanna, California, USA. 

Making Nature your Guru!

Astad R Pastakia

Venerated by some farmers of Maharashtra as “Krishi Sant”(agricultural saint) for his pioneering work on natural farming, and yet without a following in his own village in South Gujarat, Bhaskarbhai Save remains an enigma in the post green revolution phase of Indian agriculture. Bhaskarbhai, a contemporary of Fukuoka, did not receive the kind of media attention that the latter received. However, during the past five-six years he received more than ten thousand letters from all over the world seeking information about “Sajiv Kheti” (living agriculture/ natural farming).

Context

Bhaskarbhai Hiraji Save, resides at Dehri, a coastal village, five km from the industrial township of Umargaon. In the early fifties, Bhaskarbhai gave up his job as a school teacher to take up farming on about 4.5 acres of land. He was amongst the first to adopt the use of new chemical inputs. He also became an agent of a leading chemical fertilizer company.

During the sixties, like most of the farmers at Dehri, Bhaskarbhai used to grow vegetables, to supply urban customers in Bombay and Surat. In 1968-69, he suffered heavy losses, due to an unexpected drop in the price of vegetables. Since then, he had switched over to horticultural crops such as coconut, chikoo and banana.

His farm, named *Kalpavruksha*, comprises of 14 acres of irrigated land. About 10 acres are devoted to horticultural crops, where *Sajiv Kheti* is practiced. This involves cultivation of crops with minimal interference in natural processes i.e., allowing nature to do the production. In about 1.5 acres of land, Bhaskarbhai cultivates organic paddy, wheat, pulses and vegetables for home consumption. He makes the following distinction between natural and organic farming:

1. In natural farming silt is added to the soil as an external input while in organic farming, organic fertilizer is used.
2. No ploughing is done under natural farming while in case of organic farming one initial ploughing is necessary.
3. Weeds may be suppressed but not removed in natural farming while in

organic farming weeding is necessary. Bhaskarbhai has two sons who practice *Sajiv Kheti* as taught to them by their father. The elder son owns a farm of 28 acres, named after his daughter, Sonali. Bhaskarbhai and his sons have also taken up *Sanghvi farm* of 24 acres, for organic cultivation on a partnership basis with a Bombay based industrialist, Ashok Sanghvi.

Trigger for change

In 1957, after about five to six years of chemical farming, Bhaskarbhai realized that the intensive use of chemical fertilizers was affecting the balance of available soil nutrients and its long term productivity. Chemicals also had an adverse effect on soil micro-flora such as bacteria and earthworms. This realization prompted him to give up the fertilizer agency. As an experiment, he decided not to use chemicals in about one acre of his land. In due course, he completely gave up the use of chemical inputs on his farm. The transition to natural farming was a gradual one and involved simultaneous search for alternative methods of doing things.

Search for alternative methods

Chemical farming was inconsistent with his new belief in non-violent agriculture. He soon learnt to make nature his *Guru* (teacher), which provided the answers whenever there was a problem. He learnt that agriculture could be made profitable and could be rid of much of the drudgery, by allowing nature to perform most of the functions. This led to radical measures such as doing away with weeding and tillage operations and relying on natural



predators to bring down pest populations below the economic threshold level. The package of technology that emerged over the next few years (See Box) implied a strategy that had striking resemblance to the “do nothing” method of farming being developed by Masanobu Fukuoka in Japan so far as horticulture was concerned.

An alternative method of farming required patient exploration and experimentation over a long time frame. Perhaps the switch to perennial crops like coconut and chikoo, which have a life of about 100 and 400 years respectively, may have helped achieving this long term perspective. Bhaskarbhai’s attempt was to blend modern concepts with traditional knowledge. Some of his experiments given below will testify to his approach.

1 My neighbours called me stupid

One of the early trials was made on the basis of a research finding of Dr H G Patel of the Gujarat Agricultural University. Dr Patel who had studied the Japanese method of paddy cultivation had mentioned the importance of oxygen, because of which methods involving the

use of flowing water produced better yields as compared to those using standing water. Bhaskarbhai recalled:

"I tried it in two fields. My neighbours called me stupid for removing water from the field. Sure enough, the two fields became better within a week's time. My neighbours thought that I had put in chemical fertilizers during the night!"

