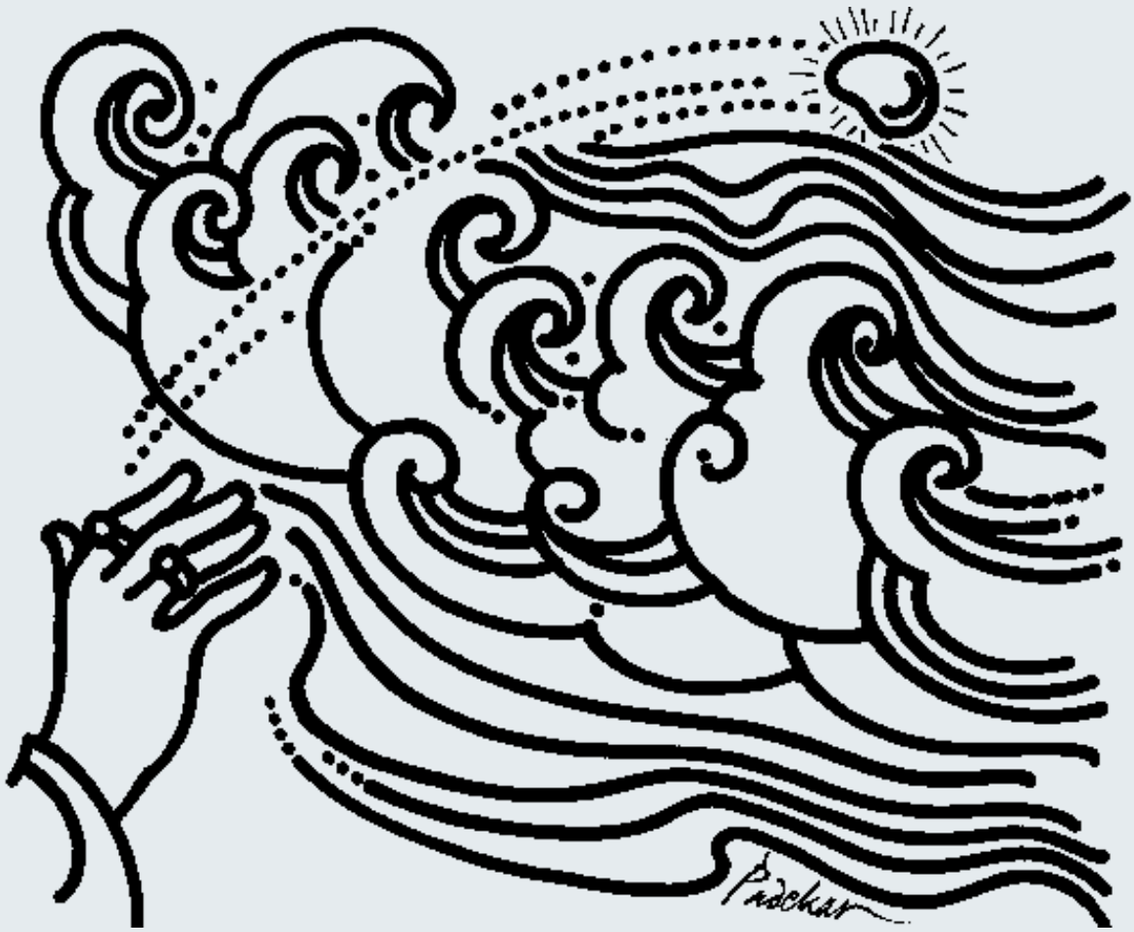
Honey Bee

Vol 1 No 1 April - June, 1995
(Old Series Vol 6 No. 2)

Learning to fail !



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

In this issue...

April- June, 1995 Vol 1 No 1
Old Series Vol 6 No 2

Honey Bee stands for

(a) People to people networking in local language, just as cross pollination by the 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

Learning to fail

This is a story of a rich, anxious and slightly careless man. He had almost everything that one could wish for and dream of, but was not content with his wealth. He was constantly worried that fate might not always treat him as well as it had, and that he ought to build up more capital to fall back on in case of dire circumstances. For, he felt, none could tell what future had in store. Being a god fearing man, he decided to meditate and pray for more wealth.

He sat down to pray on the peaceful bank of a river, far from the bustle of the city. He prayed and meditated for days and weeks without a break. A holy man passing that way one day saw the man meditating and was impressed by his devotion and ardour. The self-imposed deprivation during long hours at prayers had made the once well-fed rich man look haggard. The holy man asked him the reason for his severe austerities and when he heard that the wealthy man wanted to be wealthier, he chuckled himself. He told worried man that he had the power to grant him a boon and he was willing to fulfill any wish of his. Delighted, the wealth seeker asked for a way by which he could convert any quantity of base metal into gold as and whenever he wished to do so.

The holy man smiled and agreed to grant him his desire, and pointing at a heap of stones lying nearby, told him that one of the stones, when touched to iron metal, had the property of converting iron to gold. However, the holy man would not tell him which stone it was that had this magic property; that much the man wishing to gain wealth had to do. The rich man was very pleased at his good fortune and thanked the holy man profusely and decided to identify the magical stone right away.

Sitting by the river with a piece of iron in one hand, he picked one stone at a time, touched it to a piece of iron to test it, and threw it into the river when it failed to transmute the iron to gold. He took one stone, then another and another and another and so on. He went on with this monotonous task almost mechanically eliminating ordinary stones and throwing them in the river. It was beginning to get late in the evening and he was becoming a little impatient as there were still many more stones in the heap to check, when suddenly he found that the iron in his hand had become gold. But by that time, the stone had already been flung into the river. The gold making stone had irreparably slipped out of his hands.

And, like this man who had frittered away his splendid chance, many of us are also blessed with knowledge and resources, and 'practice hard' to fail. What's worse, we don't even realize when a golden opportunity has passed us by. Many of the traditional and contemporary innovations by farmers, pastoralists and artisans have the potential to convert degraded natural resources into extremely productive resources. However, it seems, the scientists and planners, particularly in Third World, have 'learned to fail' in this task. And therefore, in every issue of Honey Bee we carry far more information on farmers' creativity than on scientists' creativity in building upon the same.

When shall we stop practicing failure?

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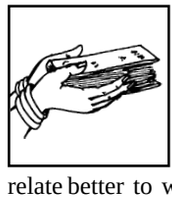
Erosion of knowledge: How shall we stem it, if we will?



SRISTI has been arguing that erosion of knowledge is an even more serious threat than the erosion of biological diversity and natural resources. Having resources of which we know little or nothing is like having a library without a catalogue. A resource becomes a weed, or just a plant, when we do not know how to relate to it. I am not saying that we should relate only to what we know. But my suggestion is that if we did relate better to what we know better, our respect for what we do not know, might increase.

There are several ways in which knowledge erosion takes place. For example, the weakening link between the grandparents' generation and the grandchildren is one of the most important contributors to this process. Traditions have become suspect in the modern mind even when they have served us well. Attention to oral traditions is particularly low. Obviously, not all traditions need to be preserved or sustained. But there is one that needs to be preserved and that is the tradition of inventing, experimenting, documenting and learning gleaned from the field, farmers and other people. I want to share with you some interesting aspects of this tradition.

More than a hundred years ago, Gangaben Pranshankar Yagnik wrote a book in Gujarati dealing with 2080 examples of local knowledge as well as practical recipes (collected from different sources) for setting up small scale, self-employment enterprises. She describes many ways of controlling household pests as well as crop pests, animal disorders, and solving day-to-day problems in agriculture as well as non-farm enterprises. Her efforts to collect all these ideas from within the country as well as to compare some of these ideas with the latest information from other countries, did not go waste. She found readers in the villages as well as cities. The second part of her book, first published in 1893, was so popular that 1000 copies were sold in three days.

Gangaben recognised the importance of local knowledge and the need for learning from people. She compiled a whole range of ideas on improving livelihood opportunities for people. She had become a widow at the age of 14 but did not loose her spirit. She became a teacher in a girls' school and started inculating among girls the spirit of self-reliance and *swadeshi* (i.e. need to buy things made in one's own country). Gandhiji visited Vizapur near her school in 1919, and made her take a vow to use things made within the country. She had already written a book in 1907 highlighting this idea.

The tradition of documenting peoples' knowledge was continued by some others too. Diwanji wrote a book called *Agriculture in Bombay Presidency* (1905), Gaya Prasad wrote in Hindi about potato cultivation in 1915. Raghunathmal Rai (1943) wrote on famine relief, restoration of traditional crafts, horticulture etc. K M Munshi in his famous lectures entitled *The Gospel of Dirty Hand* and *Land Transformation* talked about the link between soil and soul, hydrological cycle, nutrient cycle and village institutions. To him, without revitalising these links, sustainability could not be achieved. Dr. Y. P. Singh guided the first two M.Sc. students on indigenous knowledge in 1967. But the tra-dition of learning from people had already become weak by the late fifties. Unlike books in the pre-sixties, which dealt with the best of the traditional along with the best of the modern, later books on agriculture and rural development did not contain such information.

Perhaps our generation is witnessing the fastest erosion of knowledge ever in human history. Why is there such contempt for people's knowledge system? How do we bring back the spirit which Gangaben showed with admirable courage and conviction? Why is it that healthy traditions as well as contemporary innovations by the people do not become points of reference in society for science and technology or education? How will we recover the knowledge which is being lost so rapidly? Shall we just remain mute spectators?

Whither traditional knowledge?

Please write to us what exactly you intend to do to stem the erosion of knowledge.

We have mentioned in earlier issues about the biodiversity contests that we have been organizing among children so that transfer of knowledge from elders to children takes place through such means. There may be many other ideas. We look forward to hearing from you,

Anil K Gupta

(Please note that this issue has been marked once again as vol 1(1) to meet the registrational requirements.)

International Conference on
Creativity and Innovation at Grassroots

December, 1996

Centre for Management in Agriculture at IIM-A is organizing this conference to pool examples and insights from innovations evolved by individuals or collectives at grassroots level without any outside help. The search for sustainable solutions to the problem of managing natural resources world over is pointing in the direction of peoples initiative as a possible source of ideas.

