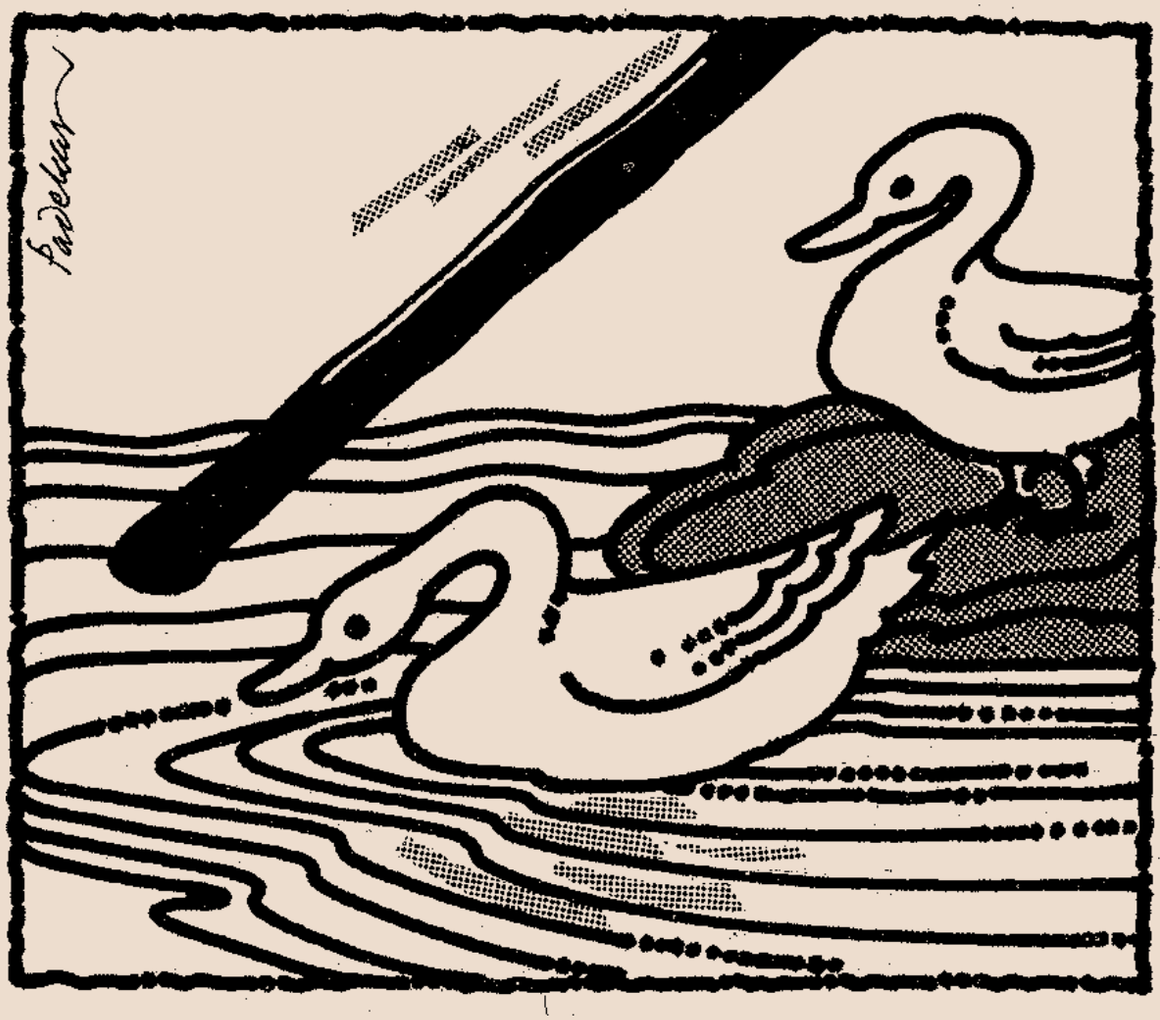
ICCIG 1997

Honey Bee

Vol 7 No 4 October-December, 1996



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

Honey Bee

October-December, 1996 Vol 7 No 4
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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

A Test for the Experts

One day a ship turned up at the Toroja harbour. The sailor who owned the ship had two ducks and a piece of black coloured wood. He appeared before the King and said, "Your Highness, if you tell me which of these two ducks is male and which female, and which side of this stick is the top and which the bottom, I offer you my ship". The King immediately summoned his expert and asked him to solve the problem within three days. If the expert were to fail in this task he would be beheaded.

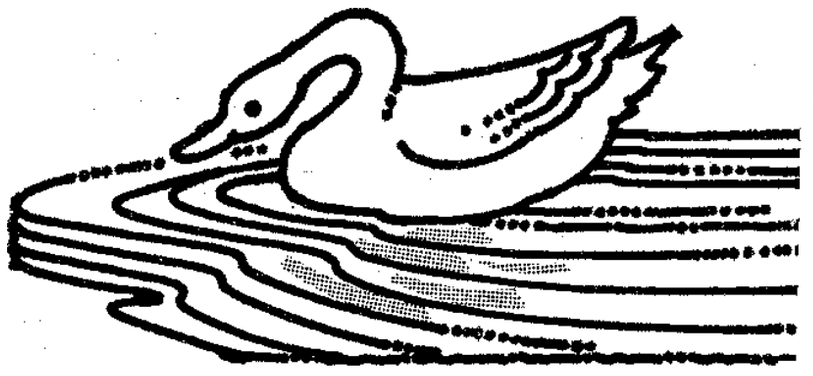
When the time was almost up and the expert had still not solved the problem he decided to commit suicide. At the river he heard some common people discussing his very problem. "Silly King, he doesn't know that he should leave the two ducks near water. The one which gets into the water first is the male". They laughed loudly. The second problem was also no problem at all. "If you put the stick in the water, the heavier end will sink more than the lighter end which is therefore the top"

Having found his answers, the expert quickly went to the King and demonstrated his expertise. Highly pleased, the Raja of Toroja named him as his successor.

(*Source : Abridged from "Toroja" in Folk Tales of Indonesia (ed.) Afwani Soebiantoro and Manel Ratnatunga*)

Scouting for stories:

Participants of ICCIG 1997 are inited to contribute insights, materials and ideas for cover stories. If you have some such story as the above to share with the readers of Honey Bee kindly send it to us.



Printed, Published and Owned by Kirit K Patel on behalf of SRISTI Innovations, B/2, Srikrishna Apartments, Near Lad Society, Vastrapur, Ahmedabad-380 015. Printed at M/s Bhargavi Printers, Ahmedabad. Editor: Anil K Gupta.

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Boundaries of Knowledge systems: Power of outsiders

An elephant is very powerful when on land just as a crocodile is in water. Outside their respective domains each becomes powerless. If the new solutions for sustainable resource use cannot come from any one knowledge system, how do we empower the outsiders who bring about change?

The Honey Bee network enters the eighth year of its formal existence with a simple and perhaps not a very significant achievement to its credit. And that is it has proved, contrary to the commonly held belief, that poor people are not so poor that they can not even think. The difference this thinking has made to the formal public policy or scientific systems may be inconsequential, but does that make it irrelevant? There was a king who was coming back from a long journey one cold morning. On the way, he saw a holy man sitting on the roadside praying devotedly. Seeing him the King got off the chariot and bowed before the holy man. The latter did not open his eyes or acknowledge him. The king then sought his blessing and offered to provide him anything that he needed. The holy man still did not respond.

The king addressed the man again and yet the latter did not say a word. After a while the holy man got impatient and told the king, " If indeed you really want to offer me something, then don't block the sun rays falling on me. The king was overwhelmed with this request. He realized how an ordinary ray of light could have an extraordinary meaning. It is such a spirit of sublime, subtle and serene thing that often permeates the consciousness of the grassroots innovators and experimenters; they expect little from any one outside and they are so impatient with themselves and their performance that they keep on trying things out.

How do we recognize the role that these initiatives can play in future transformation? Let me repeat five principles of sustainability mentioned before in Honey Bee.

a: Rights of non-human sentient beings:

We had the largest number of cover stories on this theme because, to us, this appears to be the most profound gap in contemporary thinking. We seem to rely so much on anthropomorphic considerations that we even miss what nature has to offer us. A king once was travelling through a forest. On the way he stopped his chariot and went out for a little stroll. When he returned, he found that the tendril of a vine had grown and curled around the spoke of the wheel. He was in a dilemma. If he moved the chariot, vine would be hurt. And so he left the chariot and walked back to his palace.

b: Sustainability of Spirit is the key

Even if we have technologies which can help us use resources within sustainable limits, will appropriate institutions emerge if the spirit is absent? Such was the question posed once in an Indian epic, Ramayana. In this epic, Lord Rama symbolizes the Dharma (noble conduct) and Ravana (who otherwise was a very wise sage) the adharma (bad conduct). Rama was frustrated on knowing that his

wife, Sita (abducted by Ravana) was just on the other side of a vast expanse of water and he didn't have wherewithal to cross the sea or build a bridge. His followers were equally distraught. The task appeared impossible. Suddenly a ray of hope emerged.

Rama observed a squirrel behaving oddly. She kept wetting her tail in water, coming to the shore, rolling in sand and going back to the sea and washing her tail. She was doing it repeatedly and almost furiously. Rama called the squirrel and asked her the reason for her odd action. She replied that knowing the challenges before them, she was contributing her mite. She was trying to fill the sea with sand attached to her tail so that a path could be built for Rama.

The entire work force of Rama felt ashamed at their own despondency. And worked collectively to build the bridge.The projects like the squirrel's efforts are seldom sustainable. But a non-sustainable act like this could inspire a sustainable process. The trick thus is to unfold the locked up entrepreneurial energy of all those around. The momentum so generated may eventually solve the problem or generate the ripple which unsettles those believing in maintenance of status quo.

c: Sustainability through creative culture:

Sustainable arrangements require group action through some kind of CPR institutions. While many of the available frameworks of analyzing such institutional arrangements have emphasized either game theoretic or utilitarian perspectives, I stress the need for giving importance to the process of rule making as much if not more than the rules per se. Further, I also feel that there is an admixture or what I may call double-helical intertwining of explicit and implicit, secular and sacred and 'this' and the 'other' worldly consciousness in these indigenous institutions.

Feeding the birds for poaching trees:

A village panchayat (assembly of elderman) in Rajasthan devised a unique way of punishing person who cut some branches of trees from common land where it was prohibited. The offence was discussed by the village assembly of elders. Hours of discussion about various issues related to the crime resulted in a punishment - often common to each of such crimes.

The punishment was to make the culprit stand barefoot under open sun in the hot summer and feed the birds two and a half kilograms of grains inthe day. It is quite possible that this punishment would have been interpreted differently by different people in the village with some common meaning but some uncommon meanings too. On the one hand the culprit was punished and on the other, he was supposed to have been blessed by the gods for having fed the birds in such a hot environment.

The global concern for sustainable development and conservation of bio-diversity is dominated by the strategies and styles suitable for essentially the degraded environments. Since degradation in environment inevitably is accompanied with the degradation of the institutions, these policies take absence of institutions as given.

d: Sustainability through multi-functional institutions of restraint, reciprocity and respect generating collective responsibility for nature

In Bhutan there is a custom that people go together to the forest for collecting shingle wood, on a particular day. There are several implications of this practice.

(a) While collecting wood on the steep slopes, if somebody falls down, there are people around to help in the emergency. (b) Everybody monitors everybody else's collection of wood. (c) Since collection of wood has to be done keeping in mind the age, health, and condition of the tree, collective restraint helps in maintaining those conditions. (d) Some people are either too old, handicapped, weak or their requirements are larger than they can manage on their own. Groups help in such cases and carry the extra burden. (e) There are sites which might have suffered some damage due to rain, landslide or otherwise. Since such sites are observed together, it enables mobilization of the collective will for corrective action more easily. (f) In addition to the utilitarian dimensions mentioned above, the group action is its own reward when there is music, fun and laughter around.

Thus, emphasis on only the economic part of a resource would not provide sufficient information or insights for building institutions that can help in managing resources sustainably.

e: Bio-Ethics for sustainability:

The sustainability of a resource use requires development and demonstration of an ethics which guides decisions regarding current versus future consumption of resources. The conception of nature and relationship between human and non-human, animate and in-animate, born and unborn etc., are defined if not determined by this ethics. The bio-ethics can raise choices about time frame, frequency, distribution, pooling etc. of resources for present and future users. International conference on Creativity and Innovations at Grassroots (being held at IIMA January 11-14, 1997) will deliberate on these and many other issues. May the spirit of creativity continue.

Anil K Gupta

American Indian Cultures and the Challenge of Sustainability

Robert H. Winthrop

Sustainability is fundamentally a cultural, not an environmental problem. Human institutions, practices, and attitudes have created our unsustainable trajectory, and must be changed to allow for any chance of a comprehensive and enduring solution. Yet, as in medicine, diagnosing this disease of the world environment is easier than determining its effective treatment. Robert H. Winthrop is with 'Cultural Solutions', P.O. Box 401, Ashland, Oregon 97520, U. S. A.