2 Trees and trenches: Learning from nature

One of the early ideas was the "trench and platform method" for growing horticultural crops. The trees were planted on the platforms sixteen feet wide. The trenches were used to feed nutrients and water to the roots of the plants. Almost all the organic waste of the farm as well as farm yard manure were placed into the trenches.

Bhaskarbhai recalled "forests grow on the mountains, where the soil layer is thin, and not on the plains where nutrient rich soil is found."

3 Learning from past generations

The idea of adopting proper spacing in coconut crop in order to ensure pollination, was picked up from a folk saying:

"Lage to ne lage; Ne ne lage to lage"

(If the leaves of two coconut trees touch each other, especially during a breeze, they will disturb the pollen and as a result,

fruiting will be adversely affected. Hence optimal spacing should be such that trees do not touch each other).

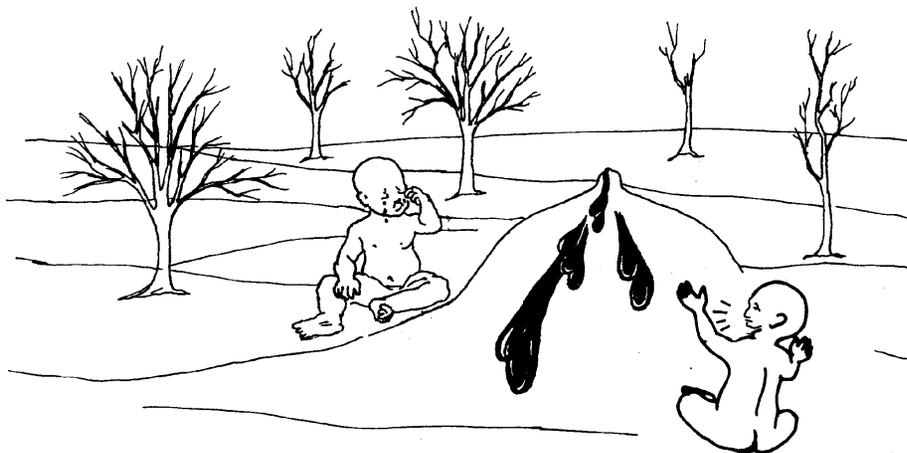
4 Natural moisture meter

Frugal use of water resources is an important part of Bhaskarbhai's package of technology. He was able to cut water consumption by about seventy percent by supplying water in the alternate irrigation channels, using organic mulch, improving soil water holding capacity and through effective monitoring of the moisture content in different plots.

He evolved an ingenious method of monitoring the soil moisture content. He once brought a potted croton plant to his farm, for ornamental purposes. He soon noticed that croton plants showed signs of moisture stress quickly. The leaves started curling up slowly from the apex portion of the plant. Further more, the roots of the croton, were confined to the top nine inches of the soil, the layer which needed careful monitoring. Soon Bhaskarbhai began planting croton plants all over the farm. Apart from adding to the aesthetic value of the farm, these serve as low cost, natural, moisture meters.

5 Getting more from less

In another experiment, in a twenty year old chikoo plantation, the effect of removing alternate rows of trees, was recorded. The results showed that by reducing the plant density to half the



Do we have right to draw blood along with mother's milk?

Key elements of "Sajiv Kheti" in Orchards

1 **Khed** (ploughing) - No ploughing is necessary. One should rely on nature's own ploughman - the earthworm. Since earthworms have punching action, roots of crops are not broken. An earthworm makes 20 holes/24 hours. A population of 4 lakh earthworms/acre will make 7 crore 20 lakh holes. This is considered optimal. (*Some scientists disagree. They believe that if the earthworm population increases too much, it may harm the roots of the plants by physical action. :Ed.*)

2 **Khatar** (fertilizer) - The nutritional cycle should be maintained by recycling farm waste. The soil turned out by earthworms is two times richer in Ca and Mg and five times richer in Phosphorus.

3 **Pani** (water management) - Water consumption should be frugal. It can be cut by more than 90 percent by adopting various techniques such as mulching, use of live moisture stress indicators etc. In this manner the consumption works out to be about 12-15 lit/tree as compared to 80 lit/tree in case of drip irrigation and 210 lit/tree in case of flooding. The high humus content of the soil makes this possible. During water shortage it absorbs moisture from the atmosphere. In case of excess rainfall it helps the water to drain out.