Contributions are welcome around following themes:

* Technological innovations (pest management, soil and water conservation, veterinary medicine, other aspects of sustainable agriculture, fisheries, forestry, etc.)
* Institutional innovations (common property resources, conservation of biodiversity including crop and animal germplasm)
* Educational innovations incorporating ecological knowledge, linking communities with learners at different levels
* Farmers' rights, intellectual property rights, green markets, value addition and commercialization

The conference has been co-sponsored by Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), International Society for Ecological Economics (ISEE) and International Association for Study of Common Properties (IASCP).

For further details, write to:
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Experimenting Farmers of Honduras : Part II
Pest Management

Gonzalo Rodriguez & Jeffery W Bentley[1]

Based on our understanding of the creative ability of farmers, we designed a course on natural pest control measures to fill in the gaps in the basic knowledge farmers had. We hoped that the farmers would blend the newly acquired skills with their existing knowledge and evolve new techniques of their own. We were pleasantly surprised when we saw, on follow up, that the farmers had done more experiments and invented far more than we had ever expected them to do.

We found that 98 per cent of the farmers had done some experiments based on what they had learnt from us. The 52 farmers we interviewed had adopted, in all, 179 ideas we had suggested or taught during the course. There were 33 adaptations and they had invented 33 new technologies to control pests, based on blending what they learnt and what they already knew.

We then organized a three-day workshop for the farmers who had carried out the maximum number of experiments to talk about and discuss their experiences. We selected 20 farmers who had experimented the most and invited them to the farmer-experimenter workshop. Only 12 attended. Though we hoped they would talk about their experiences and we would merely be moderators, we were a little apprehensive that some of the farmers might finish narrating their whole experiences in ten minutes and that we would be left with extra time. So we were ready with prepared talks to fill in the extra time in case the need arose.

To our surprise, the first day was barely enough for four farmers to narrate their experiences. They not only told us what they had done, but also demonstrated their inventions.

Moving ant nests

Mr Israel Lemus had discussed this practice in the workshop, but we had also learnt of it from other farmers who had attended our course. It was possible to move ant nests when they were more or less new and not too deep. The nests were moved by first digging a pit where one wanted to relocate it. A little organic matter was placed in the pit and then the nest to be shifted was dug up till the brood was found. The soil, with ants and their brood, was dug up and carried in a shovel (or in a sack) and placed in the new location where the ants were provided food like bread crumbs. The relocated nest was covered with straw or grass. The ants settled down by digging a new nest deeper. But there is always a risk that ants would abandon the new home, especially when the queen is lost.

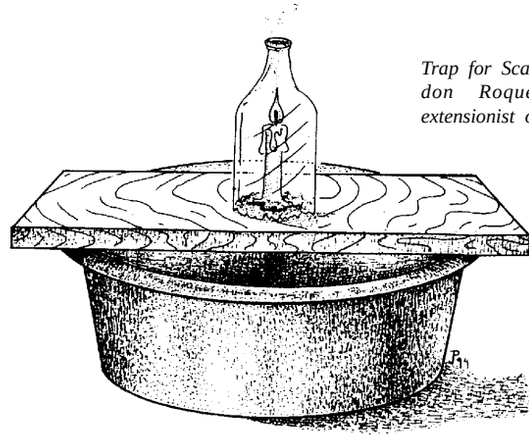
Many farmers knew something about ants but had not valued them as important agents of biological control. Many thought of ants merely as pests that sting people. For example, in a course conducted in January 1992, only 48 percent of the participants mentioned that ants ate insects, even though all of them could recognize ants. It was easy to show them that ants ate many insects. Some people already knew it, but underestimated the magnitude of the benefit that ants bestow on the farmer. After the farmers had learnt about the ants' beneficial role, their attitude towards the insect changed dramatically. We recall the testimony of dona Enma Acosta de Bonilla of Catacamas, Olancho: earlier she used to douse ant nests with hot water to destroy them, but now she protects them.

Control of Scarab beetles

Some farmers did not really understand insect reproduction. For example, 41 percent of the course participants in 1992 believed in spontaneous generation. Most did not know what an adult white grub looked like. In some batches, not even one person knew.

With the coming of the first rains in May, the beetles that produce the white grubs emerge from the soil. They must be eliminated to reduce white grub damage in maize. Two farmer-extensionists, don Roque Esppinal, of Choluteca, and don Ismael Vargas, of Olancho, devised a light trap to attract beetles.

The first trap comprises a basin of water (with a little soap dissolved in it) and a board placed over it. A lighted candle was placed on the board and it was protected with a broken bottle to keep the wind from blowing it out. This trap was placed near trees where the beetles mated, for example: oak (***Quercus spp***), *caulote* or *tapaculo* and others. The beetles attracted by the candle flame drown in the soapy water.

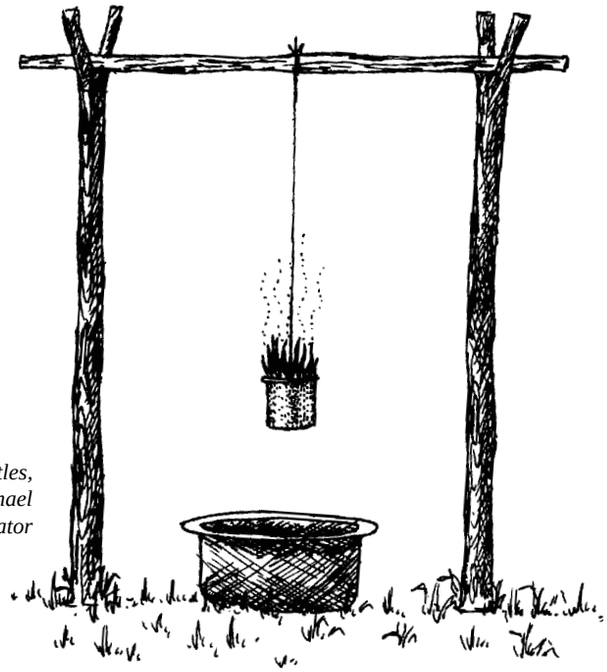


Trap for Scarab beetles invented by don Roque Espinal, farmer-extensionist of Choluteca 1992.

Indigenous Pest Control Measures Learnt from Farmers

During the workshop, farmers shared the following pest control practices known to them;

a) Using '*manioc*' (***Manihot esculenta*** (Crantz)), starch and milk to control whitefly.
b) Placing the maize above the kitchen fire (a traditional practice) prevented damage from weevil (actually several families of beetles, not just Cucurlionidae).
c) Canavalia bean (***Canavalia ensiformis***) to control leaf cutter ants.
d) Ashes or maize wash (what remains after washing the grains cooked with lime) to control soil pests.
e) Neem (***Azadirachta indica*** A. Juss) against fungal diseases, as a pest repellant and to control fungus in the soil.
f) Milk to control bacterial wilt.
g) Whey to control leaf beetles.
h) Milk to control virus.
i) China berry (***M. azedarach***) as a repellent.
j) Bud of '*pitaya*' (***Acanthocerus pitajaya*** (Jacq) Dugand.) as a sticker.
k) '*Madreado*' as herbicide, rodenticide, soil insecticide, fertilizer, medicine and to ripen fruit.
l) '*Palo de tambor*' to control whitefly and fall armyworm and as a foliar fertilizer.
m) Slime of '*baba de tapaculo*' (***Guazuma ulmifolia*** Lam) as a sticker.
n) Anona (***Annona muricata***) and kerosene against lice.
o) Fresh cow manure with water as a repellent.
p) Horse, donkey and mule manure as a foliar fertilizer.
q) Burying fallen fruits to avoid chili weevil.
r) Ashes to control maize weevils.
s) Sand to control fall armyworm.
t) Covering crops to lower the incidence of maize ear rots (***Stenocarpella maydis*** and ***Fusarium*** spp.).
u) Urine as a foliar fertilizer.
v) Toads to control pests.
w) Lighting a candle in grain storage bins to remove oxygen.
x) Yellow oak bark as a foliar fertilizer.



Trap for Scarab beetles, invented by don Ismael Vargas, farmer-educator Olancho, 1992.

The second trap was similar, but the basin of soapy water was placed below a tripod. A wire hung from the tripod holds a torch made from a can, sand, used engine oil and a wick made of a piece of strong fabric like canvas. Once the torch is lit, it remains burning for several hours. This method uses only simple and easily obtained materials. We have taught this experiment to subsequent batches to motivate people to do their own experiments.

Control of fall armyworm

Dona Hubalda Castro, a farmer from El Sitio, Comayagua, told us about the measures of checking fall armyworm by sprinkling sugar solution on her crop to attract ants and wasps that eat armyworms. She said that in a *parcel* (about 400 m^2) where she had planted about two pounds (about one kg) of maize, she used four pounds (about two kg) of sugar. We had talked about this practice in the workshop. She told that she had taught the practice to a friend. The man seemed unconvinced, but was exasperated by hordes of the pest in his two *'manzanas'* (1400 m^2) of land. He spread 25 pounds of sugar, mixed with water, on his corn plants. According to dona Hubalda, the farmer's friends had told him that he was crazy and that it would be better for him to give them that sugar so they could put it in their coffee. But when his trick worked and he had harvested over five wagon loads of maize, the people who had ridiculed him also began using sugar to control armyworms. When we visited them he was halfway through with his harvest.

Control of the chilli weevil

Dona Cladys Rojas, of Comayagua, told us that she controlled chilli weevil (***Anthonomus eugenii*** Cano) in her home garden by cutting down the chilli plants from the top and destroying the cuttings. The chilli plants grew back from the roots and produced well.

Control of squash weevil

Israel Lemus explained how he controlled the squash weevil. He noticed that the weevil laid her eggs on the squash flower. When the flower closed and the fruit started to grow, the worm entered the fruit and ate it. On closer examination he found that when the flower closed, it sheltered the eggs and kept them from being eaten by natural enemies or from being destroyed by the elements. So he decided to cut the flower in half after it closed. This controlled the weevil

completely. Literature does not report any weevils in squash as pests in Central America. It was possible that don Israel was referring to the squash borer, (***Diaphania spp***), a Lepidoptera pest.

The farmers had a lot to share and show. Consequently, time was always running short in the workshop. Every farmer was an expert in his own way and everytime we had to skip over a proffered piece of information, we felt we were letting the dark side of social relations blind us to the value of a great source of knowledge.