The Problem of Sustainability

Environmental outcomes, benign or destructive, are the end-products of immensely complex cultural behaviours. For this reason the goal of sustainability constitutes a directed cultural as well as environmental change, requiring a search for those culture patterns which can organize, motivate, and justify environmentally sustainable outcomes. It calls for a journey of exploration, where neither the goal nor the itinerary can be well defined in advance.

For the already industrialized societies, particularly of western Europe and North America, thinking seriously about environmental and social justice for future generations is extremely difficult, for doing so runs contrary to all of the dominant values: a very short-term perspective, an emphasis on individual freedom without corresponding social responsibility, and a cult of personal fulfillment through material possession. As Alan Durning wrote in the World Watch Institute's 1993 annual report, it is for this reason that it is useful to consider the examples offered by communities that have sought to maintain a stable relation to their environments over many generations, even in the face of dramatic pressures for change.

Sustainable use of local resources is simply self-preservation for people whose way of life is tied to the fertility and natural abundance of the land. Any community that knows it is going to live in the same location for a long time is more likely to take a long term view than a community without attachments to local places.[3]

The American Indian (also termed Native American) communities of North America provide many interesting lessons in this respect. The sessions on American Indian Knowledge Systems and Indigenous Environmental Management in the conference `Creativity and Innovation at the Grassroots' (being held at the Indian Institute of Management, Ahmedabad,

January 11-14, 1997) demonstrate how some American Indian groups have conserved and adapted traditional knowledge and resource practices. They also suggest models that may apply to other communities and other environmental challenges. The present brief report has a more general aim: to describe certain key environmental values common to many American Indian cultures, and some of the ways in which these values challenge mainstream approaches in the environmental sciences and environmental policy.

The Place of Tribes in Environmental Policy

In the United States, American Indian communities or `tribes' stand in a unique legal position: they are first and foremost dependent sovereign nations, not ethnic groups. Throughout American history this evolving legal doctrine competed with political and social objectives that pulled fiercely in a different direction—addressing what was popularly understood as the `Indian problem.' From the Euro-American or `anglo' perspective this `problem' had three aspects: first, how to secure American Indian resources, particularly land; second, how to transform American Indians into non-Indians; and third, how to maintain political control so as to accomplish the first two objectives. This in turn defined for American Indian peoples a `Euro-American problem': tribal survival, `the maintenance of particular sets of social relations, more or less distinct cultural orders, and some measure of political autonomy in the face of invasion, conquest, and loss of power.'[4] Much of this struggle between the Anglos and American Indians has involved the agricultural and industrial development of natural resources—through logging, mining, clearing fields, damming rivers, and building roads.

In the United States in recent years the emergence of environmental protection as an objective of public policy prompted the creation of systematic procedures for evaluating proposed environmental change. This has provided American Indian tribes with a new and significant forum in which to fight for the

preservation of tribal resources and culturally significant landscapes, and indirectly to preserve the traditional practices (such as dipnet fishing, root gathering, or prayer and power questing in remote areas) which current environmental conditions make possible. The National Environmental Policy Act (originally enacted in 1969), which established a system of comprehensive federal environmental review, is only one of a number of Acts and Regulations that provide a role for American Indian tribes in environmental decision making. Another important law is the National Historic Preservation Act, which recognizes `traditional religious and cultural importance' for an American Indian tribe as a basis for determining sites or landscapes to be eligible for the National Register of Historic Places, a status conferring certain protections in United States law.

However valuable these statutes may be, their usefulness for American Indian tribes is reduced considerably because of the divergent understandings of nature guiding environmental science and regulation on the one hand, and traditional tribal cultures on the other.

Nature, for the environmental sciences, is an external biological realm. It lies beyond the sphere of human activities and relationships. Environmental analysis has extended this perspective by treating the natural world as decomposable into constituent systems-vegetation, hydrology, wildlife, fisheries, and the like-each of which can be understood independently of each other and of human society. In attempting to predict the consequences of proposed environmental change-for example, the construction of a dam-the environment to be affected is analyzed by reducing it to these constituent elements, each interpreted through technically appropriate studies. The consequences of the project on each element are projected, and means for mitigating negative effects on each type of resource are proposed. However sophisticated these analyses may be, such approaches to environmental review are seldom truly ecological, for the interrelatedness of physical and biological systems is largely ignored.

The challenge of envisioning what would constitute a sustainable system has pushed the discussion of scientists to a position closer to that of traditional American Indian thought. Paradoxically, the more systemic and encompassing the goal of sustainability is taken to be, the less it can be expressed in strictly scientific terms. Reed Noss has made this point in contrasting sustainable *forestry* and sustainable *forests*:

[S]ustaining forestry is not the same thing as sustaining forests. . . . forests comprise much more than wood and other products useful for

human consumption, much more even than the `public service' functions of climatic regulation, water supply, pest control, gene banks, or recreational opportunities. . . . Forests are valuable and must be sustained for their own sake. Until we acquire such an attitude, the sustainability concept may be a smoke-screen, behind which we continue to chip away at our biotic heritage.[5]

One can specify the conditions defining a sustainable forestry regime: the mix of timber species, the protocols for assessing revegetation rates and thus allowable (sustainable) cuts, the minimum number of mature trees per acre to remain after harvesting, the modification of cut plans in sensitive environments such as steep slopes and riparian areas, or minimum standards for water quality in affected streams. One cannot, in contrast, specify exhaustively the conditions of a healthy or sustainable *forest*. Nor can one explain scientifically the *value* attributed to the system as a whole-a forest considered for its `own sake.' The answers to the questions, what is to be sustained?, why?, and how?, depend not on science, but rather on culture or tradition.

American Indian Environmental Knowledge

Models for preservation and for appropriation of natural resources are essential aspects of any traditional cultural system. For example, the Columbia Plateau of the Pacific Northwest is home to a number of American Indian tribes. The Columbia Plateau is an area of major ecological contrasts: the vast Columbia River and its tributaries, arid semi-desert lowland zones marked by rocky canyons and buttes, forests and prairies at somewhat higher elevations, and meadows along mountain flanks. Each of these zones contained critical resources including numerous species of salmon, roots, berries, and ungulates used by American Indian peoples within a yearly subsistence cycle.

The tribes of the Plateau possessed sophisticated systems for conserving and allocating these traditional resources, through the scheduling of harvest via `first fruits' ceremonies, the distribution of gathering areas and fishing sites to kin groups, and the ritual significance attributed to these foods through their prominence in ceremonial life and gift exchange. Moreover, from the Indian perspective these staples formed only

the most prominent elements within an integrated web of resources, physical and spiritual, yielding an ethic of `holistic conservation,'[6] the equivalent of valuing the forest for `its own sake.' Not surprisingly, these resources retain great cultural significance for the Columbia Plateau tribes today.[7]

Such resource practices reflect a vastly different understanding of the environment than that guiding the environmental sciences. Among these indigenous perspectives are the following.

- Nature is personal and responsive. One interacts with a natural environment, which may take the form of personified spirits or forces.
- The relevant knowledge of an environment is gained through experience, which alone can reveal its relevant properties and powers. The goal is wisdom, rather than the abstract, theoretical knowledge of the environmental sciences.
- The appropriateness of environmental change is judged in relation to a conception of collective good and collective identity, and within a time frame extending indefinitely into the past and future.

Moreover, readers of *Honey Bee* will appreciate that not only the content but the forms of traditional American Indian environmental knowledge differ markedly from those of the environmental sciences. Three points are worth noting here.

(1) Traditional American Indian knowledge is location-specific. Conceptions of the environment are not generalized, but pertain to very specific locales, generally known in considerable detail. This knowledge is generated primarily by observation and experience over many generations, rather than by conscious experiment. It is practical, not theoretical, shaped by the needs and values of life in a particular community and environment. Such knowledge conveys which wood makes good needles, which makes good hoops for dipnets and where each can be found; where rocks most appropriate for heating a sweathouse can be obtained; or how one gathers huckleberries in a respectful manner, to insure that the plants will thrive. All this cannot readily be generalized. Western science, in contrast, `searches for knowledge that does not change depending on the context. . . .[it] is transferable across time, space and societal setting.'[8]

(2) Traditional knowledge is highly contextual. Traditional American Indian speakers leave much of their message

unstated, relying on the listener to place what is said within a context of shared understandings. Traditional speech grows out of common understandings within a community or tribe, passed from one generation to the next through stories and legends, jokes and comments, formal statements by leaders and elders and, most of all, through common experience. Scientific discussion, in contrast, is by definition explicit: assumptions and evidence must be clearly presented, so that they may be criticized, tested, and if necessary, revised.

(3) Traditional knowledge is socially restricted. Even within an American Indian community, information on certain topics cannot be freely communicated. An elder's knowledge regarding the properties and locations of medicines, for example, might be shared with only one or two other family members. Furthermore, traditional knowledge is usually conveyed from one person to another for a particular reason: perhaps to instruct, to cure, or to correct. From an American Indian perspective, however, to commit traditional knowledge to writing is to lose the control which an elder should retain over who may share in a teaching, and under which circumstances. Scientific practice, on the other hand, regards information as a public commodity or resource, which usually can be freely disseminated through the printed page.

Conclusions

American Indian communities are not static. In different ways, each attempts to find an appropriate balance between traditional and modern perspectives: in politics, medicine or economics. Nonetheless, traditional resource practices are likely to have an important place in the lives of American Indian peoples for the foreseeable future.

Unlike the `scientific' understanding of nature, traditional American Indian understandings of the environment emerge from, and are reproduced through, the activities of daily life. The reverse is also true: traditional resource practices provide a means for transmitting cultural knowledge and social identify from generation to generation. Cultural survival is dependent on the preservation of a shared life-world. Each element of cultural communication—demonstrating a pattern of basket making, recounting a story, demonstrating an herbal remedy—involves more than itself. Each communicates a tempo, an ethos, a web of symbolism reflecting a far broader cultural experience.[9]

In numerous ways American Indian perspectives push against what have been the conventions of scientific thought: by insisting on the uniqueness of particular environments; by envisioning very long time spans in assessing the consequences of environmental change; and by emphasizing the complexity of human-environmental interactions, rather than abstracting and isolating cultural and

biological patterns from each other. These assumptions of American Indian cultures anticipate, in remarkable ways,` changes occurring in the environmental sciences, toward recognizing the connectedness of systems, the necessary complexity of effective solutions, the intimate feedback relationship holding between social and technological change, and more generally, the appropriateness of sustainability as an overarching policy objective. This offers lessons for advancing sustainability in other cultures and contexts.

Endnotes

1 Herman E. Daly and John B. Cobb, Jr., *For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future.* 2nd edition. Boston: Beacon Press, 1994, p. 146.

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5 Reed F. Noss, `Sustainable Forestry or Sustainable Forests?' Gregory H. Aplet, et al., eds., *Defining Sustainable Forestry.* Washington, D.C.: Island Press, 1993, p. 18.

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7 Eugene Hunn and James Selam, *Nch'i-Wana, `The Big River': Mid-Columbia Indians and their Land.* Seattle: University of Washington Press, 1990. Robert H. Winthrop, `Conflicting Perceptions: Tribal and Regulatory Views of Nature, Risk, and Change.' *Practicing Anthropology* 16(3)[1994]:25-28.

8 Billie R. DeWalt, `Using Indigenous Knowledge to Improve Agriculture and Natural Resource Management.' *Human Organization* 53(2)[1994]:124.

9 Robert H. Winthrop, `Persistent Peoples: Mechanisms of Cultural Survival in Southern Oregon and Northwestern California.' N. Hannon and R. Olmo, eds., *Living with the Land: The Indians of Southwest Oregon.* Medford: Southern Oregon Historical Society, 1990.

Indigenous knowledge about a plant parasite:

Vakumba (Makar) a parasitic plant of tobacco

'*Vakumba*' or '*makar*' are local names of a plant parasite on the tobacco plant. This pest causes greater damage under irrigated conditions (four annas) than in unirrigated (two annas) conditions. It attaches itself to the root of the host and sucks out the nutrients. Deprived of nutrients, the leaves of the host die.

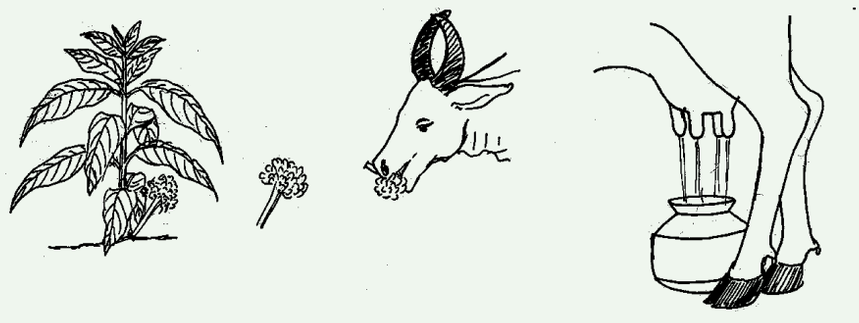
'*Makar*' grows well when the moisture in the soil is high, however, excess moisture acts as a deterrent. It causes rotting. In irrigated areas, farmers try to exploit this weakness of the pest by irrigating their field as soon as they notice its appearance. They also add ammonium sulphate to the water which is believed to hasten the process of decay of Makar. This method is perceived to be partially successful because as soon as the field dries up, the parasite is found to recover, and tobacco crop cannot be kept water-logged for long.