4 **Jeev-Jantu** (pest management) - "*Jeevo Jeevasya Jeevanum*": One should rely on biocontrol taking place in nature eg. tree-ants control several insect pests. They also feed on fungus that attack custard-apple and other plants.

5 **Khard** (weeds) - Weeds may be suppressed if necessary but they should never be removed, because they perform several functions. They conserve moisture, maintain soil-air and provide protective covering to the soil. Weeds do not compete for fertilizer (*some may disagree! :Ed*). They compete for sunlight. If the soil is alive, crops will grow earlier and weeds will not be able to overtake them.

original, (from 70 trees per acre to 35 trees per acre), the gross income had increased to more than 150 percent. This was because the plots with lower plant density had produced larger fruits, which fetched higher price in the market.

6. Co-existence with sentient beings

Bhaskarbhai asserts that a number of pests and diseases can be seen on his farm, but before their populations build up to economic threshold levels, these get controlled by natural predators.

Black headed caterpillar is a serious pest of coconut through out the Deccan plateau. He observed that the '*bul bul*' (*Pycnonotus cafer*) bird was one of its natural predators. This bird perched usually at a height of six feet. He decided to plant '*curry patta*' (*Murraya koenigii*) trees around the coconut trees. Not only did the trees provide the natural habitat for the birds, these also fetched additional income through the sale of its leaves.

Self evaluation

Bhaskarbhai found that although there was an initial drop in productivity, this was covered up within three years. Afterwards the productivity began to go up steadily, simultaneously improving the quality of produce.

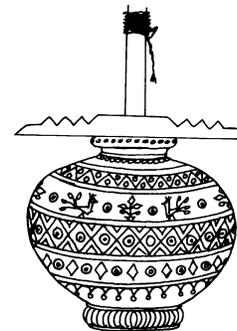
He has demonstrated that with proper rotation of short, medium and long term crops, not only could the land be put to intensive use, but the problems of short term liquidity and transition losses could also be taken care of. In the long run *Sajiv Kheti* was extremely profitable. According to his estimate the Cost to Benefit ratio on his farm worked out to 1:7.

Diffusion

During the past five years, Bhaskarbhai has begun spreading the message of *Sajiv Kheti*. The growing influx of visitors on his farm made it necessary for him to put aside every Saturday, exclusively for visitors from India and abroad.

Despite widespread interest in his methods, there are only a handful of farmers who have adopted the technology. However, few have remained unimpressed by his achievements after visiting his farm.

In recognition of this achievement, farmers of Maharashtra have informally conferred on him the title of "*Krishi Sant*" (agricultural saint). Perhaps implied in this title is a sentiment that what Bhaskarbhai was doing was worth emulating, but was beyond the scope of the common farmer. How else can one explain the poor diffusion of his environment friendly technologies? 



Adding Value to Indigenous Knowledge: The Case of Fermented Milk

Fermented milk products are well known throughout the world for their taste, nutritive value and therapeutic properties. '*Dahi*' (curd) is an Indian fermented product known for its palatability, refreshing taste and therapeutic importance as claimed in Ayurvedic literature.

However, very little scientific research has been done on therapeutic use of acidophilus milk in India. Recent research initiated by Dr P K Gupta, Dept of Microbiology and Public Health, G B Pant University of Agriculture and Technology, Pantnagar, Uttar Pradesh, India led to the development of a new product with greater therapeutic value for humans than '*dahi*'.

Many conditions such as abusive and improper dietary habits, starvation, alcohol consumption, stress, diseases of the digestive tract, oral antibiotic therapy and surgical operations considerably reduce the population of *Lactobacillus acidophilus* in the intestine of hosts. This in turn gives rise to intestinal maladies including diarrhoea, flatulence and infection by enteric pathogens. Lack of β -galactosidase activity in the intestine gives rise to lactose intolerance syndrome in humans.

Dr Gupta's research showed that *Lactobacillus acidophilus* strain could be characterized on the basis of their therapeutic properties like prevention of colon cancer, reduction of cholesterol level in blood, improvement of lactose intolerance and antagonistic action against

pathogenic and food spoilage organisms. *L. acidophilus* strains that fermented mannitol were even capable of growing at low pH and in presence of 0.3 per cent bile salt. This indicates that these strains could establish in the human intestinal tract in the adverse conditions. The research also revealed that mannitol fermented strains exhibited cholesterol uptake from the blood serum which could be beneficial for the high blood pressure and coronary heart patients.