Farmers are great experimenters and always adapting to change. They shared a lot in the workshops and with other farmers. If we enhance their knowledge, they can produce their own technologies faster. This supports the real process of participatory technology generation.

Control of grasslooper

Jose Pompilio Molina, of Olancho, had problems with grasslooper (***Mocis latipes*** Guen), a Noctuid caterpillar that walked like an inchworm, in a 3/4 *'manzana'* (5250 m^2) maize field. He was able to control the pest by herding chickens onto his field. He told us that he borrowed chickens from his neighbours besides using his own. The birds ate the grassloopers; that also seemed to have boosted their egg laying. Jose told us that before attending the course he had applied different kinds of poisons, especially Tamaron (MTD), to control grasslooper.

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1. Casilla 2695, Cochabamba, Bolivia

Protecting Tomatoes from Frost

Is it possible to grow tomatoes in cold weather? Yes, it is. Mr.Francis Handwa, a farmer in Zimbabwe, uses cooking oil bottles or milk bottles filled with water to keep tomato plants warm.

Francis fills cooking oil bottles or milk bottles with water until they are three-quarter full. While the plants are still young, he places the bottles upright on the ground among the tomatoes. He places one bottle beside every third plant in every other row. He makes sure that the neck of the bottle appears above the plants.

When the plants gets taller than the bottle, he places chick stacks besides the tomato plants. He hangs a bottle on each stick with a string. The bottles hang 10cms above the plants.

When the temperature drops below freezing, the water in the bottle freezes. The tomatoes stay frost free even though the surrounding grass and shrubs are covered with frost.

P R Makaya an expert on fruit and vegetable, provides an explanation to the phenomenon that when water has things dissolved in it, it freezes at temperature a lower than when it is pure. The water in the tomato cells contain dissolved salts while the water in the bottle is relatively pure. In frost conditions, pure water freezes earlier than the water in the plant cells.

When the water freezes it releases a lot of heat. The heat released when the water in the bottle freezes keeps the air around the tomatoes warmer than the surrounding area.

For further details, Contact Livai Matarirano, Coordinator Farm Radio Network (East and Southern), C/o Africare, P.O.Box 308, Marare, Zimbabwe.

Papaya, Paddy and Ponds: Persistent Peasants from Assam

Dr M P Borthakur[1]

1. **Control of citrus pests**

It is a common practice among farmers of Assam to spray fish washings on citrus plants. After washing fish for the table, housewives spray the water on the citrus plants, mainly on lemon trees to control the caterpillars, borers etc. The water seems to act as a repellent. Perhaps it is the strong odour of water that has this effect.

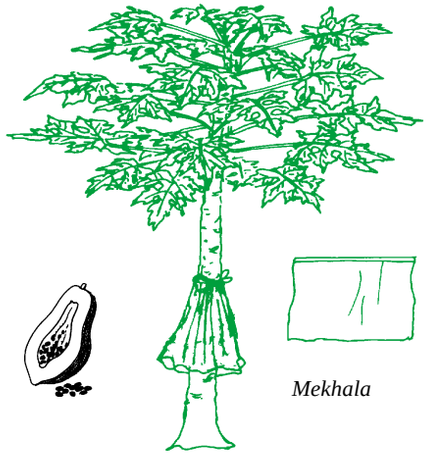
2. **Control of rice pests**

To control major pests, like stem borers, in paddy fields, farmers in some parts of Assam cast the rind of '*rubab tenga*' (***Citrus grandis***) into the standing water in the field. The strong, sour taste of the rinds, it is believed, brings about certain reactions in the water which causes the pests to flee.

3. **Germination of cucurbit seed**

Because of their hard coats, seeds of the ridge gourd and some other cucurbits take long to germinate. There is a traditional method that farmers of Sibsagar, Golaghat and Jorhat district use to overcome this hurdle. A one and half foot-long banana leaf sheath is slit longitudinally and the seeds are inserted through it into the stem. This is kept in a previously prepared pit filled with cow-dung. The seeds germinate faster this way. It is believed that this practice ensures a greater supply of moisture to the seeds. As the leaf sheath contains water, it keeps the seeds soft thereby enhancing germination.

4. **Fruit bearing of papaya**



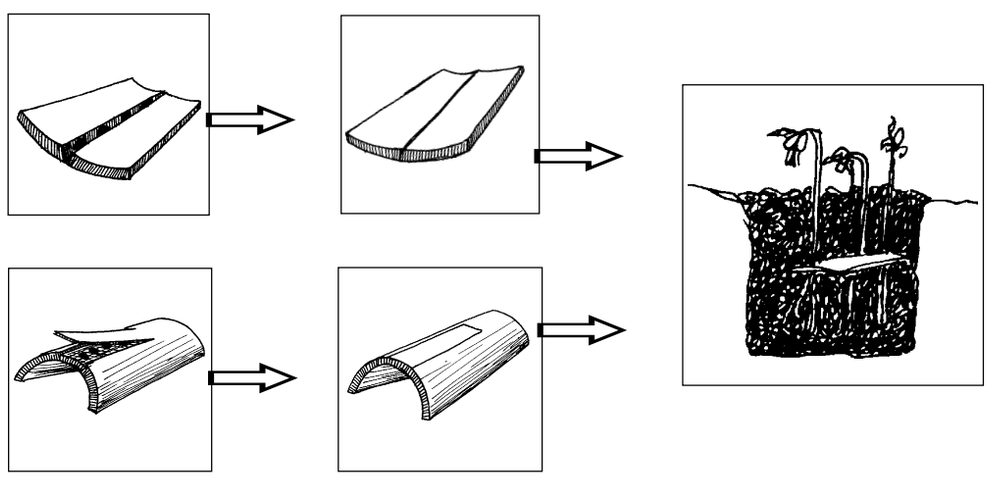
Although the papaya can be a hermaphrodite flower bearing plant, in many cases it bears only male flowers and consequently the plant bears no fruit. For inducing such plants to bear fruit, farmers of the Sibsagar, Golaghat and Jorhat district cover its stem by tying a *Mekhala* (a traditional dress of women of the state) around it. There is no scientific reason to explain how this practice might work. It is believed that, in the male plant, because of increased movement of food materials to the top portion, an imbalance is created between top and bottom portions and the plant fails to bear female flowers. The folk belief, however, is that because women give birth to babies, the tying of Mekhala will change the behaviour of the male plants.

(*All these practices were collected from a farmer, Shri Kamalakanta Gogoi, Jhanji village, Jorhat district, Assam who has been following these practices. Shri Gogoi is a winner of the Progressive Farmer of the State award. Dr Borthakur will be sending some more practices collected from him. Ed*)

5. **Protecting fishes from '*ood*' attacks**

In almost all the districts of Assam, '*ood*' (English name: *Beaver*; Genus: *Castor*) attack fish in the ponds causing a heavy loss to fish farmers. Sri Hussain Ali Master of Ambagan area of Nagaon district of Assam has protected his fish by growing turmeric on the embankments of his fisheries. He says that odour of the turmeric leaves keeps *oods* away from his pond. His idea has been copied by many others in the area.

1. Farm Information Officer, Directorate of Extension Education, Assam Agricultural University, Jorhat - 785 013, Assam.



Kana Bundi: Traditional Method of Controlling Wind Erosion

S B L Mathur[1]

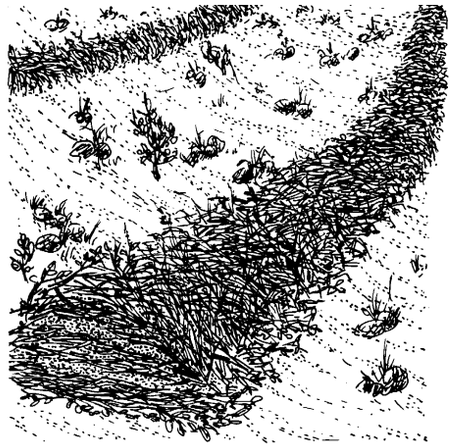
High velocity winds loosen material on the soil surface, and lift, bounce and slide it along from one place to another. Wind erosion is most common in arid and semi-arid regions where the rains are scanty and erratic. It leaves the land surface dry and bereft of vegetation. And land surfaces without an effective vegetation cover are even more susceptible to wind erosion. Around 32 million hectares of the country is subject to wind erosion.

A wind with a velocity of 12-14 kph at 15 cm above the ground can initiate the movement of sand particles of 0.10 mm to 0.15mm diameter. In order to contain the wind velocities within safe limits near the surface of the ground *'kana bundis'* micro-windbreaks of dead wood, are built.

Locally available vegetation like '*siniya*' (***Crotolaria burhia)***, '*kheep*' (***leptadenia***) '*bui*' (***Arva-pseudotomentora***) is used for making a '*kana bundi*'. The vegetation is laid down in three lines across the wind direction, in rows 20 to 25 metres apart. (Soil is dumped on each mass of vegetation to hold it in place) Grass like '*dhaman*' (***Cenchrus ciliaris, Cenchrus setigerus***) or '*sevan'* (***Lasirus sindicus***) is then sown on the leeward side of each windbreak. Ultimately the grass grows into permanent vegetation.

Care should be taken that the micro-windbreaks are not damaged at the time of agricultural operations such as cultivation in the vicinity of the '*kana bundi*'.

When high velocity winds are thus intercepted by the '*kana bundi*,' the lifted



soil particles accumulate near the windbreak. The sand is then spread over the field. With the deposition of fresh sand along the '*kana bundi*', crop yield is considerab ly increased along *kana* lines. *(In Mahendragarh district, farmers used the twigs of* ***Prosopis ceneraria*** *for the same purpose. :Ed.)*

1. Dy. Director, Watershed Development & Soil Conservation, Jodhpur

Neem for Fish Ailments too!

Mr V Ganapathi of Veerapatti Village near Keeranur, 50 km away from Tiruchy, has successfully developed treatment for deadly fish disease called epizootic ulcerative syndrome (EUS). EUS is a devastating scourge that is crippling aquaculture all over the country. Almost all species of fish are susceptible to this dreaded disease.