At Choryana Muvada one farmer observed that the parasite lodges itself in the roots of the host when the latter gets damaged during ploughing operations. Subsequent to injury, a node is noticed in the root from which the parasite grows out. Other farmers believe that the parasite gets lodged in the plant at the nursery stage. The activity of earthworms during the nursery stage may cause similar damage to tender roots and allow spores of the pest to enter the host plant. The farmer at Choryana observed that even changing the crop in a given field did not make any difference, and the parasite reappeared when tobacco was grown. This indicates that the spores remain dormant for more than two years.

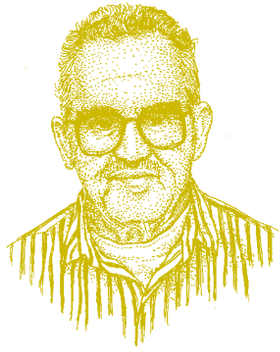
One positive feature of this infection was that the affected plant could still be fed to cattle. When fed in small quantities it in fact improved the quality of milk. However, it was not fed to animals in large quantities as it was considered as a 'garam' (hot) food. As per an earlier report in Honey Bee, this practice of feeding Makar shoots to cattle was responsible for spreading the parasite to new fields. The spores of Makar passed into dung undigested and got transferred to the field through FYM.

In areas where tobacco is grown as unirrigated crop, there is no satisfactory cure for this pest.

Source: Several farmers of Choryana Muvada, Savli Taluka, District Baroda, Gujarat



In the picturesque Cauca valley of southern Colombia there are two small farms (total area 6.5 ha) that stand out as islands in an ocean of chemically intensive agriculture. They are model farms established by 64-year old Prof. Mario Mejia. Prof. Mejia after serving in the Agriculture Department of the Government of Colombia is now involved in propagating indigenous farming systems among the small farmers of Columbia. He resides at Carrera 43, Cali, Colombia.



Exploring Alternatives to Green Revolution Agriculture:

Prof. Mejia studied green revolution style agronomy at the National University of Colombia and became a technical adviser on commercial crops (such as sugar cane, rice, African oil palm and cotton) with the Colombia government. This position gave him an opportunity to tour his country extensively. Prof. Mejia also taught climatology in several agricultural schools during which he developed a special interest in agricultural production under natural conditions. A project in 1976 in the Amazonian region of Colombia gave him the opportunity to study natural agriculture as practised by the indigenous people of that region.

Since his retirement in 1988, he spends most of his time supporting non-governmental organizations (NGOs) which help small farmers. One such NGO is located in a coffee growing region. This NGO was created after the coffee price crash in the 1980s. This price crash coupled with increasing production costs and increased pests and disease devastated the means of livelihood of most of the small farmers.

The crops were cultivated using green revolution technologies of high chemical inputs for enhancing soil fertility and

for pest and disease management. Local hardships, in these times, were accentuated by the system of coffee monocropping which involved sacrificing land normally under food crops.

During this time, Prof. Mejia worked in collaboration with the NGO to explore alternatives to green revolution agriculture. He also published two books entitled `*Agriculturas para la vida*' (`Agriculture(s) for life' ; 253 pages) and `*Agriculturas sin agrotoxicos*' (Agriculture without chemical toxins; 96 pages). Currently he is writing a book on natural livestock husbandry without chemical inputs.

Learning Process

In 1994 Prof. Mejia started his own demonstration farms for small farmers who had been adversely affected by the coffee crisis. On these farms alternative agricultural models were designed and set up, based on a learning process developed by creative/ innovative farmers in collaboration with the local NGO (CIPAV in Cali and IMCA in Buga). The objective of the demonstration farms "Manantial" and "Horizontes"is to present alternative agricultural models to the small and poor farmers, especially those located in the coffee growing regions.

While designing the farms, the ideas of several schools of alternative agricultural thought were considered including biodiversity, associative, microbial, trophobiotic, natural farming (based on Masanobu Fukuoka) and permaculture.

Land preparation and weeding are carried out in ways that maintain soil structure (through no-till and limited-till techniques) and produce compost from the weed biomass. Perennial crops are given preference. Pest and disease control is effected through natural predators like birds and beneficial insects. Eight different types of compost and half a dozen types of low cost microbial and trophobiotic mixtures are used. Besides, the farms have a recycling system including dry latrines and composting. The farms also seek to establish alternative value systems that emphasise the practice of non violence.

Cropping System Models

Ten different cropping systems or models have been established on the demonstration farms. While all these models aim to provide farming families with at least a minimal subsistence income, each has a special focus of its own: (i) Medicinal plants. (ii) Ornamental flowers of *Anturios* (*Anthurium andreanum*) and of the genus Heliconias . (iii) *Fig trees* (*Ficus carica*.) (iv) *Orange trees* (*Citrus spp*.)

Agroforestry models based on plantains, *fodder trees* (*Erythrina edulis, Trichanthera gigantea* and *Tithonia diversifotia*) *fuelwood trees*, medicinal plants and herbs. (v) Nurseries for ornamental and timber yielding trees. (vi) Sugarcane production with a small scale cane crusher, run by animal traction, for farm-level molasses production. (vii) Subsistence crops to ensure food security. (viii) *Achira* (*Canna edulis*) for starch production.

Composting Methods and Microbial Mixtures for Improving Soil Fertility

Several composting methods are used on the farms: (i) vermiculture (ii) decomposition of wood by worms and other insects. (iii) treating urban sawmill wastes with microbial mixtures. (iv) composting weeds and other spontaneous herbs. (v) composting weeds and herbs that have been chopped and treated then placed in layers with forest litter. (vi) composting household organic waste. (vii) from indoor compost (viii) piling poultry manure or indoor compost in the hen house to compost further and also encouraging earthworms as an additional source of protein for the poultry.

Several other techniques used for improving soil fertility and plant vigour are: (i) Microbial mixtures- Agroplus type: This contains a mixture of photosynthesizing bacteria, actinomycetes, yeast, lactobacillus, soybean meal, milk, yogurt, molasses, and clean water. It should be applied at least once each month to the soil. (ii) Anaerobic mixtures of fermented cattle manure. (iii) Trophobiotic mixture of micro minerals. Micro minerals are fermented for a month in fresh ruminant manure. (iv) Mixtures of medicinal plants that have been prepared in hot water or fermentated in fresh water.

Livestock husbandry models

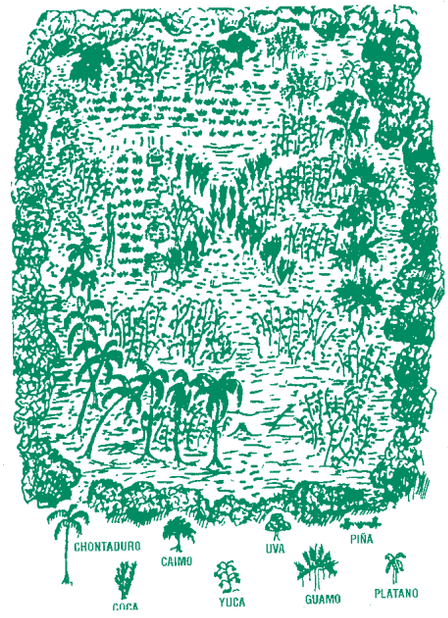
Three different livestock models have been established on the demonstration farms. Again each of them is aimed at providing a minimum subsistencing income for peasant families. Here the models established are: (i) Bee keeping (apiculture) (ii) Guinea pig (*Cavia porcellus*) production (iii) Stall fed cattle production. The ten head of cattle are fed on fodder from such as *nacedero* (*Trichanthera gigantea*), *chahafruits* (*Erythrina edulis*) and *imperial grass* (*Axonopus scoparius*) or *king grass Gusica* (*Pennisetum purpurem*). In addition, plantain stem, native herbs, salt, molasses and urea are also fed to the cattle.

Additional Technologies Employed at the demonstration farms:

(a) To reduce bad odours and flies in the cowshed and piggeries the following measures are taken:The cattle manure is collected every two days, pig manure daily and fed to earthworms (red Californian type). The animal houses are sprayed with microbial mixtures every week or once in two weeks. The piggery is washed twice a day. (b)To prevent contamination of water sources at the farm: A dry latrine is built in the house. The latrine has two separate collecting pits (one cubic meter each) that are used for a six month period each. The fermented faeces is used as fertilizer. The feaces are covered with ash or which dry soil. Once it also add minerals, soil or limestone to the fertilizer. (c) Small drainage tanks beside the animal shelters collect waste water which is then used to enrich the trenches of compost.

Recovering biodiversity

Prof. Mejia has also established *in-situ* collections of several important land races including:



Fodder crops : (i) 5 types of *Erythrina edulis* (ii) 18 types of *Trichanthera gigantea* (iii) 14 types of soft, downless sugarcane

Food crops: (i) 11 types of *achira* (*Canna edulis*) (ii) 6 types of *cidra* (*Seehuim edule*) (iii) 16 types of *Cassava spp* (1800 m above sea level) (iv) 6 types of *Xanthosona* spp.

*Ornamental flowers:(i)*15 types of *Helionia spp*. (ii) 7 types of *Anthurium andreanum*.

Medicinal plants: 35 different species
Fruit trees: 8 different species of orange trees

Indigenous trees: rare or threatened species are planted on a 40m wide strip on the banks of all water channels.

Diffusion of the technologies

In 1995 alone, 220 people visited the demonstration farms. Prof. Mejia was also invited to undertake 14 courses in various places of Columbia for an audience of over 400 people. Besides this, he conducted ten conferences on the subject in 1995.

Cashew and Camphor to Keep Humidity Away

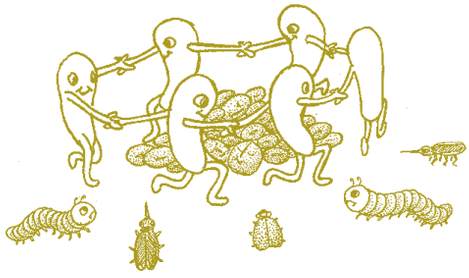
The north coast of Karnataka is characterized by heavy rainfall and high humidity which are major hindrances for the effective storage of seed materials and efficient cultivation of crops. Under these adverse circumstances, farmers who are entirely dependent on agriculture have, over the years, devised the following methods for cultivation and storage. The following practices have been compiled by A Bheemappa and M.M. Hosamani, Extension Education Unit, Regional Research Station, Raichur - 584101 Karnataka.

Protection Against Storage Pests:

Leaf powder of ***Vitex negundo*** is added to stored paddy and pulse seeds. The method consists of leaving the threshed paddy in field for three days and then threshing and storing them, without winnowing, in gunny bags or tied with paddy straw. Then in the month of March (Shivaratri festival) they are taken out and dried in the Sun for 3, 5 or 7 days & nights. Later they are winnowed, cleaned and filled in gunny bags or tied with paddy straw with the addition of leaf powder of ***Vitex negundo*** in the proportion of 15:1 or 20.1.

Comm: Masti Avanti Gaovkar, Mannu Baba Padati, Bela village and Suresh shankargouda, Belambar village

Pulse crop seeds after drying in the Sun for 4 to 5 days (days & nights), should be kept in gunny bags or tied with paddy straw after adding split seed-coat pieces of **Cashew** ***(Anacardium occidentale)***.



The oil content in cashew nut seed coats has a heat conserving and pungent effect which repels the storage pests. Some farmers also add ash.

Comm: Sri.Panduranga Laxman Nayak, Shirukuli, and Masti Anant Gaonkar, Bela village, Ankola.

After properly drying pulse seeds leaves of (***Moringa pterygosperma)*** are added and then seeds are stored in gunny bags or tied paddy straw.

Comm: Devagukagouda, Keni village.

Camphor is used to store groundnut pods for 6-7 months. The method consists of filling properly dried groundnut pods in polythene lined gunny bags to a height of 30 cms: Then a few pieces (8 to 10) of camphor are placed on this before filling it further. Likewise, the entire bag is filled up and then its mouth is tied tightly. The bags are kept in moisture-free places. This process has to be completed before onset of monsoon. The same method is also used for storing pulses meant to be used as seed.

Comm: farmers of Amdalli village, Karwar taluka.

Minimize Crop Pests:

By burning heaps of paddy husk in field at night, pests are attracted towards light; they die by falling into fire. ***Sphaeranthus indicus*** plant is used as a repellant to crop pests in paddy: Leaves of ***Sphaeranthus indicus*** are spread in fields. The peculiar smell of this plant has the property of repelling insects like leaf rollers and hoppers.