Acidophilus milk was prepared by inoculation of three per cent (v/v) active cultures of *L. acidophilus* - 1899 (hypocholesterolic) and *L. acidophilus* - 301 (antagonistic). A dose of 200 - 300 grams of the acidophilus milk (10^9 viable cells per ml. and 0.8 percent titratable acidity) for feeding human volunteers was used. The results showed that use of acidophilus milk reduced blood cholesterol and gastrointestinal disorders in the human body to some extent. The faecal bacterial enzymes, that is, glucuronidase azo reductase and nitro reductase that convert procarcinogens to carcinogens in the colon were also reduced to some extent.

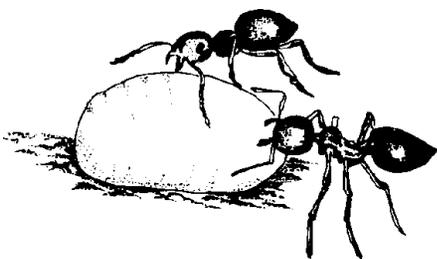
Dr Gupta reports that small dairy entrepreneurs have come forward to adopt the process of making *L. acidophilus* based fermented products.

(abridged from Gupta P. K. "*Therapeutic Value of Lactobacillus acidophilus in whole cow milk*"). Dr Gupta can be contacted at College of Veterinary Science, G.B. Pant University of Agriculture & Technology, Pantnagar - 263 145, India 



Natural Pest and Disease Control Henry Elwell & Anita Maas, (1995), Harare: *Natural Farming Network* (P O Box 301, Causeway, Harare, Zimbabwe) p 128; US\$ 5, (ISBN: 0-7974-1429-0)

This compilation of information related to the management of pests and diseases of crop plants is based on the experiences of practicing farmers and gardeners. The book is divided into four parts. First part deals with the conceptual framework for understanding natural pest and disease control. The authors stress that effective pest control does not mean eliminating all the members of the particular pest community from fields and gardens. The aim should be to minimize crop damage by regulating pest populations. This is possible only through an ecological perspective integrating structural and functional attributes of the agro-ecosystem. In part two the authors present some examples of important pests and diseases with their life cycles, method of damage and simple ways for control. The third part deals with the significance of understanding the role of bioresources in natural pest control. The last chapter provides examples of natural pest control for stored seed and grains.



Many good illustration make the book very reader friendly. It provides access to a wealth of information to farmers and scientists on on-farm experimentation in various eco-systems.

... (SMK & RG)



Sacred and Protected Groves of Andhra Pradesh (1996), Hyderabad: *WWF-India* (Andhra Pradesh state office, View Towers, Lakdi ka Pool, Hyderabad-500 004), p 96; Rs. 200.

The tradition of maintaining sacred groves has been in existence in India for centuries but their importance and significance in conserving biodiversity had been largely overlooked even after the British left India. It was only after the systematic documentation of the sacred groves in Maharashtra and then along the Western ghats that these areas have started receiving some attention. The state office of WWF-India has done a commendable job by bringing out this preliminary information on the sacred and protected groves of Andhra Pradesh.

The book is an inventorisatio n of the sacred groves of Andhra Pradesh, probably the first of its kind in the country. It is a product of the efforts of university students, faculty and others involved in the documentation. It provides an exhaustive district wise listing of the groves with notes on the climate of the region, locations of groves, and the hot spots of rare/endangered or endemic flora and fauna found in these regions. Some good colour plates add to the attractiveness of the book.

This book will be of utmost use to those interested in conservation of biodiversity. It is well known that many sacred groves harbour the climax vegetation of the region to which they belong. Similar studies need to be carried out in other states where sacred groves exist. Studies on contemporary institutional innovations for conservation of biodiversity are also needed.