When the air breathing murrel (***Ophiocephalus spp.***) raised in Ganapathi's paddy-cum-aquaculture farm was infected with EUS, he trapped them in a small net and examined the symptoms of the disease. The pox-like appearance and peeling of the scales were quite evident. He could immediately spot the similarity in appearance of the lesions with those of chicken pox in man. He thought of trying time-tested simple remedy which is used on pox lesions in humans.

He took each fish out one by one, and applied a thick paste of ground neem leaves and turmeric over the lesions. He left the treated fish in a tray containing just enough water sufficient to sink half of their body so that the paste dried up well. After an hour or so, he took out the fish out again and poured a few drops of a solution containing equal proportions of thinned neem and turmeric pastes into their mouths. The pond was also treated with the same solution before letting the fish in again.

The results of this treatment were remarkable. The survival rate was near total: in two to three days, the fish were completely cured and the spread of the infection was also arrested. The fully recovered fish soon began to grow well. Mr.Ganapathi tried out this treatment on ***Tilapia spp*** too and found that the results were equally good.

Mr. Ganapathi has been practicing this treatment for last two years and has advised other fish farmers in the region to follow the same. (*Source: The HINDU, 9th Nov; 1994)*

Hatching Eggs: Batulu Narsayya's Way

Durga Prasad[1]

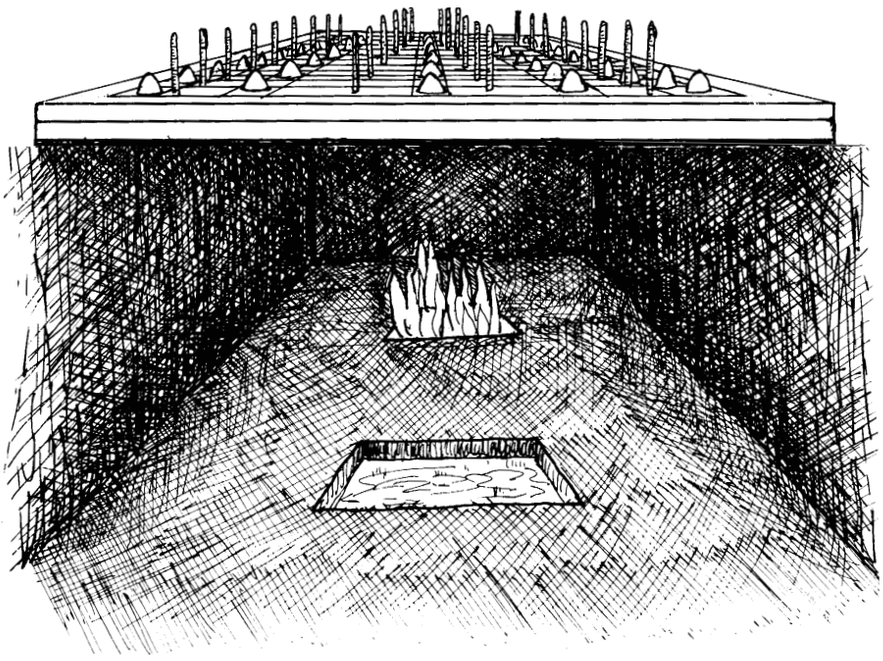
The year was 1986, and the time sometime during February-March. As Branch Manager of the SBI (State Bank of India) looking for avenues to offer credit to farmers under IRDP (Integrated Rural Development Programme), I was strolling around in Karakumalla, Nalgonda District, Andhra Pradesh.

I walked past a large hut which had some frames stacked outside. I was curious to find out of what use the frames were. As the owner of the hut wasn't home that day, I left word with the neighbours for him to call on me at the bank.

Next morning, Batulu Narsayya turned up at the bank. In Telugu, 'batulu' means ducks. I asked him how he got a name like that. It was his trade, it turned out, that was responsible for it. His business was selling one-day and two-day-old ducklings. I was keen to know the size and nature of his activity. After some initial hesitation, Narsayya agreed to allow me to see his place of work. I decided to visit him the following day.

When I went to Narsayya's house he showed me one of the most fascinating and imaginatively constructed hatchery. Narsayya was, at that time, hatching something like 5000 to 7000 eggs without using a mechanized incubator. The hatchery was housed in another hut, which was different from the one he lived in. Inside this hut he had dug two pits about 20 to 23 cm deep, about 360 cm long and about 300 to 330 cm wide. The total trenched area of the system was therefore nearly 7.0 square metres.

Within the pits he had scooped out what could be called sub -pits. In two places at the base of the pit where he had dug deeper trenches he placed a fireplace and water respectively for maintaining temperature for hatching. Over the primary pits he placed a frame on which he placed the eggs. Under this frame was another frame covered with a large cardboard bearing 18 holes per pit. Each hole in the cardboard had a rubber stopper with a thermometer inserted into it. What Narsayya was doing was to maintain an constant temperature within the pit for hatching the eggs just as in an incubator. The thermometers were uniformly distributed across the pit. The temperature within the pit could be controlled by adjusting the flame in the sub-pit. He adapted the normal (for duck eggs) 28-day cycle of hatching. Both Narsayya and his wife took turns in monitoring the temperature inside the hatchery.



This entire concept of the hatchery was Narasayya's own. The hatching rate ranged from 40 to 80 percent depending on the quality of eggs. This rate of hatching success was considerably higher than that of mechanized incubators besides being energy efficient as it relied on a manual process.

In terms of the economy, the process had an extremely low break-even. The market, it appeared, was almost unlimited which is evinced by the fact that Narsayya had something like six months of orders pending.

A few days later I worked out a way by which Narsayya's process could be mechanized so that the productivity of his enterprise could increase. Even the modified mechanized process would cost much less than the available incubators in the market.

However, Narsayya did not show interest and eventually got himself an incubator on hire or some similar arrangement from another party in the District Headquarters Centre. Nevertheless, I am convinced that with more understanding of a process like this we may be able to design and adapt it for large scale use. The adapted process would be less strenous on the individual operating it, because as he/she would be relieved of the drudgery of moving the eggs every four hours, six times a day. *(Are scientists listening? :Ed.)*

1. c/o INFAC, Dr Anne Besant Road, Bombay-400 018

Practices from Local Versions of Honey Bee

Honey Bee
Humsssssss...

Madhuchakra

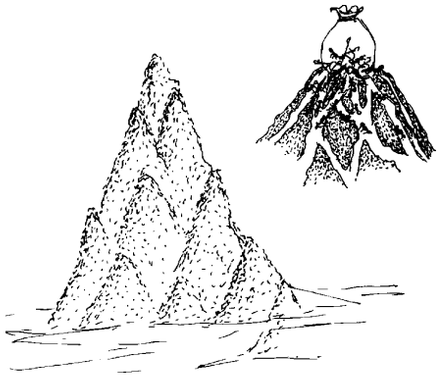
(*The following practices have been sent by Dr Sabyasachi Rath, NISTHAA and OUAT, Bhubaneswar. They are from an experimental publication he started based on Honey Bee, with his own resources. We are in touch with many other colleagues in Orissa so that efforts of this kind can be revitalized and coordinated to bring out an Oriya version of Honey Bee. The idea, as we have mentioned many times in this column, is to promote lateral learning among creative farmers across different language cultures within and across different countries. :Ed.)*

Crop Production Practices

1. **Ensuring germination**

(a) Farmers wrap the '*saguan*' (***Tectona grandis***: teak tree) seeds in a piece of cloth and put them inside a cow dung heap for a few days. This results in better germination.

(b) Termite ant hills are commonly used for ensuring easy and better germination of teak seeds. After knocking off a portion of the anthill, the teak seeds, wrapped in a cloth, are put into the hole. The ants nibble at the seed coat and quick germination is ensured.



(c) Balasore farmers wrap the seeds of '*Bhindi*' (Lady's finger) in a piece of cloth and put them in water, in the sun, for a whole day. They then keep them inside a straw heap overnight, and sow the seeds the next day. (Ghosh, 1992, Ghosh *et.al.*1995)

(d) Seeds of '*arhar*' (***Cajanus cajan***) and '*kandula*' (***Sterculia urens***) are mixed with wet red soil and dried in the sun to prevent insects from attacking them (Rath, 1991).

2. **Mulching and green manuring**

Tribals cover the field with '*sal*' (***Shorea robusta***) leaves after planting the turmeric rhizomes. They believe that this improves the crop performance in the following year. They always prefer '*sal*' leaves for mulching because the leaves remain attached to stem for a longer period and are not blown away by summer winds.

3. **Induction of flowering and fruiting**

(a) In Koraput, farmers drive nails into the papaya plant about 1.55 m to 1.8 m (five to six feet) above ground level for inducing femaleness. (*This is a widely prevalent practice and has been reported in previous issues. :Ed.*)

(b) In Balasore, farmers tie bricks to the peduncle of coconut. They believe this results in fruiting.

(c) Some farmers cut off branches of palmyra palm and cover the apical portion of the tree with a large earthen pot to induce fruiting.

(d) In Balasore, farmers pierce the cucumber vine with the bone of a type of fish called '*singi*'. It is believed to induce bearing of more female flowers.

(e) In Koraput, opium is applied into a cut made in the pumpkin vine to induce flowering.

(f) For lengthening yam, farmers dig a hole, put a segment of a banana stem below the planting material which is then placed on it. When the tuberization begins, it is easier for the yams to grow lengthwise (Ghosh, 1992; 1994).

4. **Crop protection**

(a) '*Karada*' (***Rhizophora conjugata***) leaves are scattered in paddy fields to kill the '*gandhi*' insect and weeds. The leaves make the water toxic and this perhaps results in the killing of the insect and the weeds (Panda, 1991).

(b) In Koraput, '*kendu*' (***Nicotiana tabacum***: Tobacco) stems are burnt in different parts of paddy field. Some farmers fumigate paddy crop by burning the wood of the '*sisu*' (***Dalbergia sissoo***) to reduce the insect population.