Comm: Sri. Mahadeva Sheshu Nayak and Sri.Tekugaru Nayak, Bavikeri village, Ankola Taluka.

Control Termites:

As a protective measure against termites and other soil inhabiting pests in sugarcane crop, **dry dung** and other **crop residuals** are burnt in the furrows opened for planting sugarcane cuttings before planting the crop.

Comm: Sri. Devugukagouda of keni village. Raichur District.

Combating Striga

In the mid-western region of Vakinankaetra, several hundred km south of the capital of Madagascar, striga causes great damage to maize, rainfed rice, and cassava; other subsistence crops in the "tanety" area also suffer damage due to it.

Small farmers of that area have evolved a local solution to eradicate or limit it's spread. Farmers take the trunk and leaves of a banana tree, cut them into small pieces and bury them at the foot of the striga plant. In this way, these noxious weeds are suppressed in a short space of time, at very little expense.

Comm.: Ravelomanantsoa Olivier Lot 10.C.115, andohatany 110, Antsirabe, Madagascar. Source : Acacia No. 12, April, 1996 pp-21

Ed: In an earlier issue of Honeybee (vol. 3.1) we reported that Wazeye farmers of Nigeria incorporate Sesame seeds with millets to protect them against striga. Farmers claim that Striga wraps itself around the root of sesame,thus leaving the millet free.

It is a recognized fact that India's traditional fishery sector is its main strength. A survey undertaken by Bheemappa. A[1] and N.Sivasankar[1] in Ankola, Kumta and Karwar talukas of north coastal Karnataka, revealed the following indigenous practices for maintenance of crafts and gear.

1 Bheemappa. A and N.Sivasankar Extension Education Unit,Regional Research Station Raichur - 584101 Karnataka

Boat Building Material:

Wood of ***Mangifera indica*** and ***Pterocarpus marsupium*** are used for building of boats. Fisherfolk opine that these woods do not split even after long exposure to the sun and are good absorbers of preservatives as well.

Comm: Sri. Shankar Takikar and Vishnu Shankar Takikar, Shedikuli village, Ankola taluka, Karwar district.

Making Fishing Nets

Knotted nets using vegetable fibre twines such as jute can withstand more strain during hauling/dragging. The durability and efficiency of these nets is comparatively better than machine made nets.

Comm: *Sri. Panduranga, P.A. Ahmed, Abdul Ahmed, Tadadi village, Ankola taluka.*

Preservative for Fishing Nets:

The bark extract of **Terminalia tomentosa** is used as preservative for fishing nets. The preservative is made by boiling bark in water. Later the extract is filtered and the fishing nets are dipped in the filtrate. After treating they are to be dried in the sun, and this process has to be repeated three to four times. The fisher folk point out that this treatment helps in keeping rodents away from the nets, imparts antifungal & antibacterial properties, and it is inexpensive and efficient as well. Sri. Chandrahas Shankar Takikar, Shashi shankar Takikar and Vishnu Shankar Takikar, Shedikuli village also highlighted the practice of washing fishing nets in salt water and then in fresh water later dried in the sunlight.

Comm: Sri. Panduranga, Sri. P. Ahmed and Abdul Ahmed, Tadadi village

Staining Fishing Nets :

Kesari colour and salt solution are used for staining nets. The process consists of dissolving 400 gms of pakkadaaneka rang (kesari) in about 50 litres of boiling water and then two kilograms of salt mixed thoroughly. This is sufficient for staining eight to ten nets weighing eight kilograms each. After this, the nets are to be dried. The freshly knotted nets should be stained within 90 days after the first staining and repeatedly stained whenever the nets get bleached, which is normally two times a year. This method, the fisher folk say, increases the life of the fishing nets.

Comm: Sri. Chandrahas shankar Takikar, Shashi Shankar Takikar and Vishnu Shankar Takikar of Shedikuli village and Ganapathi Isram Takikar of Harwad village.

Protecting Boats from Wood Borers and Barnacles:

Seed oil of ***Pterocarpus marsupium*** mixed with gum as adhesive is used to cover the bottom of boats, this is, the part which stays immersed in water. One kilogram of ***Pterocarpus marsupium*** seed oil is mixed with about one kilogram of ***chandras*** (***gum***) into a slurry of medium thickness (in semisolid form) and applied. After application of this paste, the boat is allowed to dry. The seed oil helps increase the life of the boat by protecting it from wood borers and barnacles; chandras increases adherence of oil to the wood. This type of preservation is efficient and far less expensive as compared to synthetic paints which act superficially without penetrating deep into the wood.

Comm: Sri Ganapathi Isram Takekar, Harwad village, and P. Ahmed and Abdul Ahmed of Tadadi village, Ankola taluka

To keep hull of boat in light condition, prevent sticking of mud, and also to protect it from wood borers and barnacles the hull of the boat is painted with seed oil of **Cashew (*Anacardium occidentale)***.

Some farmers apply a paste prepared from mixing of seed oil of **Cashew *(Anacardium occidentale)*** and ***lime***. This method consists of mixing 1.5 kg of cashew nut seed oil in one kilogram of lime to make thick paste.

Comm: Sri. Chandrahas Shankar Takikar, Shashi Shankar Takikar, and Vishnu Shankar Takikar, Shedikuli village and Sri. Ganpathi Isram, Harwad village, and Sri. Abdul Ahmed other fisherfolk, Tadadi village

நம் வழி வேளாண்மை

Nam Vazhi Velanmai *(Tamil version of Honey Bee)*
Mr P Vivekanandan, Editor, 43, T P M Nagar, Virattipathu, Madurai 625 010.

Increasing the Fragrance of Leaves

About 1.5 litres of butter-milk (from cow's milk) are poured at the foot of a grown up Karuvepilai tree — also known as Kadipatta — **(*Murraya koenigii*)** for increasing the fragrance of leaves several fold. This is done once a week or whenever there is excess butter-milk in the house.

Increasing Productivity in Sweet Potatoes

Sweet potatoes, in low lying areas are raised on soil mounds one metre high. Three sweet potato plants are raised in each mound. A mixture of two kilos of green leaves of **Vajar** (***Albizzia lebbeck***) and half a kilo of donkey dunk is put inside the mound. This results in an increase in the size of tubers.

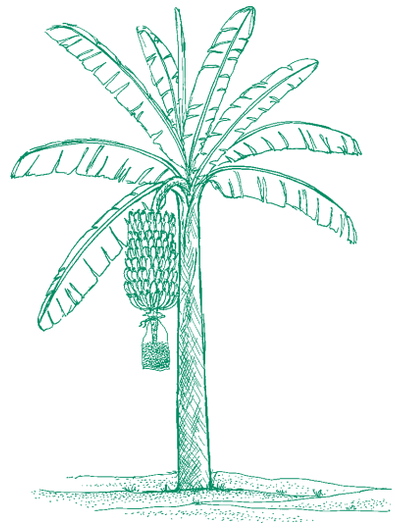
Preventing Damage to Orchard Trees:

Farmers who have their gardens near forests face the problem of marauding boars which cause extensive damage to mango and guava trees during the night. Boars are able to feed on mango and guava fruits from grafted varieties since this trees are not upright; they grow sideways profusely touching the ground. In order to avoid damages caused by boars, mango seedlings of the desired variety are raised and planted directly (without going for grafting). The ungrafted tree grows tall and is immune to attacks by boars.

Comm: Sri. Velumudaliar, Kanyakumari district

Increasing the Size of Bananas

During the phase of bunch development in banana, after 10 days of formation of



fingerlings/tender fruits, the flower cone is removed. To prevent oozing of the plant sap, a polythene bag filled with 50 g of ash mixed in 100 ml of water/urea solution is hung at the tip of the bunch. This ensures getting larger sized fruits. After one month of fruit development, farmers apply an algae, which grows in ponds, over the entire bunch and cover it with a banana leaf sheath. This ensures a good yellow colour.

Preventing Pest Attack in Banana

Application of 150g of a solution prepared from powdered and boiled shells, sea pearls etc. in the pits dug for planting banana plants is used to kill root infecting organisms.

Controlling Weed Growth:

In order to prevent the growth of a weed called '**Korai**' (***Cyperus rotendus***) goat manure used is obtained from villages where there is no infestation of this 'Korai' grass. This manure is free from seeds of Korai. Neem kernel powder is also applied as manure to trees like citrus, guava and mango.

Comm: Sri. Velumudaliar, 4 Chidambara Vinayagar Street, Pulingudi, Nellai Kattaboman district.

Incompatible Partners:

If **mulberry (*Morus alba)*** plants are raised along with **coriander (*Coriandrum sativum*)** the quality of Mulberry leaves and in turn the cocoon production for sericulture is adversely affected. This observation is based on experiences of farmers in Karnataka.
Comm: Dr. Sethu Rao in PTD Seminar organised by Kerala Horticulture Development Programme.

Pest Control in Paddy

In Tirunelveli district the male cones of Sannamboo plant (*Cycas cercinalis*) are tied on sticks and erected in paddy fields for repelling paddy earhead bugs.We noticed that activities of predator birds were higher in the fields tied with cones of ***Cycas*** due to swarming of earhead bugs repelled by the strong smell of cones. In the same district farmers bury mud pots containing fermented water of ground castor kernel (after soaking the castor seed particles obtained at the time of extraction of oil) in the coconut garden. This attracts adult Rhinoceros beetles which fall in to the pot and get killed. For control of the same pest, farmers insert whole plant of Kozhunji (*Tephrosia purpurea*) in the primordial region of Coconut trees.

Honey Bee Colonies for Coconut Pollination

In the yellow variety of coconut, male and female flowers do not mature at the

same time. Hence fertilization is based on cross pollination by agents like the honey bee. The natural cross pollination process by wind is accelerated by establishing honey bee colonies in the farm. Empty mud pots are hung upside down on trees or poles to facilitate building of bee colonies. Natural colonies of bees are noticed within two months.

Comm: Sam Daniel, Kodiyur, Kollan Kaduvetty, Mulagummodu post, K.K. District 629 167

For Increasing timber yield

A quick growth in hedges is ensured by planting stem cuttings rather than seedlings of **subabal *(Leucaena leuco cephala)*** Subabul trees are raised for feeding goats. Stem cuttings are also used for raising **Thulakkan vembu** (***Melia dubia***) a fast growing tree useful for light timber. (Raising the seeds give poor germination in ***Melia dubia***) Procedure for growing neem and tamarind seedlings is also note worthy. 2 or 3 seedlings of one type in a pit are planted and the vigor of the growing plant is maintained by thinning the other slow growing seedlings in the second year.

Kolinchi a green manure plant (***Tephrosia purpurea***), is planted in between mango trees for soil conservation and for increasing the fertility of soil.

Incompatible partners:

If **mulberry (*Morus alba)*** plants are raised along with **coriander (*Coriandrum sativum*)** the quality of Mulberry leaves and in turn the cocoon production for sericulture is adversely affected. This observation is based on experiences of Karnataka farmers.

Comm: Dr. Sethu Rao in PTD Seminar organised by Kerala Horticulture Development Programme.

Increasing Milk Yields

Tamarind (*Tamarindus indica*) seeds are heated in an oven and then pounded gently so as to remove the outercoat. The dehusked seeds are then soaked in water overnight. The soaked seeds are fed to cattle (one or two kilo per day) as a high energy food. This also induces increased milk secretion in dairy animals.

Comm: Sri. Govindasamy Reddiar in Vembarpatti village (Natham taluka) Dindugal district.

Treating Animals that Refuse to Feed

Root of milagaranaikodi (***Stephania japonica***), three cloves of garlic and 10 pepper seeds are to be ground and diluted in hot water and fed once to the the animal.

Animal Fever

A handful of Veppalai leaves (***Wrightia tinctoria***), a **bark** (palm size) peeled out of the same tree, **chilli** (one pod) and, **garlic rhizome** (three or four) are to be ground together along with a little water. This has to be diluted to make half a litre and administered in the morning. The fever comes down considerably by evening.

Inducing Heat in Animals

Raw milk (1/4 litre) of cow is added to the plant extract prepared from young leaves (handful) of Ponnavarai ***Cassia senn*** and two rhizomes of turmeric. To this, salt (100 gm) is added and stirred well. The final solution is made up to one litre by diluting with water and administered to the animal for one day.

Comm: Sri Kuppaiah Gounder, Sithandapuram village,

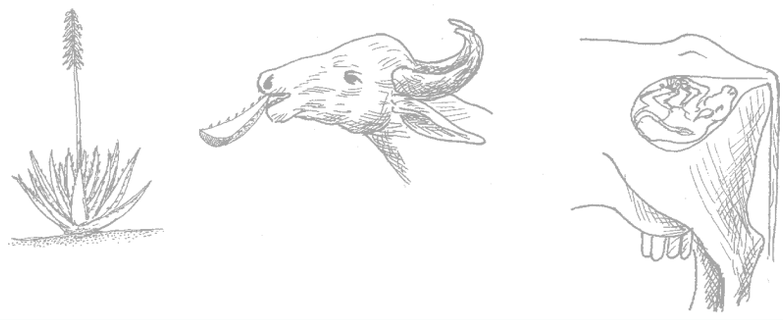
Inducing Conception in Cows

One seed of **Searnkottai** (***Semecarpus anacardium***) is administered to the cow per day for three days instead of ***Aloe vera*** for deworming. Then 250g of sprouted wheat seeds per day are given to the cow for 15 days . Sri. Pitchai's dairy cow conceived after a lapse of two years after undergoing this treatment.