...(NJ)



Global Pesticide Campaigner Quarterly, Pesticide Action Network (PAN), North America Regional Center, 116, New Montgomery St. # 810 San Francisco, CA94105, USA

The Campaigner is the official journal and news magazine of the PAN, an international coalition of citizens' groups and individuals who advocate adoption of ecologically sound practices in place of pesticide use. Established in 1982, PAN currently links over 400 organisations in some 60 countries, coordinated by five Regional Centres. PAN is well known for its Dirty Dozen Campaign, an international effort launched on June 5, 1985, targeting some of the most hazardous pesticides for ban or strict controls. The Global Campaigner reviews the progress of the campaign in over forty countries. The news section is a valuable source of information on the negative externalities of pesticides, as well as on the progress (or the lack of it) made by various countries in banning toxic chemicals and adopting safer and ecologically sound alternatives.

Electronic News Service

Apart from the Campaigner, PAN also provides Online information services. PANNA Update Service (PANUPS) is a weekly news service featuring articles on pesticide use and sustainable agriculture from around the world. To subscribe, send email to majordomo@igc.apc.org with the message "subscribe panups".

Pesticide Information Service (PESTIS) is an online database containing pesticide reform-related material that PANNA is developing in collaboration with a number of other groups. For EcoNet users, PESTIS is available in the online databases section (in the main menu) under News Services. PESTIS is also available on the Internet via the EcoNet Gopher. See also PANNA'S Webpage, <http://www.panna.org/panna/>

...(ARP)



Sodh sankal: A club of experimentors

In Saurashtra, SRISTI has been supporting a **Sodh Sankal** -an informal network of innovative farmers, artisans, pastoralists, veterinary experts, local scientists, teachers and development workers etc. The aim is to provide a self supported local platform where grassroots innovators can interact, respect, reward, critic and scale up innovations being developed by members of the network.

The lead was taken up by Amrutbhai Agrawat, an innovative artisan and a member of the SRISTI advisory committee. He organized a meeting of innovators on 19th May, 1996 at the farm of Shri Thakarshibhai -another innovative farmer of Pankhan village who has developed a new groundnut variety through selection. About 75 innovative farmers, artisans, veterinary experts, scientists, artists and teachers attended this meeting at their own expense, on the invitation of Amrutbhai and Thakarshibhai. Many members shared their innovations with their new peer group. They declared their firm determination to initiate a movement to support innovators in Gujarat.

Teachers as change-agents : quality education for all -A workshop of outstanding primary teachers, 14-15 December 1995

Shri Ajitsinh M. Solanki, Principal of the Manas Primary School, Vallabhipur, Bhavnagar district, Gujarat, organized a two day workshop of about 50 district panchayat primary school teachers of Bhavnagar district in collaboration with the district education committee, State Department of Education, district wing of the Primary Teachers' Federation and SRISTI.

The focus was to learn from extraordinary

innovations developed by teachers without any outside help. For instance 'Shala Bina Tala' (School without locks) was one experiment narrated at this workshop. Education minister Gujarat Government and Director (Primary Education) and senior functionaries of teachers' federations listened to the innovative experiences of teachers.

Several experiments were described dealing with: methods of improving enrollment, retention and attendance of backward communities and girls, increasing achievement levels of children, improving the quality of schooling, tapping alternative knowledge systems, resource mobilization, networking, institution-building and alternative models of schooling. Among the follow up activities were the planning of a newsletter and other workshops for promoting lateral learning.

FAO seeks advice of the younger generation

The FAO is taking a second look at its rural development strategies in the context of the post cold war scenario. The Directorate of Rural Development in FAO decided to get together young development workers and academics from different parts of the world to participate in a workshop and advise FAO. The workshop at Godollo, Hungary during 9-14 April, 1996 was attended by about forty participants, most under



Mulchand Chitara

the age of forty. Mr. Astad Pastakia from SRISTI represented India at this forum.

Decision support systems for grassroots innovators

International Institute of Software Technology of United Nations University organized a workshop on "Software Technology for Decision Support Systems for Sustainable Development" at Macau during February 25-March 8, 1996. The workshop was cosponsored by IDRC (International Development Research Centre) of Canada and The Macau Foundation and Instituto Politecnico de Macau. More than 40 delegates from different parts of the world discussed their experiences. Srinivas Chokkakula from SRISTI attended the workshop and presented a paper on the operationalisation of Knowledge Networks (see H B 6(4) :1).