(c) Some farmers hang tin boxes in their field and attach a long rope, which stretches up to their house. Thus even while busy at home, they can use the rope to create a noise in the field to scare away birds and animals. This is a widely prevalent practice in Karnataka and may be other regions. (*Could readers write to us about different designs particularly the odd shapes. We have seen farmers in Karnataka affixing cloth, plastic strips, shining pieces of paper or wrappers of cigarettes etc. A variation, seen in Bharuch district of Gujarat is to split the top portion of a vertically planted dried bamboo pole and to connect one half to the house with a rope. When the rope is tugged and released, the two split halves 'clap' for some time. :Ed.*)

(d) In Balasore, the root and stem borer is the most severe pest in coconut. The farmers clean the affected portion of the plant and apply salt to it, to keep away the insects. Some farmers also paste a mixture of coal tar and kerosene (2:1) on the plant to protect it (Lenka, 1994).

Nam Vazhi Velanmai: Tamil Version of Honey Bee *(Mr P. Vivekanandan, Editor had sent us the following practices. He has an extensive network of experimenting farmers and can be contacted at 43, T P M Nagar, Virattipathu, Madurai 625 010, Tamil Nadu. Ed.)*

Agricultural Practices

1. **Sound waves control caterpillars**

Farmers of Avarangulam, Pulvaikarai Villages in Kamaraj District blow the '*sangu*' (conch) to chase away the red hairy caterpillars in groundnut crop. (The '*sangu*' is usually used during religious occasions or at the time of funerals to make announcements or to draw attention). Farmers start blowing '*sangu*' from three corners. Farmers believe that the caterpillars congregate and try to escape from the fourth corner. The caterpillars are collected manually and destroyed.

2. **Increasing the germination rate of soya beans**

When soya bean seeds are sown in saline/ alkaline lands, the germination rate is below 30 per cent. The germination rate can be increased up to 90 per cent if the seeds are treated with leaf powder of ***Usil-Albizia amara*** at the rate of 150 g leaf powder for every kg of soyabean seeds. Boiled rice water can be used as an adhesive for making leaf powder stick to the seed. (Source: Reported in *Dinamani*, August 31, 1993. Contributed by Shri S.Selvaraj.)

3. **Arresting flower droppings in chillies**

Ash from brick kiln is mixed with cowdung, diluted in water and sprayed on the chili plants (***Capsicum sp***) to reduce the dropping of flowers and buds. (Source: Reported in *Bulletin of Madras:* Agricultural Department (1932)).

4. **Neem for controlling leaf caterpillars**

Thirty days after planting paddy, powdered neem cake or cakes of '*punnaikai*' (***Calophyllum inophyllum***) are applied to control leaf caterpillars in paddy. The quantity used is 10 kg per acre.

(*Farmer: Sri Thavasinathan, Peyodu, Santhapuram Post, Kanyakumari 629 201, Tamil Nadu*).

5. **Control of root grubs in mrinjal**

Neem cake is powdered and applied to the field to control root grubs in brinjal.

(Farmer : Samuel, Swami Koil Street, Agastheeswaram, Kanyakumari 629 701, Tamil Nadu).

Veterinary Practices

1. **Control of enteritis**

Dried ginger (100 g), pepper seeds (2 in number) are pounded together and diluted in water and orally administered to the animal. Sometimes *'ragi'*, cooked the previous day, is mixed with fat of the pig. Small balls made of it are fed to the animal.

2. **Cattle lice**

Water, in which tobacco has been soaked, is applied over the body of goats or cattle affected with lice.

3. **Indigestion or Anorexia**

Gingelly oil (100 ml) and a bunch of ***Calotropis*** leaves are fed to the animal. This treatment offers relief within half an hour and the animal begins to masticate.

4. **Asphyxia**

Water or castor oil is poured inside one of the nostrils of animals so that any material blocking it will be ejected through the other nostril of the animal.

5. **Foot and mouth disease**

Neem oil is applied in between the toes of the cattle three times a day.

In addition, fumigation is done by burning the straw of the '*varagu*' (***Paspalum scrobiculatum***) and leaves of '*Kondrai*' (***Cassia fistula***) in front of the animal, for two days. During the treatment period, the diseased animal is isolated and penned separately. Its food consists of cooked ragi and boiled water.

6. **Inducing conception**

When cows do not conceive, country poultry egg, red soil, 1/2 kg of tomato are ground together and fed.

7. **Increasing milk secretion**

Bottle gourd, fenugreek, coconut, black gram, palmyra jaggery are pounded together and fed to animal for three days.

All the above veterinary practices are contributed by: R.Kannappan, Botany Teacher, Government Higher. Secondary School, Nagarasampatti, Dharmapuri Dt., Tamil Nadu.

source: The Neighborhood Tool Box

Survey of Innovations in Gujarat Part XI

Anil K Gupta
Kirit K Patel
Jitendra H Suthar

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, Dumyani*
- *Gandhi Gram Vidyapith, Vedachi*
- *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*
- *Dept. of Botany, Gujarat University*

Innovation Scouts

Vijay Chauhan
Dilip Koradia
Jalamsinh Zala
Alka Raval
Shila Patel
Ramesh Patel
Rajesh Patel
Ganapat Solanki

Honouring Innovators, Teachers and Scouts

As we enter the sixth year of our continuing survey of innovations, we are faced with new challenges. Some of the experiments we would like to share with you, provide an idea of how we are facing these challenges. But it is possible that you have some other suggestions and we look forward to hearing from you.

We realize that the search for innovations of farmers or artisans will prove futile if students in schools and colleges do not rethink their approach to learning about nature and its relationship with day to day life. Accordingly, we decided to identify teachers who had already thought about this problem of knowledge erosion and had taken some interesting initiatives. Some of these teachers, primary school as well as college teachers, tried to generate among the students a competitive spirit for learning about nature, particularly its unusual aspects. For instance, one primary school teacher, Shri Bavabhai G Sondarva asked the students to gather different kinds of thorns. In the process, he achieved a methodological and conceptual breakthrough. Assuming that thornyplants generally grow on uncultivated plots, some low-lying areas or less accessible passages, the teacher succeeded in sending the students to the boundaries of the system. Such insights are very meaningful. Not only did we learn about new approaches ourselves, but we have also been encouraging other teachers to try out such ideas.

Similarly, Amrutbhai B Patel, a senior teacher at Gram Bharati Vidyapith, Amrapur, had started, on his own, experiments on organic agriculture in field crops as well as horticultural plants. When he failed to find any answer for the slow death of an old neem tree, he tried to put the extract of ***Ipomea fistulosa*** around the base of the trunk. And the problem was solved.

Our task would have been more difficult, if a large number of officials and farmers had not acted as scouts of innovation. We organized a state-wide competition among various field-level functionaries of Department of Rural Development, Gujarat, last year. The process unfolded with tremendous enthusiasm among the functionaries regarding indigenous knowledge. These scouts, we realized, could help in scaling up the process of searching innovators. We honoured in a function held recently those teams of officials and individual village level workers or other functionaries who had identified many innovative farmers. Hitherto, we had relied on the students, during summer vacations, for scouting rural innovators. With this new channel of search and scouting our goals have become realizable in shorter time and at lower costs. The ultimate purpose of searching for teachers or scouts with discerning eyes, was to reach the innovators themselves. We also honoured these innovators. In an arid village of Gujarat, the common property land had been usurped by many villagers. Shri Balwantsingh H Chauhan, a farmer, determined to revitalize the common property resources, tried to persuade the farmers to vacate the encroachments. When they did not, he decided to encroach the remaining common lands and warned everybody about the consequences if they did not vacate. After the animals suffered for one day without grazing in the common lands, every encroacher agreed to vacate, and so did Balwantbhai himself. The people evolved many other norms for protection of trees, cleaning of catchment of the ponds in which water was stored before the rains, and for punishing those who did not subscribe to the collective norms.

The fact that some of these institutions are being renewed through peoples' own initiative without any outside help gives us the hope that a process of natural regeneration is feasible by building upon indigenous institutions.

We also honoured a few other innovators with whom we had worked for several years, on developing or multiplying innovative implements, conservation of biodiversity through local institutions, development of herbal pesticides, and providing durable solution for pest problems.

The most positive impact of our efforts to recognize and respect innovative teachers, scouts and farmers has been the triggering of imagination in neighbouring states of the country. The Government of Rajasthan is sending a poster to announce a competition all over 30,000 villages in the state. It is asking people to write back if they themselves have done some innovations or know of others who have contributed to sustainable natural resource ;management. Similarly, The Government of Maharashtra is taking initiative to announce a competition in various watershed programmes.

We earnestly hope that our readers and collaborators in different parts of the country as well as other parts of the world will take initiatives to involve teachers, rural development functionaries and innovators themselves in scouting others of their kind. In this issue we present a few practices which were discovered through the state-wide competition in Gujarat described above.

Prize Winning Innovations

6201

Leather tanning

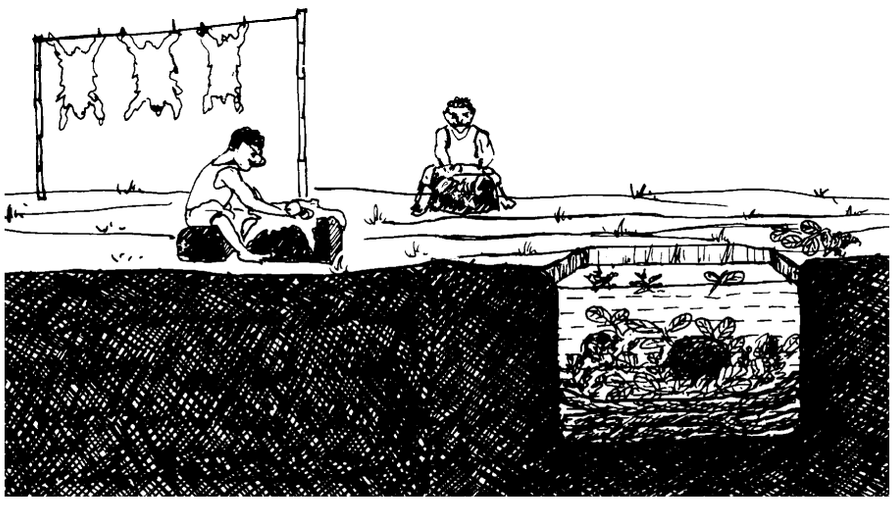
Tanning leather is a very common rural enterprise in Banaskantha District, a drought-prone region of North Gujarat. In most of the villages, groups of 8-10 families are involved in this business. There is a very strong institutional arrangement for collecting, dissecting and processing of dead animals. '*Kund*' is an institutional arrangement where dead animals are brought and their hides are separated and processed. The '*kund*' is situated in common land, but is isolated. Grazing animals cannot go near it easily. Three or four tanks (*kunds*) are constructed on this site.