Comm: Sri. Pitchai, Pappinaickanapatti village, Kanyakumari Dist.

Sprouted bengal gram + Aloe to induce oestrus

In Madurai it is a common practice to give sprouted bengal gram to dairy animals which do not come in to oestrus or conceive. For the first 3 days, animals are given leaf flesh extract of *Aloe vera* (a single leaf each time) for the next 2 weeks, the animal is given about 200 gms of sprouted bengal gram daily. SEVA had asked 4 farmers to field test this method with 10 problem animals (2 cows + 8 Buffaloes);9 have conceived. Now we have an ambitions plan of testing 100 animals which do not conceive in the normal course.

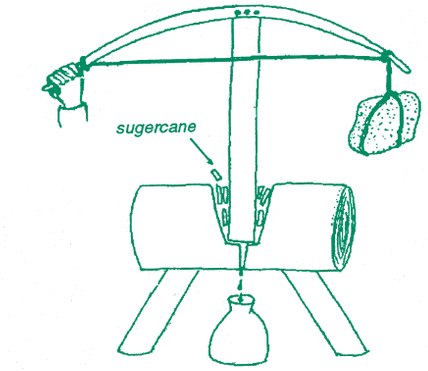


Indigenous Technology from Bhutan

The Following practices have been abstracted from "Indigenous Technology" Vol. 1(November 1996) Published by NRTI, Bhutan. "Indigenous Technology" is the Bhutanese version of Honey Bee.

"GUR" from Sugarcane

Gur or *Sakhar* is the local name for molasses obtained from the sugarcane juice. This technology is popular in Southern Bhutan. It is also practised in some regions in the North. It is believed that the technology was originally practised



in Sarbhang and later spread to Chirang where it is most popular and common at present. The technology employs less labour and the product has multiple uses. The bagasse is used as fertilizer and cattle feed.

Materials required:

A block of wood, a bamboo piece (flat or round), two wooden stands, a container (pot), a stone, wooden nails, ropes, axe, knife, chisel, fire, crowbar and spade.

Procedure:

Fix the stands firmly on the ground as shown in the diagram. Make a depression (16 cm deep and 14 cm wide) on the wooden block. At the floor of this depression make a small through and through hole of about 0.5 cm so that the juice from the crushed sugarcane drains out through this opening. Fix the bamboo piece to one end of the wooden log with the help of wooden nails. With a rope tie the ends of the bamboo to make it slightly curved. Place the other end of the wooden log into the depression of the wooden block. Tie a stone or any heavy object to one end of the bamboo. The log tilts to the side the stone is tied. Put the cut pieces of sugarcane one after another in the depression of the block and rotate the log holding the free end of the curved bamboo. Sugarcane is crushed and the juice is collected into a pot kept below the block of wood. The collected juice is boiled till the liquid becomes semisolid. Cool the semisolid extract and transfer it to a new container. The extract solidifies and thus the "Gur" is ready. The Gur retains the shape of the container.

Comm: Arjun Gurung

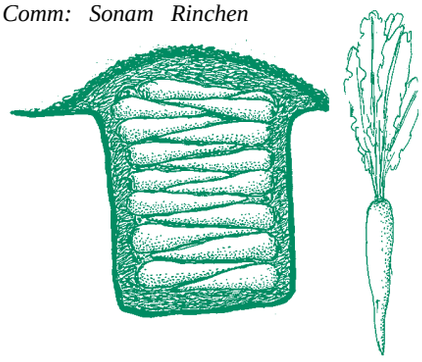
Storing Radish

Radish is the main vegetable grown in the cold regions of Bhutan. The Bhutanese people store Radish and use them during their lean seasons. It is very often used for curry and also for the ceremonial pujas and festivals. The method for its storage is very simple.

Procedure for storage:

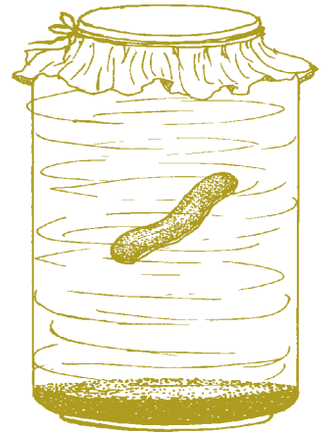
Dig a pit (3'x4') on the ground. Sole the bottom. Put a layer of straw on all the sides of the pit. Cleaned radish is then put into the pit. It is convered with straw and the straw is then covered with soil. A bamboo mat is placed on top of the pit. Radish can be stored for 4-5 months by this method.

Comm: Sonam Rinchen



Nature's Weatherman: The leach

In olden times there were no instruments like barometers, thermometers etc. Can you imagine how people used to predict the weather then ? "Hunnar Varnan" a book written in Gujarati almost a hundred years ago by Gangaben Yagnik gives a very interesting account of how peoples' creativity



and ingenuity to come up with solutions knows no bounds. She describes the following method employed by the people at the time A clean glass bottle of 500 ml. capacity is filled with water to the brim. One leach (Hirudinea spp.) along with some sticky mud is placed in the bottle. A piece of cloth is then tied over the mouth of the bottle. If the leach settles down at the bottom of the bottle it indicates that weather is going to be calm and if it stays near the mouth of the bottle then one can expect rain. If the leach becomes restless and continues to move round and round rapidly in the water then it indicates the arrival of a severe storm and if it settles down at the bottom then the weather will be calm again. The water in the bottle is changed every week.Leaches are commonly found in water puddles or other moisture laden places. They feed on the blood of animals and even humans at times by sticking to the body.

India Looks back to forgotten natural dyes

Fredrick Noronha

This article reviews recent publications on the subject of traditional natural dyes. These dyes, particularly those derived from plants, have been used in India since pre-historic times. Shri Siddiqui, a research officer at the drug standardization research unit of the Lucknow-based National Botanical Research Institute has done a study on dye-yielding medicinal plants. His study points out the potential of user-friendly, soul-soothing and eco-friendly dyes derived from natural sources. Fredrick Noronha is a journalist from Goa.He can be contacted at House # 784, Saligao, Goa 403511

In the Harappan civilization, there is evidence of the use of a red pigment, most probably obtained from *Madder* root. Dresses, manuscripts and paintings kept in Indian museums, as well as colorful decorations and ceilings of various monuments of the Moghul period and earlier testify to the mastery of Indian craftsmen in using natural dyes.

Herbal dyes have also been widely used as cosmetics for women. For instance, *Henna* or *Mehndi* went into decorating the palms and soles. Catechu along with lime and betel leaf was used for tinting the lips, and *Missi* for beautifying the gums. Plant dyes like *saffron*, *turmeri*c and *ratanjot* have also been used as food and confectionery colorants.

But these were mostly supplanted by newly developed synthetic dyes, which were easy to use, needed small doses, and acted fast. All this resulted in the ousting of natural dyes from almost every field in the world of colors. According to Siddiqui, "Even the brilliant natural color of Indigo, which at one time resulted in the uprising of the planters of Champaran in Bihar, lost its glory and value as a blue dye, and its international trade was restricted to only a few tonnes."

But concern in the West about the harm caused by synthetic drugs and dyes is putting the brakes on their manufacture today. Countries like Germany have already taken a lead in this direction. This, together with the "back-to-nature" movement, is giving a new boost to dyes and cosmetics derived from safer natural sources. There are very many options to choose from. *Babul* (*Acacia nilotica*), the strong tree, yields black, brown and khaki colors from its pods and bark. Brown to yellow shades come from the *Catechu tree* (*Acacia catechu*). Even waste onion peelings give yellow and orange dyes.

The study also lists wide sources for an interesting rainbow of colors. Flame-of-the-Forest (*Butea monosperma*), a deciduous tree available throughout India, offers brilliant yellow shades

from its flowers, and its gum can act as a durable blue dye. *Mehndi* (*Lawsonia inermis*) leaves give their typical reddish-brown dye. Yellow, golden, brownish and greenish shades come from the fruit and rind of the *pomegranate* (*Punica granatum*). Green color comes from the leaves of *Shikakai* (*Acacia concinna*). Turkey-red oil from the castor oil tree can be used for dyeing and printing cotton and woollen fabrics. Yellow and dull green colors can be obtained from the *Marigold herb* (*Tagetes erecta*), if its flowers are used with alum or in such combinations.

From them, one can get black, blue, brown, chocolate, crimson, green, grey, indigo, maroon, orange, pink, purple, red, scarlet, vermilion, violet, white and yellow shades. "This information is more in the nature of a curtain-raiser," he (Chandramouli, 1996) says modestly, hinting at the untapped potential of such sources.

Herbal dyes are safe to collect, handle and use. They come in aesthetically more-appealing color shades. Above all, they cause little or no, chemical pollution or toxicity. If their sources are taken care of and replenished, there is no fear of extinction as in the case of non-renewable resources like coal tar and petroleum.

But they have some limitations too, such as weak colours, difficulty in standardizing the quality and shortage of land for cultivation. While there are nearly ***500 plant species*** from which dyes could be made, the available literature refers to only a few of these. Methods of cultivation for other species are not readily available. Tropical India is rich in equatorial to temperate flora, but so far few efforts have been made by taxonomists and economic botanists towards a comprehensive survey of dye-yielding plants. After the end of colonial rule, much attention was paid by Indian scientists to the pharmaceutical use of plants but very little to plants which can provide safe dyes.

K.V. Chandramouli, the author of the new book, **Sources of Natural Dyes in India: A Compedium with Regional Names**, *lists some 458 plants which yield a range of colors.*

Survey of Grassroots Innovations

Part XVII

Team

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Riya Sinha

Making the Cuckoo Hatch Crow's Eggs: Extension Workers as Scouters of Innovation:

We organized competition for scouting of innovations among grassroots functionaries of the District Rural Development Agency, Government of Gujarat, on two occasions and provided them with a simple format for reporting their finds. Prizes were offered for the best contributions. This competition was open even to teachers, scientists, students and rural youth besides extension workers. In this issue we publish some of the practices collected through these contests by extension officers of the state agriculture university including ones like the propagation of date palm, using dried cumin stalks to control weeds, etc. The most significant point to be noted here is that information began to flow in the reverse direction as the extension workers began taking information from the farm to the scientists.

7401

Natural Humidity indicator:

Predicting the Monsoon

The aerial root of the banyan tree serves as a practical moisture indicator during the monsoons. It works like this: the tip

of the aerial root is snipped off; if several drops of water flow out, it indicates likelihood of good showers in near future (within couple of days). Given the hygroscopic nature of aerial roots one can expect them to serve as a crude indicator of relative humidity.

Comm: Desai Samatbhai, Choryana Muvada, Tal: Savli, Baroda

7402

Flowering of cactus

The year in which cactus flowers bloom in bunches, it is said, one can expect good rains and an extra month of monsoon rains. This is a time-tested indicator.

Comm: Farmers of Choryana Muvada, Tal: Savli, Baroda

7403

Banana Crop Lasts for Years:

Generally, farmers take only one harvest of banana nad do not allow the plant to grow suckers and remove the main plants after the harvest. A few farmers take a ratoon crop once. It is believed that after one season or two, the yield of fruits is reduced and so the plant is removed.

Jayantiblai Bhavanjibhai Khodiyar, a farmer of Kutch district, has been taking the crop continuously by retaining the plant for last 20 years. He allows all the healthy suckers to grow and removes the mother plant after two or three harvests. He has been weeding crop only two or three times a year and applies organic manure twice in a year to his crop which has been standing in the same field for last 20 years.

Over the years, he has found that the tree produces the highest yield in its

Collaborating Institutions

- *Mahila Gram Vidyapith, Nardipur*
- *Gram Bharati, Amrapur*
- *Sabar Gram Vidyapith, Sonasan*
- *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, Shardagram*
- *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*

second year of harvest, but the yield stabilizes from third year onwards up to the tenth year when the average yield is around 15 to 20 Kg. But sometimes the fruits may be small. Another farmer, Haribhai Kunxarjibhai Khodiyar of the village also follows the same practice.

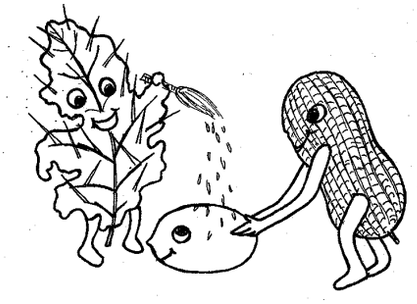
Jayantibhai Bhuvanjibhai Khodiyar,Via-Dabada, Tal: Anjr, Dist: Kachh, Comm: Prof. K.D.Solanki, GAV, S.K. Nagar.