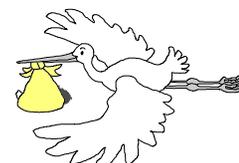
Case studies on innovations in forests and tree conservation

A one day workshop was jointly organised by SRISTI and IIM-A on 13th January 1996, for the FAO/FTPP to discuss the conceptual issues involved in carrying out indepth case studies related to forest and tree conservation. The purpose of the cases is to highlight the initiatives and innovations of the people at the grassroots level in South East Asian countries. It was decided to organize a workshop in January 1997 as part of the forthcoming International conference on Creativity and Innovations at the Grassroots, where the case writers would present their cases. If you have innovative experiences to share, please write back to us.

Pesticide action network's workshop

A workshop on the "Sustainable Agriculture Info-Doc Collaborators" was organized by PAN (Pesticide Action Network) Asia and the Pacific during 29 March - 1 April, 1996, at Penang.

Murali Krishna from SRISTI attended



National research station goes organic!

Dr K C Dalal

National Research Centre For Medicinal and Aromatic Plants
Boriavi, Ta. Anand
Gujarat - 387 310.

The Indian Council of Agricultural Research has recently established this National Research Centre. We have got 50 acres of very fertile land which has not been cultivated for nearly five years.

I wish to use only organic manures and other biofertilizers and wish to avoid use of chemical fertilizers, pesticides etc.

I seek your assistance in developing a non-chemical system of farming for raising medicinal plants to be utilized for traditional system of medicine. An early reply is requested.

(We are delighted with your plans to make the research center go organic. Perhaps it will be the first such case in the history of modern agricultural research in the country. We look forward to a long term relationship of mutual support, and welcome you to the Honey Bee network. :Ed)

IRED joins Honey Bee network

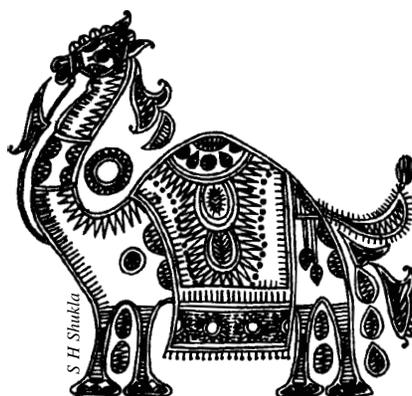
Dr O D Date

IRED West Africa
19, Balogun Street
Anifowose
P.O. Box 326
Nigeria

I work for IRED (Innovations et Reseaux pour le Development - or Development Innovations and Networks) as its Representative for Anglophone West Africa. Our Regional Office in Asia is in Colombo. We work very closely with grassroots organisations. At personal level, I am actively involved in training and research in Participatory Rural Appraisal as well as Indigenous knowledge and Technology Systems. I believe, that there is a lot to share on both continents.

I received the Honey Bee a few times when I was at the University of Ilorin and wish that you place IRED West Africa on your mailing list.

(We shall put you on our mailing list. Your experiences and views on indigenous knowledge based innovations will enrich Honey Bee network. Send us your contributions soon. Please also consider subscribing to Honey Bee. :Ed.)



Little solutions of Puerto Rican farmers.

Judith Van Riper

Coral Beach II 1802
Carolina, PR 00979-5709

I recently read your article in Cultural Survival and am impressed by the initiatives taken through the Honey Bee network. I believe you are on the right track.

I am a farmer in Puerto Rico. I face problems similar to the ones you describe, except that in Puerto Rico there is no one under 50 years who remembers some of the old techniques or plant varieties. People were told in the 1950's that industrialization would make them rich. So when the older leaders in rural communities died so did their knowledge. The government agencies are more interested in trying to make US style agriculture fit a mountainous tropical island rather than learning how to optimize the assets of the island. In many ways India and many countries in the poor tropics were better off not having the \$ to buy the "new agriculture".

I have found that academics here do not wish to get their hands dirty and continue to belittle the attempts of the few innovative small farmers by describing these as non-modern. University programmes train people as paper-pushing agronomists, but little help is available for farmers trying to solve the problems - like the simple solution to spread the manure you described (*Amrutbhai's bullock cart*, See HB 6(4): 3).

I would be very interested in sharing some of the little solutions which I have found to work in my moist sub-tropical area. Many of my crops are similar to those in parts of India. It would also be my desire at some time in the future to work in some capacity in agricultural research in India.