Processing leather organically by using locally available plants and substances is an art. The freshly separated hide is cleaned and dried carefully. It is processed for softening and inducing a natural colour.

First of all, the dried hide is immersed in clean water till it absorbs the water. The bark of '*aval*' (***Cassia auriculata***), and Calotropis branches along with the infloresence, are chopped and kept in, the '*kund*'. Salt is also added. The soaked hide is put in the '*kund*' and water is poured on it till it gets immersed. Weights are kept on the hide so that it remains completely submerged in the water. It is made sure that the hide is completely immersed in the water because unsoaked portions become hard. The '*kund*' is covered with tin sheets to protect it from dust and impurities. It is left undisturbed for two weeks. It is believed that this method of treatment makes the leather soft and it gives it natural colour.

The processed leather is known as 'ripened' leather. It is cleaned and used either for making shoes or sold in the market. It is believed that the colour, shine and durability of *'kund'* treated leather are much better than those of chemically processed leather. The chemical processing is faster and easier. If the leather is processed by the traditional process, shoe-makers give a two-year guarantee on their product without any hesitation. People also believe that shoes made from *'kund'* processed leather gives cooling effect to the feet and reduces the chances of developing eye problems. Sometimes ropes are made from such leather. These ropes do not rot in water.

Lavajibhai Vasabhi Parmar, Dist: Banaskantha, Comm: Paragbhai Kalabhai Parmar, VLW, Vill: Nanapura, Tal: Radhanpur, Dist: Banaskantha.



6202

Fruit bearing in coconut

At times coconut trees grow taller by the year but bear no fruits. Jarabahen Dudha had one such tree. She learned that driving an iron nail into the trunk resulted in inducing fruits. She drove an iron rod of about 0.5 cm diameter and 45 to 60 cm length into the trunk at a height of about 1.5 m from the ground. She noticed a reduction in the vegetative growth of the tree and the tree started bearing fruit the following season. According to her, this is a rare practice in this region. (*This practice is very well known in other parts of*

Gujarat state. It is widely practiced in papaya orchards. :Ed.)

According to Dr S K Dave, scientist at Aspee College of Forestry & Horticulture, Navsari, this practice probably helps in two ways: (a) as the heavy black soil of this region is deficient in iron, it may help in rectifying the deficiency, (b) because the soil nitrogen content is very high, the land is highly fertile and any tree grows vigorously if optimum moisture is provided. Increased nitrogen in soil leads to imbalance of C:N ratio. Driving an iron peg in the trunk probably helps in restoring optimum C:N ratio.

Jarabahen is 50 year old, landless, housewife.

Ms Jarabahen P Dudha, Dist: Valsad, Comm: Dr S K Dave, Scientist, Aspee College of Forestry & Horticulture, Navsari.

6203

Trapping fish with leaves!

Leaves of '*supali*' (***Mundulea suberosa***) are dried in the sun and powdered. Approximately 100-200 g of the powdered leaves are wrapped in a cloth and secured by knots. About three or four such cloth bundles are immersed in different parts of a small water reservoir. Half an hour after immersion of this powder, all the fish become dazed and come up to the surface. They then can be trapped with a net. Untrapped fish become normal after an hour or so. Generally, this method is used in stagnant pools or slow streams.

Girishbhai Vashi has learned this method from tribals of the Dang district. He brings leaves from Dang, dries them and stocks them up. He has brought some seeds of '*supali*' and raised some saplings for his future needs. He wants to check that whether stored powder and fresh powder differ in their effectiveness.

Girishbhai is 45 year old, educated and a well organised and equipped farmer. He has about 15 acres of mango orchard and four cows, two bullocks and one buffalo. He has a pucca house with modern facilities like TV, refrigerator etc. He enjoys farming.

Vashi Girishkumar Ranchhodaji, Dist: Valsad, Comm: Parmar Chhatrasinh Gomansinh, VLW, Vill: Sonavadi, Tal: Gandevi, Dist: Valsad

6204

Discarded Glucose infusion sets for drip irrigation: A case of contemporary innovation

Everyday, several used intravenous (IV) infusion sets are dumped in the garbage. Badribhai Patel, an organic farmer of Dharampur village, Savali taluka in Middle Gujarat got the idea of using these discarded (IV) infusion sets for applying liquid organic fertilizer and water as drip irrigation.

He collected used infusion sets from veterinary dispensaries of surrounding villages. He hung the bottle from a stick planted near one to two year old saplings in a sapota orchard and inserted the discharging needle in the rootzone. The bottles were covered with dried grass or old gunny bags to protect them from scorching heat of the sun. A hole was made in the bottle through which 500 ml water is poured in everyday, using a funnel.

He has also used this set up to apply specially-prepared organic fertilizer. In a big barrel filled with 200 litre water, approximately 30-40 kg of cattle dung is hung in gunny/cloth bag and sealed. The water is stirred on every alternate day. After 15 days, the filtrate becomes yellow and is used as organic liquid manure after

mixing with clean water in the proportion of 1:2. It is filled in the IV bottles. The organic fertilizer is given at an interval of one week.

It is believed to provide all the essential nutrients and to improve the growth.

The use of IV bottles was successful last year in 1-2 year old fruit orchards of sapota, pomegranate, amala, guava etc.

Badribhai is 40 year old and has studied up to SSC. He has stopped using chemicals on his farm since last six years. He attends various training programmes, agriculture fairs, workshops and enjoys reading literature on agriculture. He always tries to modify modern technologies of organic agriculture and reproduce them on his farm. He has set up a small lab for producing biopesticide like NPV (Nuclear Polyhedrosis virus). He has plans for designing a bullock-drawn sprayer for organic/herbal pesticide. SRISTI has arranged to provide him the services of an innovative artisan, Shri Amrutbhai Agrawat, to make this sprayer.

Badribhai Somabhai Patel, Dist: Vadodara, Comm: Chaudhari Dineshkumar Nagajibhai, VLW, Vill: Valavav, Tal: Savali, Dist: Vadodara.

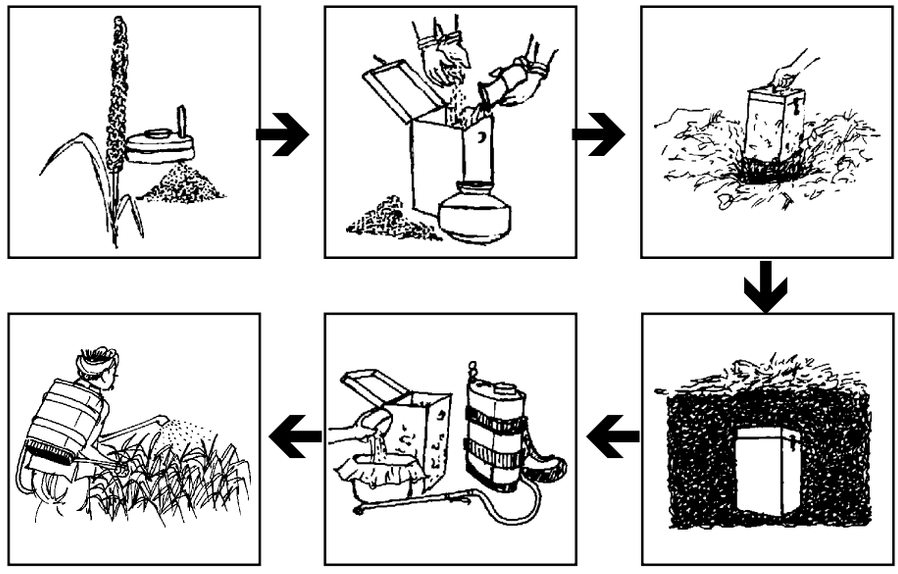
6205

Control of Larval pest in castor

Approximately 0.5 to 1 kg of bajra flour is mixed with 15 litres of water in an airtight container. This container is kept inside the manure pit for 20 days. Thereafter, the suspension, filtered through a cotton cloth, is used as insecticide (25ml in 12-15 litres of water). Two sprays at the interval of a week, help in controlling the green larval pest in castor. The pest had appeared in Laljibhai's field after 40-50 days of sowing (end of the September). This larva, a voracious feeder, eats away the entire green part of leaf and later attacks midribs and the tender infloresence as well. It also migrates to the other crops. Earlier, Laljibhai used chemical insecticides, but under the influence of *Swadyay Parivar* (a religious movement), he began to turn to traditional practices. He learned about this practice from a member of *Swadyay Parivar* who told him that *Charaksanhita* was the source of the practice. *(This is a widely prevailing traditional practice in other parts of Gujarat. Sometimes, farmer dust old flour of bajra on cumin crop to control the powdery mildew and other diseases. Usually, bajra flour becomes unfit for consumption after six to seven days, because of rancidity caused by fungal growth. :Ed.)*

Laljibhai is an innovative farmer, has seven hectares of land and two bullocks, two cows and one buffalo. He regularly visits Vruksh Mandir (a site where prayers are held by the followers of *Swadyay Pariwar*) and meets many farmers every day. He has great interest in traditional practices of farming which, he believes, are eco-friendly.

Laljibhai Veljibhai Paghdar, Vill: Nani Parbadi, Tal : Dhoraji, Dist : Rajkot Comm: Gunvantbhai A Mehta, Extension officer, Dhoraji and Dilip D Koradia.



Gauchara: Community Care of Cows

P G Vijaya Sherry Chand[1]

Many parts of Saurashtra have sizeable populations of the *Ahir* community. The *Ahirs* trace their descent from Lord Krishna and even today count care of cows and animal husbandry among their main duties. Most villages in Kalyanpur taluka of Jamnagar district have an indigenous institution for community care of cows — the *Gauchaara* system. This system is believed to have been evolved by the *Ahirs* in the distant past. According to certain elders of the community, the essentials of the form in which it is practiced today date back to at least three hundred years. The system is believed to have been created in response to the frequent droughts in the area and the shortages of fodder during the dry season.