7404

Control of Soil Pests

Soil pests such as white grub and termite damage groundnut crop and drastically reduce yields by thinning out the plant population.

To prevent grub-induced damage, a farmer, Nathubhai Patel of Sabarkantha district, uses the fruit and seeds of a plant locally called '*bhoyringni*' (***Solanum surattense***). Approximately 500 g of fruits along with its seeds are



crushed and boiled in water. The decoction is filtered and the filtrate is used to coat seeds of groundnut before sowing them. The decoction prepared with 500 g of the fruit and seed is enough for treating 20 kg of seeds. '*Bhoyringni*' is a thorny plant that spreads on the ground in rainy season. It is generally found on pastures, wasteland and river banks. It bears violet flowers and yellow fruits.

Nathubhai had long back quit his profession as a teacher in a primary school to become a farmer. He has since been experimenting with non-chemical agricultural methods.

Nathubhai Bahecharbhai Patel, Vill: Rampur, P.O.: Jambudi, Tal: Himmatnagar, Dist: Sabarkantha, Comm: Ishwar P Valand

7405

A Sowing Method to Prevent Blight in Cumin:

Farmers generally sow cumin seeds by broadcasting. Cumin is often infected by blight disease and consequently suffers significant reduction in the yield. Blight the makes plant turn black and wither away.

Bhagvanbhai Tavadiya, a farmer from Panxi Village of Vallabhipur taluka of Bhavnagar district noticed that plants growing on bunds of the small beds in the field were not affected by the disease. This led to him devise a new method of sowing cumin seeds.

He broadcasted seeds in the field and made small beds using a wooden multi-tool bar having three coulters known locally 'tarfen' or 'dantal' which is drawn through the field by a pair of bullocks. This makes long narrow ridges in the field and the seeds blend well with the soil and accumulate on the small bunds made by ridges. This contributes to a higher germination rate, says Bhagvanbhai. The soil around the plants remains dry even during the severe cold when dew fall is very high. As a consequence, the incidence blight is greatly reduced. Several other farmers of the same village have also begun to use this method of sowing cumin.

Bhagavanbhai Talashibhai Tavadiya, vill:Panxi, Taluka:Vallabhipur, Dist: Bhavnagar, Comm: Dilip D. Koradia.

7406

Propagating Date Palm through Suckers :

When approximately 5 or 6 years old, date palm trees produce suckers from the stem near the ground. The suckers strike roots as they come in contact with soil and can be used to raise new plants. But when suckers sprout from higher up on the stem, that is, at about one metre or more above the ground level they do not reach

the soil and hence do not produce roots. Ishaqbhai Yakubbhai Turq, a farmer of Dhrab Village from Mundra Taluka, Kutch district, however, has evolved a method to make the high up suckers strike roots so that they can be used for propagating the plant. He mixes soil with organic manure in polyethylene bags and ties them around the suckers sprouting from the higher points of the stem. The bags are secured in such a way that soil and a portion of the stem remain in contact; after few days these suckers also strike roots.

Suckers which develop roots are separated from the parent tree and transplanted along with the bags in the field. Trees raised by the vegetative method of propagation have characteristics identical to that of the mother plant and produce fruits of similar size and taste.

Ishaqbhai has been successfully practising this method of propagation for the last 10 years. The only care that needs to be taken, according to him, is that after detaching the suckers from the mother plant, the cut portion from where suckers have been removed must be plastered; otherwise, the exposed portion would make the tree susceptible to attack by a grub locally known as 'dhal kitak'.

Ishaqbhai Yakubbhai Turq, Via- Dhrab, Tal:-Mundra, Dist: Kutch, Comm: Prof. K.D. Solanki.

7407

Weed Control:

'Dharo' (***Cynodon dactylon***) is a noxious, perennial, grassy weed that grows on fertile patches and bunds in the fields. Even running a harrow for interculturing is very difficult in spots where the weed grows. The weeds are difficult to remove even manually.

Devashijibhai Thakor of Kathi village, Mehasena district, has come up with an interesting practice to control this weed using dry stalks of the cumin plant. According to him, the stalks must be spread over the field in summer. In the monsoons, the rain water gets absorbed in the stalks before filtering down to the soil. It is believed that the water filtering through the cumin stalks prevents the germination and growth of the'*Dharo'*. He claims that even crops could not be grown in the field where cumin stalks were incorporated. It takes almost one year for the stalks to decompose.

Devashijibhai Hathijibhai Thakor, Village: Kathi Tal: Hariji, Dist: Mehasana Comm: Vanarsiji M Thakor

7408

Cure for Kidney Stones

Urination becomes difficult for animals which have stones in the urinary bladder and the bladder swells. Farmers believe that if pregnant animal suffers from this problem, there are chances that its uterus may prolapse. If the animal is not treated promptly, urine accumulates in the bladder and the ensuing toxicity can kill the animal.

To treat this condition, farmer Baldevbhai Patel uses leaves of a plant locally called '*pathar paan*' which translates as `stone leaf'. (***Bryophyllum Spp.***). Approximately 500 g leaves are crushed and squeezed to mix well with 500 ml water. About 250 ml of the filtrate is given twice a day, once in the morning and once in the evening for 8-10 days to effect a complete cure.

'Pathar paan' is also locally known as '*paanfuti*': or a plant that sprouts from a leaf. It grows 30 cm to 60 cm tall and is also used for treating humans with similar urinary conditions. Baldevbhai is a local livestock expert; he treats different animal diseases in nearby villages too.

Baldevbhai Hirabhai Patel, Vill: Pogalu, Tal: Prantij, Dist: Sabarkantha, Comm: Ramesh C Patel

Natural Therapy for plants

"Thovalai" is a village situated in the Kanyakumari District of Tamil Nadu. It is a traditional flower-farming area where Bushjasmine,Chrysanthemum, Cassandra, Tuberose, Rose, Jasmine etc. are cultivated on a large scale.

During summer months the jasmine cultivators allow large herds of goats to graze their plots. The goat keepers make small temporary huts in the plots and sleep with the animals there itself. They migrate from one plot to another with the animals.

The goats feeding on the Bushjasmine plants eat away all the leaves leaving behind only the stems. They leave their dung in the plot and move repeatedly among the plants. As the pre-monsoon showers start, the herds return home.

With the arrival of the rain the bare stems of Bushjasmine start bearing buds and grow with renewed vigor. Substantial yields of flowers are obtained from the plants during subsequent months.
Why does this treatment result in renewed vigour and profuse flowering? The possible explanation is that the loss of leaves during the summer months result in reduced transpiration losses from the plants. The goat dung improves the soil fertility and movement of the animals enhances the soil tilth.

This practice can be considered as a "natural therapy" for plants as well as the soil. The goats benefit from the availability of green fodder during summer months, when fodder is usually scarce.

Contributed by:
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An Indigenous System of Resource Management Accountability On The Pacific Northwest Coast

Martin Weinstein

If resources are to be managed in a sustainable manner, how do the managers and general public know when success is achieved? The Kwakiutl of the Pacific Northwest Coast developed an ingenious system of public resource management accountability through the gift giving of the ceremonial potlatch *system. The Kwakiutl are the indigenous people of northern Vancouver Island, the adjacent mainland, and the waters and islands in between. The Kwakiutl and other Northwest Coast groups are distinctive in the development of a village form of social organization which was not based on an agricultural mode of production.* ***Martin Weinstein*** *can be contacted at 108 Croteau Road, Comox, B.C. V9M 2 P8, Canada.*

The Kwakiutl model of management was based on two central institutions: land and resource tenures and the *potlatch*. Each of the nearly 30 Kwakiutl tribes had a recognized territory and could also hold specific resource harvesting rights on the territories of other tribes. Land and resource rights belonged to corporate household groups the 'numaym', the basic economic and social unit of Kwakiutl society. Each tribe consisted of a number of ranked numaym which owned neighboring territories and wintered together in a tribal village.

Ownership of the territory and rights were vested in the numaym head chief. As official owner of the group's lands and provider of its resource richness through his relation with the spirit world, the chief received a portion of all harvests. The chief's portion was used to finance the group's ceremonial obligations, one of which was "potlatching". The head chiefs of the numaym had two major administrative responsibilities, the economic organization of the numaym and the management of its properties, both resource and symbolic properties. Symbolic properties included the group's good name and its ranked place within Kwakiutl society. The social rank of the numaym and its chief was the basis for accountability within Kwakiutl society.

The *potlatch* operated as a monitoring device within the Kwakiutl system of resource management,(in addition to other functions it performed). At its most basic, the *potlatch* was a public witnessing of the internal business - the legal transactions - of a numaym. Prior to and during the early phases of contact, *potlatch* gift giving was not competitive and it was based on harvests from numaym tenures. The numaym had to produce enough surplus wealth to show that they continued to deserve their place in Kwakiutl society. The natural resource wealth of the namima's lands had to be managed so that they would continue to renew themselves. And the chief's otherwise autocratic rule was tempered by a possible loss in rank. He had to ensure that his numaym co-workers were happy with their lot, or they would decide to live with another numaym with which they were affiliated, and this would adversely affect the rank of his inherited position.

The *potlatch* then acted as a fully integrated monitoring and public accounting system for resource management. Thus, the Kwakiutl formula for sustainability used core social institutions to control access to resources and provide self-regulatory feedback systems.

"Lingon": An indigenous chant and knowledge system of the T'Boli in Southern Philippines

The "lingon" is one of several indigenous forms of chanting among the T'boli in South Catabato, southern Philippines. It is a marathon debate engaged in by two or three gifted chanters. Still widely practised, the lingon is a living testimony to the unique identity of the T'boli and a very rich indigenous information system.

The lingon reflects the physical, emotional and experiential reality of the T'boli in the backdrop of a homeland threatened by environmental degradation. Textual analysis of the lingon indicates an ideology of spatial relations that serves to organise sociopolitical actions and cultural forms. The analysis goes as far as relating the chant to a sense of ancestry and history, including the dynamics of environment, resource management and culture. It provides rich information about the culture of the T'boli which reflects their internal creativity and ability to experiment and innovate. The lingon is an example of both a knowledge and an indigenous learning system which is useful in enabling indigenous peoples to articulate their views and influence their own development. The lingon demonstrates a powerful potential for a locally-based, culture-specific environmental education.

Contributed by:Levita A. Duhaylungsod

Ethnometeorology: Plants as Ecological Indicators of Weather

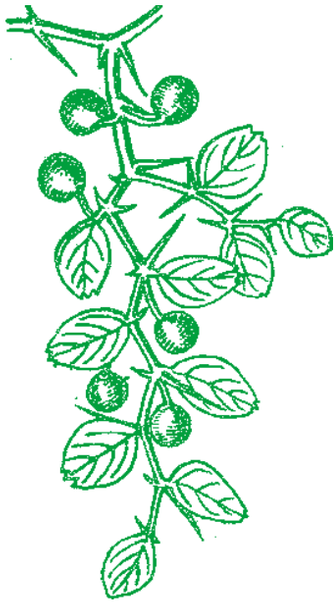
Prabhakar Joshi and Om Prakash Kulhari

If the fruits of Neem-"Nimbolis"- dry on the tree itself and are not shed on the ground following ripening - it signifies that not a grain of crop will ripen or in other words famine is to follow. This and other similar folk sayings have been documented in the ancient Indian treatise called Brihat Samhita . We reproduce below the findings of a study of folk knowledge about plants undertaken in Rajasthan by Prabhakar Joshi and Om Prakash Kulhari.

Amongst all the major deserts of the world - the Thar is unique as it is the most populated one having a sparse but varied vegetation. The economy of the region is largely pastoral and in most areas the people nomadic. The major tribes and communities existing are: Raibaris, Langas, Baoris, Meenas, and Vishnois besides the other rural folks. Prominent examples of plants serving as indicators of weather to the people in these areas are given below:

Overgrowth of "**Khadira**" (***Acacia catechu***) trees is indicator of famine while on the other hand a similar phenomenon in case of "Arjuna" (***Terminalia arjuna***) is an indicator of good rains.

Zizyphus nummularia: Abnormally profuse fruiting in the shrub indicates congenial conditions i.e. good rains and crop.



***Argemone mexicana*:** Abundant growth of the plant indicates rich kharif crops following a good monsoon.

***Calligonum polygonoides*:** On healthy and profuse growth of the plant, accompanied with good flowering and fruiting, good rains for the oncoming season and subsequently a good crop are forecasted.

Cucumis agrestis: Extra ordinary fruit setting signifies famine in the same season.

Prosopis cineraria: Appearance of abnormally profuse flowering in the tree is interpreted by the natives as indicating poor harvest in the future and famine.

Tribulas terrestris: On abundant growth of this plant a rich harvest of the gram crop (***Cicer arietinum***) is forecasted.