(Your candid observations about the state of agriculture in Puerto Rico should be an eye-opener for policy makers in many countries in the South. Your little innovations are eagerly awaited. We firmly believe that the path to sustainable agriculture will emerge through these little innovations and adaptations which are specific to the local micro-climates. Do let us know if we can be of support in your work in any way. :Ed)

Will drug companies help to conserve biodiversity?

Angelika Laub (Sr)

Wilgespruit Fellowship Centre
P O Box 81, Roodepoort
1725 Transvaal
South Africa

In the February issue of Eco News Africa, Honey Bee newsletter is mentioned in the context of Property Rights on the utilization of plant and animal material indigenous to a country.

The theft of plant material used by pharmaceutical companies for medicinal purposes by our indigenous healers is already happening in South Africa. Can the Honey Bee be helpful in this respect for genuine development. Kindly send me a sample copy.

(We would be most happy to join hands with you in this important subject. Write to us in greater detail. :Ed)



Registration facility for small innovations

N. Murthi Anishetty

Plant Genetic Resources Services
Plant Production and Protection Division
FAO, Rome
Italy

As you are aware FAO, through its Commission on Plant Genetic Resources, is initiating the process of the revision of the International Undertaking on Plant Genetic Resources to harmonize the undertaking with the Convention on Biological Diversity. The process will include germplasm information as well as realization of farmers' rights.

I am pleased to note that SRISTI would also provide a registration facility for informal innovations. In my opinion this is essential and unless such registration and documentation exists it would be difficult for the communities that develop such innovations for Sustainable Development to realize the benefits.

(While we have mooted the idea of a global registration system for small innovators at the grassroots level at various fora, we have still not been able to get it initiated. We think this can best be achieved through a collaborative effort of interested international organisations such as the FAO, IFAD, IDRC etc. We need to discuss this idea further. :Ed)



Validating an ancient Egyptian pregnancy test for cattle

Arun K Agrawal

Kasturbagram Krishi Kshetra
P.O. Kasturbagram
Indore - 452020

I have planned experiments for validation of the ancient Egyptian pregnancy test for cattle which, Dr. T. Veena and R. Narendranath attempted to validate at the University of Agricultural Sciences, Bangalore.

In their experiment they used only wheat seed. Wheat is sown only in *rabi* (winter) season and not in *kharif* (monsoon) and *zaid* (summer). However, breeding among cattle is not restricted to *rabi* season. Hence we need to test whether the results hold true in *kharif* and *zaid* seasons as well.

Therefore, we are carrying out an experiment in all three seasons and with different crops, to check the validity of this ancient test in modern times.

(We await the findings of your experiments with great interest. We wish that more and more NGOs would take such initiatives in future. :Ed)



Local initiative for validation of farmers' innovations

S R Sundara Raman

Satyamangalam-1
Erode- 638401

I request you to send some information about the trials that you are conducting for various crops so that I too can try the same in my area and let you know the results. I also have a specific query in connection with one of your ongoing trials which uses turmeric powder in combination with ash in the ration of 1:1. Are you mixing it with water or dusting it directly on the crops?

(It is dusted directly. :Ed)



Research in biological sciences not addressing holistic issues

Dr Suresh K. Sinha

National Professor (ICAR)
Water Technology Centre
Indian Agricultural Research Institute
New Delhi - 110 012

I retired only yesterday after attending the SCOPE general Assembly in Tokyo. It was a new kind of experience. The developed world now recognizes the biodiversity of soils and seed materials as an important project. Somehow, I feel that in our country, research in biology is not addressing the holistic issues. Consequently, despite our natural advantage, we will be left behind. The story of neem is not very different. Some of us are keen and recognize the importance of not only neem but other indigenous species and practices. We do get lip service from many. To me now, it appears that *research will have to grow outside the Government system*. How should it be done? I look forward to a discussion on this issue.

(We agree with your observation about the lack of holistic perspective in modern research. This is particularly important when we deal with biological/ ecological systems - see also this issue's editorial. One way to rectify this malady

is to learn from the heuristics of local experts and grassroots innovators. The second issue raised by you is equally important and we would be happy to have it discussed in the debate column of Honey Bee. Would you like to initiate the debate? :Ed)



A new knowledge network in the offing

Mr Girish Bhardwaj

PRA UNIT
E-7/73, Lajpat Society
Shahpura Arera Colony
Bhopal - 462 016

Recently our PRA Unit has decided to work on traditional technologies. In fact we are not clear how we would go about it but to begin with we have thought of exploring, documenting and promoting the farmer based research on some specific issues.