Chhaganbhai B Ahir is the "caretaker" of the *Gauchaara* of Tankaria village. The *gauchaara* of this village is considered small since there are only about 150 cows and about 100 female calves in the village; buffaloes and male calves are excluded from the system. The milk from the cows is retained for home consumption, and buffalo milk is converted into ghee for the market. All cow owners, regardless of their land holding or caste status, are members of the *gauchaara*. The physical infrastructure includes a fenced yard of about a quarter of an acre (with a few trees providing shade), a godown for storing fodder, a bull pen and a small irrigated patch for green fodder for the bull.

The affairs of the *gauchaara* are managed by a committee which decides the various norms to be followed. The membership of the committee is voluntary and is drawn from the community of elders. The size of the committee is elastic, and usually varies from eight to fifteen. There are no rules for changing members: when someone is "tired" he retires and a new member comes in. The accounts of the gauchaara are kept by a member of the Lohana community, in which book-keeping has been a traditional skill. The crucial pivot around which the system revolves is an annual contribution (*neeran*), around diwali time, of sorghum stovers and groundnut by-produce by all bullock owners. The current norm is 100 bundles for every pair of bullocks owned. Groundnut by-produce is contributed voluntarily. People who do not own bullocks - for instance, many families belonging to the scheduled castes which do not have land or bullocks - are exempt from this condition. The contributions are stored in a covered godown.

Every morning, all the families hand over their cows and female calves to the caretaker at the yard. He feeds the animals from the stocks maintained in the godown, and then takes them for grazing and watering. The animals are back by lunch time and the owners collect them from the yard.

The sorghum stovers are not the only contributions the *gauchaara* receives. On every occasion, auspicious or inauspicious, contributions ranging from Rs. 2000 to Rs. 10000 are made to the gauchaara. The money is used for buying fodder in times of scarcity, developing the infrastructure and maintenance of the bull. Every month, on '*amavas*' day, the dung collected in the yard is auctioned. The winner is responsible for carting away the dung.

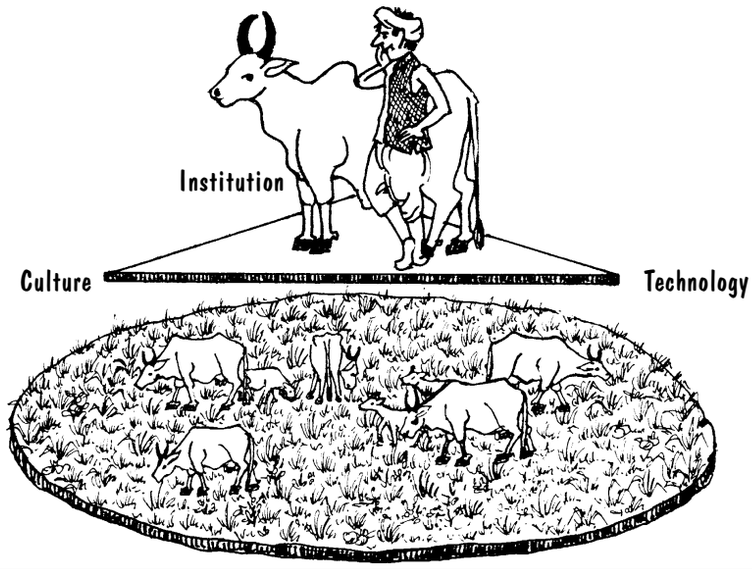
The caretaker is not paid from the gauchaara fund. He receives from the cow owners Rs. 8 per month per cow and its female calf.

The accounts of the *gauchaara* are presented by the committee to the village every year. The surplus is maintained in a bank account. There is a strong belief that the institution is carrying forward Lord Krishna's efforts to protect animals, and hence there is an emphasis on total honesty in matters of accounts.

One Kankrej bull is maintained by the *Gauchaara*. A small patch of gauchar land is set aside for green fodder for the bull. The water costs are borne by the *guachaara* fund. The costs of seeds, other inputs and harvesting are borne by the caretaker. In return, he is allowed to retain half of the green fodder for his own cows. The bull is also fed ghee and concentrates which are bought out of the fund, or are contributed by the people of the village. The bull is changed every three years. The old one is exchanged for another one, or a new bull is bought.

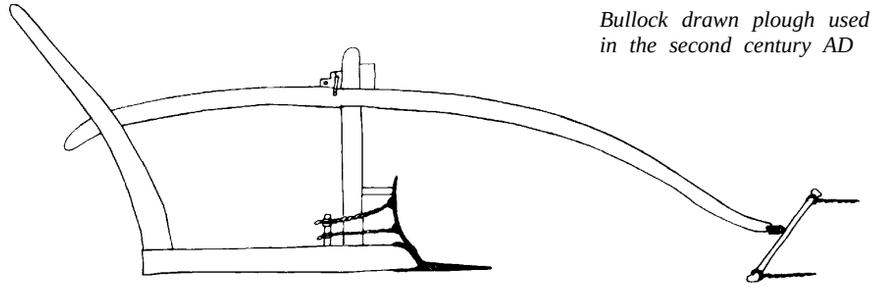
Contd on page 17...

1. Fellow, RJMCEI, Indian Institute of Management, Ahmedabad - 380 015



Book Worm

The Genius of China: 3000 Years of Science, Discovery and Innovation by Robert Temple: Simon and Schuster Inc., New York, 1985.



Bullock drawn plough used in the second century AD

For those who are not familiar with the lifetime contribution of Joseph Needham, who has introduced this book, this is a compulsory introduction to a magnificent account of how many of the concepts, theories and technologies had been developed in China centuries long before they were rediscovered in West. It is a different point that western scholarship has seldom acknowledged this debt. The book under review is a distillation of Science and Civilization in China published by Cambridge University Press - a 25-volume study of which 15 volumes had been published 10 years ago.

To introduce such a monumental work in about 250 pages is not easy. But, Robert Temple has done an admirable job. Joseph Needham mentions how he began with a study of medicine in 1918, but eventually got interested in History of Science. He recalls that Francis Bacon had considered three basic inventions; paper and printing, gun powder and magnetic compass as having done more than any other religious convictions or astrological influence or colonial achievement to transform the modern world. He did not even know that all three inventions were Chinese in origin. It is to put the record straight that Needham devoted his life.

It is a pity that modern scholars of sociology of science and students of indigenous knowledge systems have not made even a preliminary effort to learn and derive inspiration from Needham's work. The debt of western society to China is a huge one and therefore, **also requires rethinking the categories of western and eastern science.**

The book includes 11 parts dealing with agriculture, astronomy and cartography, engineering, domestic and industrial technology, medicine and health, mathematics, magnetism, the physical sciences, transportation and exploration, sound and music, and warfare. In this short review, it will be difficult for me to review each section comprehensively. But I have made a selection of a few practices primarily from agriculture to illustrate the value of this work.

Needham's work has shown how row cultivation and intensive hoeing were practiced at least by the 6th century BC.

Hoeing and row cultivation of crops in sixth century BC

A stone relief of the second century AD from the southern province of China shows bullock drawn ploughs in use, some of which with some modifications, still continue to be used. The winnowing of grain to separate the husk and stock from it after harvest and threshing by using a continuous stream of air generated by a crank operated fan was a technology developed in second century BC. Similarly, multi-tube seed drill which is considered a modern invention was practiced in second century BC in China whereas western agriculture had no seed drill until the 16th century AD. The Sumerians of the Middle East had a single tube seed drill 3500 years ago. Needham considers the seed drill in India as having been adopted from China - a proposition which warrants a more careful historical study. Because when Chinese travelers came to India around 3rd or 4th century BC, they were indeed impressed by the nature of technology already in use as well as the quality of various products and system of governance. It is possible that several technologies may have evolved independently in China and different parts of South and Southeast Asia. This is the challenge which probably will have to await another historian of Needham's calibre.

In another section, an example of biological pest control developed in 3rd century AD is described. Mandarin Oranges were attacked by black ants, caterpillars and other predators. The Chinese had discovered the use of yellow citrus killer-ants to protect the trees. In a document of AD 304, Hsi Han is quoted to describe how the citrus ants made a nest of the leaves, grew in them and killed the insects. These ants identified as ***Oecophylla smargdina*** are still very widely used agents of biological pest control. Western

Multi-tube seed drill used in 2nd century BC

scientists noticed this concept only when a paper was published in North China Herald on 4th April, 1882 by H.C.McCook (p.95). If you ask any student of biological pest control today, he or she is unlikely to trace the origin of this technology to China.

The book is full of very systematically documented evidence about Chinese supremacy in various technologies. For example, the Chinese were the first people to correlate the type of vegetation with the kind of underground minerals. The entire discipline of ecological indicators thus began in 5th Century BC. Yet, seldom is this lineage of ideas acknowledged by the western or eastern scholars. It is this state of colonization of mind which this work effectively tries to shatter.

It is important for scholars in developing countries to study the historical roots of ideas, not to live in the glory of past but to recapture and rejuvenate the spirit of exploration, experimentation and discovery. Without such an attempt, it is doubtful that these countries will ever come out of the morass of mediocrity so evident all over. I must caution the students that, in their anxiety to search indigenous roots, they should not fight shy of acknowledging the excellence achieved in other cultures. False nationalism can do great harm to the search for truth and beauty in the historical urge to excel, found in different parts of the world. It is possible that the first law of motion developed by Mo Ching in 4th century BC will continue to be credited to Isaac Newton. Mo Ching had observed, 'the cessation of motion is due to the opposing force... if there is no opposing force... the motion will never stop. This is as true as that an ox is not a horse' (p.161).

If text books continue to generate a mindset which inhibits the understanding of historical roots of ideas, it warrants a serious rethinking. But a more important task seems to be to recognize that tradition of invention has not died down in most societies. The readers of Honey Bee will be able to see the point we are making. A large number of innovations continue to be made alongside the upgradation and value addition in traditional technologies. It is true, however, that our culture does not any more put as much premium on local solutions now as it apparently did a long time ago. It is also possible that the ethical encumbrances of indigenous innovations prevent many of these innovators from using these innovations for fulfilling an accumulationist dream. But that is an issue which needs separate discussion.