Hill Ranges: Aravallis, with the highest peak at Guru shikhar (Mt. Abu) is the longest hill range of Rajasthan spanning the whole State diagonally. Most of the tribal population of Rajasthan comprising Bhils, Garasias, Kathodias and Damors resides in the deciduous forests on Aravallis especially in the southern portion of the state.

Boswellia serrata: To the Garasias, the appearance of ample "Beej" (fruit) on this tree signifies an oncoming weather which is appropriate for the grain ripening of their crops.

Diospyros melanoxylon: An unusually bountiful fruit setting in this tree is not taken as a good sign - as its said to indicate famine.

Tamarindus indica: Abundant rains and a splendid weather conducive to the

abundant ripenning of Triticum Aestivum and Cicer arietinum are forecasted when the trees in a region have fruit lengths longer than the usual.

Besides, as in the desert region the abundance of Cucumis melo var. agrestis is indicative of famine conditions and conversely abundantly fruiting Zizyphus nummularia that of good weather prevailing the time.

Sterculia urens: Flowers on this deciduous tree appear when it is devoid of leaves. At times when the "Mor" (Inflorescence) is seen together with the leaves on the tree - an uncommon feature throughout forest it is assumed that the oncoming season will fetch plentiful rains.

Capparis decidua: Good fruit setting in the plant is interpreted as indicative of sufficient rains resulting in a good harvest.

Madhuca longifolia*:* Rich rains are forecasted by Bhils when the tree is heavily laden with fruits not normally seen.

Securinega virosa*:* Bhils claim that the onset of flowering coincides with closely following rains. As soon as the blossoming of buds on the "Mors"(Inflorescence) is sighted the tribals expect rains to arrive any time. The density of the bunches of flowers is proportional to the richness of rains expected.

Vindhyan ranges: The Vindhyan hill ranges cross the eastern portion of Rajasthan and Sahariyas are the chief tribals inhabiting them. Sharma (1990), has published his observations on the Mukundara hills of this range which is partially inhabited by Bhils and largely by Moghiyas. As on Aravallis, the vegetation is of a dry deciduous type.

Diospyros melanoxylon: trees with scanty, unripened and small fruits if found universally are signals for good rains by the Bhils. Profuse flowering is indicative of famine ahead.

Ficus religiosa: In Meena villages within Sariska Tiger National Park (Alwar dist., Northern Aravallis), copious shedding of the leaves of this tree are taken as a sign of oncoming rains.

An overview of the "Signals": A cursory view of the phenomenon discussed in this presentation reveals that predictions of oncoming weather and related conditions are generally based on the following signs:

(i) Abnormally profuse or scarce flowering or fruiting. (ii) Length/Size of fruits. (iii) Overgrowth of plants or their profuse spread. (iv) Sprouting of foliage in perennials. (v) Blossoming of buds. (vi) Shedding of leaves, retention of fruits on boughs (not generally observed). (vii) Flowering in a foliage laden deciduous tree species. (viii) Direction of flowering heads/flowers.

The data on weather indicating plants collected in Rajasthan can be broadly categorised as under:

(a) Plants signalling weather conditions well in advance; *Acacia catechu, Azadirachta indica, Diospyros melanoxylon, Madhuca indica, Prosopis cineraria, Sterculia urens* and *Terminalia arjuna.*

(b) Plants signalling slightly before onset of forecasted weather conditions; *Arisaema tortuosum, Arum trilobatum, Calligonum Polygonoides, Capparis decidua, Dioscorea bulbifera, D. globosa,* D. pentaphylla, *Ficus religiosa, Kickxia ramosissima, Securinega virosa* and *Tinospora cordifolia.*

(c) Plants indicating weather conditions prevailing at a time; *Cucumis melo var.agrestis* and *zizyphus nummularia.*

(d) Plants signalling weather conditions pertaining to grain yield: *Argemone mexicana, Boswellia serrata, Tamarindus indica* and *Tribulus terrestris.*

Some of these signalling plants yield products sometimes in abundance that also serve as famine foods. The Bhils collect large quantities of "**Timra**" (***Diospyros melanoxylon fruits***) for storage and subsequent consumption during the lean periods. Likewise, in the desert pods of *Prosopis cineraria* are collected. Fruits of Cucumis melo var. agrestis abound in famine conditions and supplement their meagre food resources at that time. Seeds of the flowering bamboos have kept thousands and thousands of folks alive during a series of famines.

Among the pests of the animal kingdom locusts for example which convert the crop horizons in to devastated sites are collected, dried, fried and eaten as protein rich food by the desert inhabitants of not only Rajasthan but Africa as well.

Conclusion and scope

In the ethnobotanical heritages of the countless ethnic communities of the world lies a great scope for identification of indicators in the flora and fauna surrounding these peoples that can help interpreting and predicting meteorological phenomenon. Jani (1991), has defined **Ethnometeorology** as "a science based on indigenous beliefs, knowledge concepts and practices about weather and other meteorological phenomenon among an ethnic group, folk or people".

The examples elucidated earlier, pertain chiefly to specific situations in Rajasthan. Such studies however, can span greater horizon phenological changes in plants preceding earthquakes in earthquake prone areas of the globe. e.g. China, Japan and Philippines, Storms and Cyclones in coastal regions, volcanic eruptions in areas abounding in active volcanoes as in some islands and the zone encircling the Pacific Ocean (where earlier, the wild fauna as rodents, lizards and even larger game as deer and panthers have been observed fleeing from the vicinity) and large tidal waves in seas. There also appears potential as in the last case in observations on lower forms like plankton.

The wisdom embodying these observations interpretations and predictions by the native peoples has been shaped over ages and needs to be systematically documented in communities the world over even in this space age and can serve in future as a useful corollary of modern meteorological sciences.

Laxmiben's Vegetable Garden: Oasis in the Groundnut Desert

Jivrajbhai N. Sutariya *(AKRSP Gadu)* **Meena Bilgi** *(AKRSP - Ahmedabad)* **Arzeena Hamir and Neil Turner** *(Canadian Researchers studying Indigenous Agricultural Knowledge Systems in Gujarat).*

Junagadh district in Gujarat is increasingly developing towards monoculture of groundnut with high inputs of chemical fertilizer and pesticides. The Zora family garden, however is the exception to the norm and represents a small island of biodiversity. While there are only 5-6 different crops in the average Junagadh kitchen garden the Zora family garden has more than 40 different species at any point in time.

This garden is just three quarters of a *bigha* (0.3 acres) but supplies over 50% of the annual farm income, distributed evenly throughout the year. In all the family has about 10.75 *bigha* of land (5.5 *bigha* of bananas and 4.5 *bigha* of cash cropping-groundnut and wheat).

Laxmiben, the mother of the family, explained that the garden was started by her family 12-13 years ago when they first came to Khera in Malia Taluka, Junagadh. The development of the garden was the idea of her eldest daughter and started slowly with the planting of coconut and mango trees and a few vegetable crops. Over the years, the garden has blossomed to include 50 different species of edible plants.The garden has not been systematically planned, but some crops are planted together such as onion, fenugreek and coriander. Other plants, like chili and eggplant, are arranged in small monoculture plots between the fruit trees.

The garden relies exclusively on an adjacent well and an associated system of irrigation. In times of adequate water, it is watered by pumping from the well for up to two hours, twice per week. In times of low water levels, the irrigation is restricted to once per week. Although the family still rely on flood irrigation to irrigate the area, very little water is wasted, as coconut and other perennials are planted along the main irrigation channels leading to the vegetable and other seasonal crops.

The Zora family belongs to the Koli caste where women have a tradition of growing vegetables for personal consumption as well as for sale in the market. Thus, this tradition has been passed down through the generations. The women in the family plant the seeds, spread the fertilizer and weed the area while the men help irrigate when it is required. For pest control, women apply ash on the leaves of eggplant but, in general, they have few pest problems. Every other day, Laxmiben or her daughters travel up to 5 km to sell their fruits and vegetables at local markets. They may travel upto 20 km on days when prices are high in the larger urban centres.

Laxmiben saves most of her own seed and has developed a complicated system of seed storage. As she explains, the first flush of eggplant is usually kept for seed to increase the chances of early ripening. However, only the third flush of okra is kept for seed. Those vegetables that are kept for seed are selected according to size, colour and disease resistance. They are first coated with ash to absorb any moisture. The ash is then removed and the seeds kept in plastic bags which are then stored in tin containers. Certain seeds such as cowpea and Indian bean are stored in kerosene to protect them from fungus. If the seeds are to be stored for long periods of time, they are coated in road dirt and stored with chilli seeds. Certain seeds are bought from the market such as clusterbean, radish, cabbage and cauliflower. Other seeds such as eggplant and Amaranthus are traded with other farmers.

One of the factors responsible for maintaining a high level of diversity is the bore well located next to her garden. Few other families have year-round water. Secondly, both of her daughters work in the garden and without their help, the labour required to maintain the diversity in the garden would be too much to cope with.

Many questions remain unanswered, such as the benefits that the Zora family receive from reduced on-farm risk due to product diversification. How can these benefits be measured? Is the threatened challenge from large scale monoculture too great and are small diverse farms like Laxmiben's doomed to failure in the present agribusiness climate?

Book Worm

Conserving Indigenous knowledge : Integrating two systems of innovation. An independent study by the Rural Advancement Foundation International Commissioned by the United Nations Development Programme.

This study, commissioned by the UNDP is proposed to be used as a basis for consultations with indigenous communities on the best ways of preserving traditional knowledge. The aim is to ensure that such communities will, "on their own terms, benefit from any commercialization of products of their knowledge". In a crucial departure from similar reports, this study recognizes that indigineous knowledge is an organized and dynamic system of constant investigation and discovery. The study assumes that this process happens within a "cooperative innovation system." More detailed treatment of the latter would have helped. The reader can only infer that this system offers macro-system innovation with micro application in contrast to the institutional innovation system, which offers micro system innovation applicable on a macro-scale. This dichotomy is an over simplification and does not account for local peoples' innovations that have the potential to extend the frontiers of science. The study then asserts the need for the two systems to work together, the key to the partnership being a, framework that will safeguard the "intellectual integrity", not necessarily the intellectual property of indigenous people. The study leads up to this framework after a fairly detailed treatment of IP systems and indigenous knowledge of biodiversity (Chapter 1 & 3). These chapters recognize that IPR protection used by the institutional innovation system does allow for incorporation of indigenous innovations, but that an "integrity framework may be more realistic politically and desirable. This frame work (Chapter 4) includes alternative patent initiatives(new deposit rules, IPR ombudspersons etc.); sickeners IPR system (inventors' certificate etc.), bilateral contracts (material transfer and bioprospecting agreement). Such a system has value in protecting rights of communities and ensuring community level rewards. But the fact remains that even within local communities, some individuals are more innovative than others. Also many innovations remain limited to the individual innovators. A framework like the one proposed by SRISTI and Honey Bee Network that incorporates systems of material and non-material rewards at both individual and community levels would appear to be more relevant for accommodating the various permutations possible.

i) Mejía-Gutierrez, Mario. 1995. Agriculturas para la vida: Un enfoque desde sistemas populares colombianos. LED - CEPROID, Mi Nuevo Mundo: Cali; 252p. Title translated as: Agriculture(s) for life: Peoples' systems perspectives from Colombia.

ii) Mejía-Gutierrez, Mario. 1996. Agriculturas sin agrotóxicos. Mi Nuevo Mundo: Cali; 94p.Title translated as: Agriculture(s) without toxics.

Mario Mejía-Gutierrez's books are an attempt to seek alternatives to the intensive agriculture of the Green Revolution. They represent an impassioned plea to agricultural scientists, practitioners, and farmers to move away from an agriculture based on pesticides toward organic alternatives -- many of which are discussed in the books. Coming from an individual who has learned much from indigenous peoples and campesinos (farmers) in Colombia and who continues to critically question the predominant thought in which he himself was schooled as an agricultural engineer, the importance of the books is obvious. Their utility to organic minded peoples is further strengthened by the fact he has also experimented with many of the practices on his model farms (see his article, this issue).

The first book discusses 20 agricultural schools of thought, with examples of practices in each. It critiques the Green Revolution and skims the theoretical and historical surface of alternatives. The academically minded reader will find it a good introduction to some of the diversity of approaches 'out there', as labeled by 'scientists'. The local innovators instrumental in the development of the practices have been mentioned. One would have liked the author to question the legitimacy of labels for alternative agricultures used by academicians, in lieu of those used locally or derived from local ethos. A case in point is the "Howard Method", named after Albert Howard who learnt about it from farmers in Pusa (Bengal), India, in the early 20th century. The compilation of some other alternative schools of thought, too, suffer from 'scientized' labeling (which are not the author's but are implicitly sanctioned in the absence of alternatives).

The second book is more relevant for the practitioner. It is a rich collection of alternative practices, especially for organic pest management and soil enrichment, using plants as well as animal excrement. While the plants employed in some preparations are specific to the Andean region, there is a wide range of practices which could and should be experimented with elsewhere. An English translation of the book would therefore be very useful for the readers of the Honeybee network.