(We are looking forward to learning from your experiences. As you might know, we do not approve of so called PRA kind of approaches. We are sure that once you start learning from people, you will come to the same conclusion. :Ed)



Innovations need protection

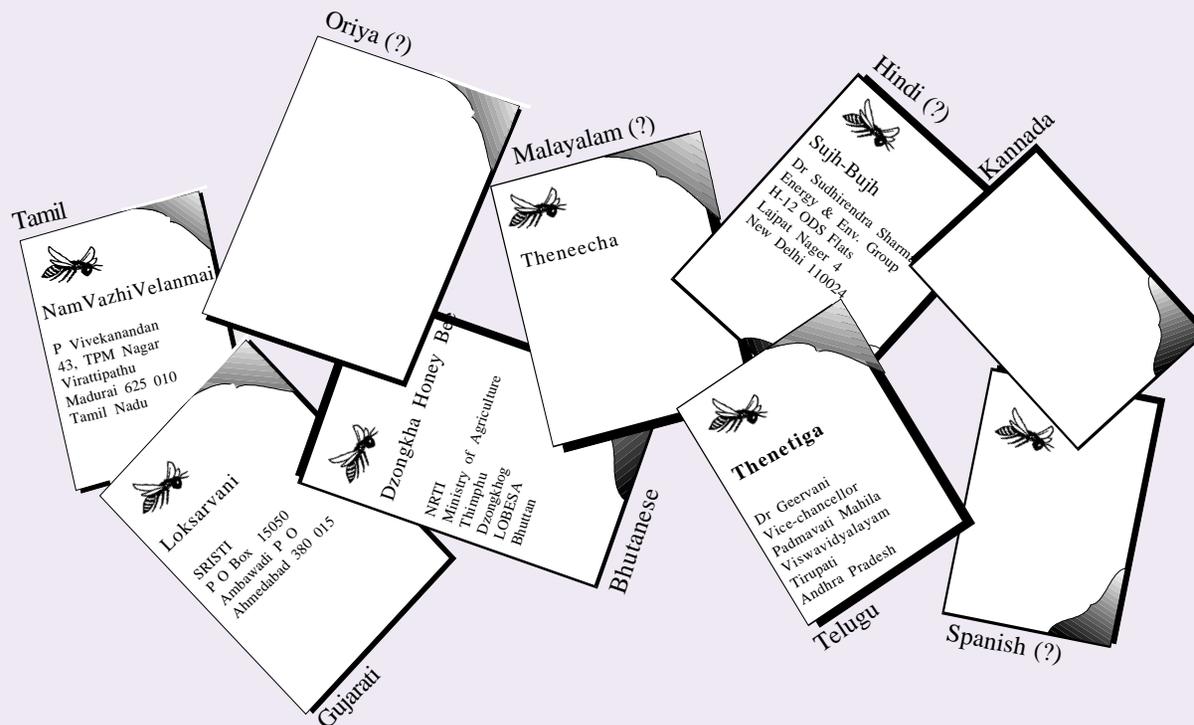
P B Vekariya

Rajmoti Society
Timbawadi Road
Junagadh- 362 001

I am an engineer and have developed during the course of my dissertation work, a new technology for the generation of energy using renewable resources. All the theoretical and practical information about efficiency, design of system and case studies on real assumptions are completed. I seek your guidance about assessment, protection and commercialization of this technology.

(We can meet to discuss this idea. Keep up your inventive spirit. :Ed)





Membership Fee for Honey Bee Network

Category	<i>Annual Membership</i>	
	National	International
Patron	Rs 2000	US\$ 200
Supporter	Rs 500	US\$ 50
Scientist/Professionals	Rs 120	US\$ 30
Foreign aided NGOs	Rs 500	US\$ 50
Farmers/NGOs (without foreign aid)		
-Large	Rs 100	US\$ 50
-Small	Rs 50	US\$ 25
Students	Rs 50	US\$ 20
Unemployed Worker	Rs 5	Free
Institutions/Libraries	Rs 2500	US\$ 100
	<i>Life Membership</i>	
Individual	Rs 1500	US\$ 250
Institutions/Libraries	Rs 10000	US\$ 1000

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