Short of visiting the author's model farms,these books provide a good storehouse of ideas for experimentation and a way to build knowledge bridges from farmer to farmer across the seas, in a common search for sustainable agriculture"s".

News & Views

Forum Belem : Paths of Sustainable Development, conference held in Belem, Brazil, 26-29 November 1996.

The Forum Belem was attended by about 250 participants from all over the world. The two principal stakeholders were Daimler Benz (DB) and the Federal University of Para (FUP).DB shared its experiences of using natural resources as substitutes for material currently used in its automobile industries. FUP, through its programme POEMA, undertakes development work in the Amazon and supports DB with research on conservation and utilization of biodiversity.

The conference had four parts : (i) opening plenaries which were lectures by people like Ignacy Sachs (Ecole des Hautes Etudes des Sciences Sociales), J. Marcovitch (University of Sao Paulo), Roger Leakey (ICRAF), Walt Reid (WRI) and Gertrude Mongella (General Secretary, 1995, Beijing Conference); (ii) working groups for discussing sustainable development criteria; (iii) presentations of 23 experiences from around the world in parallel sessions; (iv) final plenary on the last day, (three of the 23 experiences discussed in the parallel sessions-SRISTI, INBio and Uniao Nacional de Camponeses of Mozambique-were also presented in this plenary).

SRISTI's presentation was well received since its unique contribution was rewarding knowledge and not just compensating for biodiversity resources. SRISTI looks forward to collaborating further with POEMA and some of the other participants of the forum belem.

Commercialisation of an Innovation

Readers of Honey Bee may be aware of Shri Amrutbhai Agrawat who has developed many innovative agricultural implements including a tilting cart, 'Aaruni' (Honey Bee, Vol 6(4)) developed with the support of venture capital fund provided by SRISTI.

Amrutbhai Agrawat got his first commercial order for 'Aaruni' from the University of Agricultural Sciences, Bangalore, at the initiative of the vice-chancellor (UAS). He persuaded the Department of Agricultural Engineering to invest in this cart. The idea was to test out its applicability for farmers in Karnataka. The University purchased the cart and displayed it at the **state level agricultural fair from November 7-9, 1996 at Bangalore**. It was particularly exciting for SRISTI as this was the first commercialisation of an innovation funded by its venture capital fund for grassroots innovators.

Amrutbhai alongwith two members from SRISTI attended the fair and all three were provided full cooperation and assistance. 'Aaruni' was provided prime place at the fair. Amrutbhai, who knows only Gujarati built a good rapport with the visiting farmers, most of them knowing only Kannada, and discussed the merits and demerits of the cart. The response from the farmers was overwhelming and Amrutbhai got interesting feedback both from farmers and scientists. Farmers were particularly enthusiastic about the fact that a fellow farmer had developed such a product. Most of them were interested in buying, but felt the cost was a bit high though they agreed that the cost was justified given the advantages of the cart. 'Aaruni' was given an award as one of the top ten exhibits. This selection was purely based on the feedback received by the organisers from farmers.

Global Crop Science Congress and Local Innovations

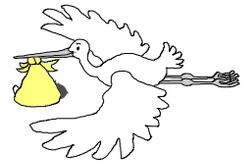
At the recently held International Global Crop Science Congress and Local Innovations in Delhi (November 1996) SRISTI and IIMA organised a special session on farmers innovations. Several crop breeders, indigenous agroforestry expert and organic farmers made presentation to a galaxy of national and International Scientists.

Dr. Swaminathan attended the session along with other top scientists like Dr. Chopra, Dr. Sinha, Dr. Panjab Singh, Dr. Reddy etc. An eminent Indian scientist who pioneered the studies on indigenous knowledge way back in sixties chaired the session. Thakarsibhai presented the process of selecting a single plant from which he developed *morala* variety of groundnut resistant to disease and pests and high yielding in nature. He also drew attention of the scientists to a unique property of this groundnut variety which breeders had not given thought to in past. This was about the soil attached to the pods after digging them out. In his variety, very small quantity of soil was attached. Rajabhai presented example of an erect ground variety unlike Thakarsibhai's variety which was spreading kind.

Sundaramji presented an innovation in agroforestry which is unique and highly effective for dry regions and requires very low quanity of water very high survival rate of seedling (editorial article following next issue). He also narrated the process of developing a new chilli variety with very high content of colour and low pungency. Traders come to his farm to buy his output. This is an outstanding example of how grass roots innovation can move the market even if public policy makers do not respond so enthusiastically.

The session generated tremendous interest and as Robert Chambers, another pioneer in this field, observed that building bridges between formal and informal knowledge systems will strengthen both. Readers can write for more detailed report. We hope that all international congresses on natural sciences would institutionalize a session on local innovations and farmers' wisdom.

Dialogue



Honey Bee Remedy Cures Ticks!

K. Krupa
809, 17th E Main, Block 5, Rajajinagar Bangalore - 560010

In an earlier issue of Honeybee you had published a remedy to ensure conception in cows.Could you please write to me about this as soon as possible. Our cow is one of those finicky over-bred ones and it has failed us the fifth time by artificial insemination and once by natural method. One experiment learnt from Honey Bee proved right again, Lantana leaves to rid cows of ticks, bugs etc.. Our dog had millions of ticks.Now with a lantana leaf bed she is totally free of them all.

Purushottam Rao's plan of 12 crops round the year is a great idea. But I was horrified to read about the forest soil in the compost. Surely this is unsustainable exploitation. Imagine, after all the deforestation, if even the soil is swept off by all the farmers. The billions of creatures sustained by the rich soil will all be wiped out. I would think it is an anti ecological practice of a serious nature. I hope Purushottam Rao will stop himself and others from doing this very soon. Look forward to your response.

(As usual your comments are perceptive and constructive. Your success with tick treatment proves the wisdom of local knowledge and importance of Honey Bee Philosophy of linking people to people. your other concerns are valid. We hope to hear from other readers. :Ed)

Volunteer from Zambia?

W.M. Simfukwi
Dept. of Agriculture, P.O.box 210612 Chililabombwe, Zambia

I write to apply for membership in the network and I am ready to contribute materials for exchange.

I am an agricultural extension worker working with small scale farmers. In addition I work part time on a farm trying to practice sustainable agriculture.

(Keep in touch and do send us the materials. :Ed)

Platform for Unsung Heroes

Ajit Chaudhri
Agartala, Tripura

I read your October to December 1995 issue which had an article on the Aaruni bullock cart invented by Sri Amrutbhai Agrawat.

I wonder if you cover innovative processes in the same way as you do innovative products. One such which comes to mind is an experiment on management of reserve forest land by an NGO working in west Tripura, 50 km from Agartala.

It developed as a result of a partnership between the research division of the forest department, the Nehru Yuvak Kendra and a NGO, formed by the youth of a village. The transformation of the forest is startlingly evident in the three years since the work has begun.

Your magazine looks as though it covers work done by non-English speaking non-elite and non-self promotional groups/individuals, why don't you have a look at this as well?

Their address is:
Mr Subodh Ranjan Sur
Acharya J C Bose Vriksha Mitra Samiti
Rudijala
Melaghar
West Tripura 799 115

(we have written to him. why don't you write about him: please write back. :Ed)

Cultures that Conserve

Dr. G.V. Tagare
3, Government Colony, Vishrambag, Sangli - 416 415

In the April June 1996 issue of the Honey Bee you have referred to the cult of Bishnois. You will be interested to learn that in Maharashtra and Karnataka, there is the religious cult of goddess Shakambhari (The goddess who feeds and sustains with vegetables). Puranas tell us that while there was a drought of 100 years, the goddess fed the people with vegetables. There are temples of this goddess found all over this part of the country, the chief centre or holy place being Badami-the ancient capital of Early Chalukyas. It is famous for its caves and is surrounded by shrines belonging to the 6th Cent. A.D. and even earlier. Its main Yatra period is from the 8th to the 15th Tithi of Pausha (this year from January 16 to 23, 1997). The speciality of the food offerings (Naivedya) is a mixed vegetable preparation of 64 vegetables. Ladies conserve various vegetables throughout to make up the Naivedya of 64 vegetables. The Devi has SAHASRA NAMA (1000 names linked in Sk. verses) and a Kavacha (Protective armour for one's body) with mantras.

As you might be knowing, I am a scholar of Purana Lore. I can write on Agriculture Botany etc. as found in Puranas. They may be of some interest to modern men as well.

(Prof. Tagare: We look forward to your article on this important subject. Please write soon. :Ed)

Debate on rewarding people's creativity

Rosenthal, Josh
USDA, Washington, USA

I have just read the first of your papers at the cdo gopher site (gopher:

csf.colorado.edu/sristi) It is an excellent start. I think your ideas of self reliance and promotion mechanisms to register traditional knowledge are very important. This is of course my personal opinion. The patent and trademark choice of my government has some different ideas on this issue.

There is one point in the early part of your paper on damage to localized knowledge that I disagree with. I recognize that your focus is more on knowledge than biodiversity but it is incorrect that biodiversity loss is less permanent or serious than loss of knowledge. Species extinction is no less permanent than loss of knowledge. In fact it may be more so. If knowledge is recorded then at least its fragments may be preserved for ever albeit without the cultural significance. The knowledge about genetic sequence of a trait gains you little if the material existence of the trait, e.g. the plant is gone.

With respect to patent rights one thing that I have come across over and over in my discussions with commercial users of traditional knowledge and patent is the issue of public domain. There--in lies a central problem. In most situations it does not matter to whom this information has been communicated, traded or publicly exchanged, especially if it appears in print, it becomes public domain by the standards of WIPO etc. This may involve recognition of collective knowledge as has been suggested by many (perhaps yourself included), but also some very explicit standard sharing communal knowledge in a way that does not compromise "ownership" rights. These I suspect need to be very sensitive to the diverse cultural modes that exist around the world. Can that be done in an international framework? I have my doubts but some movement there will be important I believe.
Of course the bottom of much of this is a profound culture class with a system based upon very narrowly defined ideas of what constitutes invention, who should receive benefits from an invention, and the self-profit that is the basis for commercial development. The challenge comes in entering this knowledge into a capitalist framework. Not completely intractable I hope, but this is fraught with contradiction and challenge.

(Josh, as you know, we emphasize contemporary innovation as much if not more than traditional knowledge. Your concerns are valid. We hope to have further debate around these. Ed)

North to South to South

Guilain de Pontfarcy
16 bis, allee des Seychelles, 33600 PESSAC
FRANCE

I am an unemployed manager, trying to create a company based on the industrial utilization of products (oil and natural coagulant) of *Moringa spp.* For this, I want create an industrial plantation in a tropical developing country (in Africa). I want to also use presscake as natural coagulant on big scale to purify turbid water. For realizing this project, I am searching for more information on *Moringa spp.* and particularly on Indian species known for their important yield in pods or seeds. I am very interested in discussing with members of Honey Bee on this subject.

I have an important collection of issues on *Moringa spp.* (more than 200 publications on this tree and its uses all around the world) and a collection of 1500 references on this subject.

(Will venture funds take note of this request? :Ed)

Sustainable Agricultural Movement in North and South

Radhika Balasubrahmanyam
P.O. Box 3657, Fayetteville, Ar 72702, USA

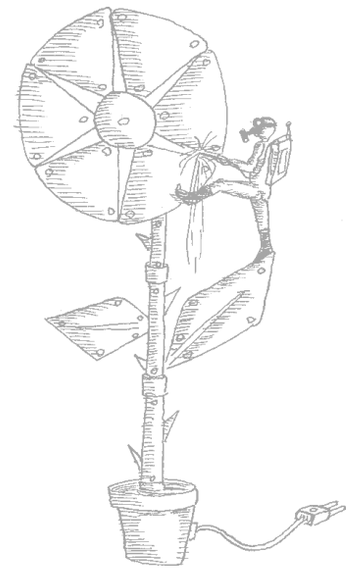
My colleague Steve Diver and I recently came across your very interesting and informative article on Bhaskarbhai Save, in the January-March 1996 issue of the Honey Bee.

We work at a nation-wide sustainable farming information center called ATTRA-Appropriate Technology Transfer for Rural Areas, here, in the United States, located at the University of Arkansas. We will be in India on separate business in December-january, but we do plan to participate in the International Conference on Creativity and Innovation on January 11-14th. We would be especially glad to meet agricultural professionals and visit innovative farms and permaculture projects in the region following the conference.

We would appreciate it very much if you could provide us with Mr. Save's address, as well as those of other farmers in the area who practise sustainable farming methods, including organic, sustainable, biodynamic, natural, and permaculture.

In turn, Steve would be glad to speak about the ATTRA program and its unique service to American farmers, and share information on sustainable farming systems currently being practised in the United States.

(I am happy that Steve Diver is attending the conference. Hope it will promote South to North transfer of technology. :Ed)



Regd no : 62082/95
ISSN no : 0971-6624

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