I strongly recommend this book to every reader of Honey Bee and urge that similar search for historical as well as contemporary roots of local creativity be launched systematically in different parts of the world.

TRANET Newsletter

PO Box 567, Rangpley, ME 04970, USA

Bill Ellis has been running a Coalition for Cooperative Community Economics and a wonderful newsletter called TRANET. In his own words, it is "a trans-national network of, by, and for people who are creating the new social paradigm - people who are changing the world by changing their own lives - people who are adopting appropriate technologies and lifestyles." About 100 issues of this bimonthly digest of alternative and transformational movements have come out. It deals with social institutions, humanistic economics, gender, technologies, environment, food and agriculture, energy, etc. It is an extremely powerful forum for networking across the globe by people looking for alternative ways of addressing social questions. The newsletter is strongly recommended to those looking for global simmerings of alternative social movements.

...Contd from page15

Treatment of cows is provided by a local expert, Naranbhai Rabari, and sometimes by the veterinary doctor.

The *gauchaara* institution has played an important role in ensuring maintenance of cows in a harsh environment with low and uncertain rainfall. Its long history, presence in many villages and close identification with Lord Krishna are, according to Sursingbhai P Chauhan, a secondary school teacher, factors favouring its continued existence and development. However, degradation of grasslands, deterioration of soil fertility and migration of the youth in search of industrial jobs are factors which are bound to have a negative impact on animal husbandry in the area, as well as on its institutions such as the *gauchaara*.

Note: Shri Sursinghbhai P Chauhan, Principal, Sarvodaya Uttar Buniyadi Lok Shala, Tankaria, and his colleagues have embarked on a programme for generating awareness about sustainable development in the area, with the support of Hind Swaraj Mandal, Rajkot.

News & Views

Green Coloured Cotton: In defense of diversity and environment

In the last few years, there has been a considerable increase in the awareness about the hazards of synthetic dyes used in textiles mills. Within India, there are large pockets which are heavily polluted by the effluents from small scale and large scale textile units. Jodhpur is one example of this kind. Poor people relying on shallow hand pumps are affected by the toxic residues. If an alternative can be found which is non-toxic and natural, it will be a boon to textile exporting as well as consuming communities. Coloured cotton could be an answer.

If naturally coloured cotton is grown organically, then it is even better, because almost 60 per cent of the pesticide used in India is consumed by cotton alone. Several scientists are working in developing naturally coloured cotton at Central Cotton Research Institute, Nagpur, Coimbatore and in Agricultural University, Indore. Dr. K.C.Mandloy has developed several coloured lines with khaki ground, yellow, blue, black, pink and green colours. He reports that in USA, coloured cotton is cultivated in about 3000 ha land. In Soviet Russia coloured cotton was cultivated during '50s. At Regional Research Centre, Khandwa, Madhya Pradesh, a systematic research programme was started in 1991-92 on coloured cotton based on selections from the fields of local tribal farmers. A culture, k.c.94-2, was found to be quite strong in terms of limit strength comparable to the best in the world. Several other lines have been found promising. Shri Rajesh Julka and Dr. G.K.Kothur are collaborating with Dr. Mandloy in this research.

We only submit that this research, praise worthy as it is, should simultaneously strive for protecting the rights of the communities which have conserved the germplasm of coloured cotton. It is these, "laggard" growers who refused to adopt the modern varieties and thus made it possible for people to have environmentally safe cotton.

In the same campus, Dr. C.B.Singh, Dean of B.M. College of Agriculture reports the development of a new variety of pigeon pea called as sivanee-7. He recalls how two decades ago he collected the seed from a tribal farmer in Sivanee district which became the basis for this new variety. Here again, our submission is that the society is unable to find a reason and framework for rewarding such tribals who continue to contribute so much to the germplasm pool. We hope that various plant breeding associations will pass resolutions in their congresses requiring every germplasm collector to acknowledge the rights of individuals and communities providing germplasm so that the Farmers' Right being debated under FAO undertaking on the subject can be operationalised in their favour.

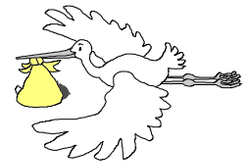
Rural developement workshop

SRISTI organized a workshop of Project Directors, DRDA (District Rural Development Agency), District Agriculture Officers, NGOs and other institutions involved in rural development, in collaboration with Centre for Regional Management Studies, Centre for Management in Agriculture at Indian Institute of Management and Department of Rural Development, Gujarat Government. 175 participants including winners of a state-wide competition on scouting of innovations attended the meeting. The workshop discussed the ways of strengthening links between formal and informal science, making grassroots innovations as the basis of ecological enterprises and generating a framework for rewarding innovators. The suitability of these innovations as a base for designing and implementing various rural development programmes was also discussed. Thirteen distinguished innovators, and teachers were accorded ***SRISTI Sanman*** as a gesture of rewarding creativity. Many other farmers and officials have also been given prizes on the basis of the state-wide competition held last year to scout innovations at grassroots level *(Refer page 11 for details of this competition. :Ed.).* The best team award went to DRDA, Rajkot. A similar state-wide competition for scouting the innovations and rewarding farmer innovators is being organized in Rajasthan. Shri M.L.Mehta, Chief Secretary, Rajasthan Govt convened a meeting of secretaries and senior officials on June 29, 1995. At the meeting, Prof. Gupta shared experiences of the competition organised in Gujarat. He stressed that many of the innovations can provide a basis for alternative people-oriented development in the regions where both market and state have often been found inadequate.

Towards Organic Certification at SRISTI

One of the important goals of SRISTI is to find marked-based incentives for conservation of biodiversity and the environment. Recognizing the limitations of available market options, we have been exploring different alternatives. The fact that much of the production in drought-prone regions, hill areas, and tribal regions is organic in nature, has two implications. (a) Unless farmers get incentive prices for organic production, they would switch over to use of chemical inputs as and when opportunities arise, and (b) With use of chemical inputs the pressure for mono-culture or reduction in genetic diversity would also start. Therefore, finding a cost effective way of organic certification should be a top priority. It is ironical that IFOAM and other associations of organic producers are willing to send their experts for certification at very high costs but have not taken initiatives to set up similar facilities in the developing world. Even ICAR and other national institutions have not given this task the urgency that it deserves. SRISTI has undertaken a survey of soil microbial diversity in collaboration with several institutions to explore the possibility of developing indicators which could help discriminate organic from non-organic farms. Those interested in collaborating in this study could write to us. We are also trying to estimate pesticide residues in the soil.

Response



Same source: dissimilar spurs for innovations: the story of '*arra*' (serrated) leaves

Mr P M Joseph
Puthukkunnath
Panipra, Via Thrikkaniyoor
Kerala

Please refer to page 9 of "Honey Bee", Vol. 5, No.2, April-June 1994. The '*arra*' plant is commonly known as '*Sand paper tree*' and its leaves are used for cleaning and polishing wooden surfaces. It belongs to the family "***Moraceae***", the species is "***Ficus asperrima***".

The '*arra*' plant is also used to control lice in poultry. Place one or two leafy twigs of the tree in the poultry sheds. Remove them after 12 hours and destroy them or throw away in flowing water. Repeat, if necessary.

The lice that get into the leaves are unable to extricate themselves because of its structure.

Patenting help needed for botanical herbicide: Can SRISTI help?

Dr S N Bagchi
R D University
Jabalpur - 482 001
Madhya Pradesh

I was going through an article in Times of India regarding filing of cluster patent of plant-based products such as herbal pesticides etc., in some European/US-based patent office through SRISTI. I also learnt the implications of such practice, which is always in the favour of the inventor. We have been working on some plant-based herbicidal products and achieved good success in developing the strategies for isolation, purification and application. Some basic work such as the mechanism of action, toxicological properties etc., has also been worked out. I am interested in filing a patent application for this product. However, I have no idea of foreign patent schemes and the procedure of application, requirements, cost etc. I shall be highly obliged if you kindly help me in providing the details.

(SRISTI is certainly willing to help individuals as well as groups working on developing sustainable technologies in getting patents. We are convinced that product patents will encourage to such inventiveness. We are in touch with CSIR on this subject. CSIR's new Director General Dr R A Mashelkar is a strong supporter of this idea and we are confident of getting his support in this exercise. Please let us have some more information so that we could first proceed with the first step i.e. getting state-of- art search done to establish that prior art on the subject justifies the new invention being called new and non-obvious. WIPO provides a free of cost facility for third world scholars for such searches. :Ed.)

Building links with peasants of Argentina

Prof. Daniel M Caceres
Altautina 2981
Residential San Carlos
5014 - Cordoba,
Argentina

I am a Professor at the Faculty of Agronomy (National University of Cordoba) and a member of a NGO (CREAR) fostering agricultural development in central Argentina. At present, I am involved in research in a forestry project with peasant communities in NW Cordoba.

As a member of CREAR, I work (since 1986) with peasants in central Argentina and our activities combine community action with academic research. CREAR's main aims are to promote the self-sustained development of the rural communities, and to support peasants in their activities to improve their present quality of life, together with the protection of the environment that will allow the sustained exploitation of their land.

I learnt about your publication from the book edited by Scoones & Thompson "Beyond Farmer First". As you may know, it is hard to keep ourselves updated on Third World countries, and we have very low budgets to buy specialized literature. Therefore, I would deeply appreciate receiving a free subscription to your newsletter Honey Bee. Although we do not produce any academic publications we can offer for exchange some learning materials for peasants. I would also acknowledge receiving further information about your publications on agricultural development.

*(Thanks to the support from Swedish **Society** of Nature Conservation, we can indeed oblige some of the third world scholars, farmers, NGOs, policy makers etc., with a complimentary subscription for Honey Bee for one year only. But there are many ways in which you could contribute to this process. You could join hands with SRISTI and Honey Bee network in bringing out a local language version of Honey bee for its dissemination among creative farmers there.*

You could encourage your students to take up small investigations into people's ecological and tech-nological knowledge systems during their holidays, visits to homes etc. You could organize competitions among school children, college students, field functionaries of various agricultu-ral and rural development departments to scout innovations and indicators of ecological change. You could send reviews of old and new books on people's creativity published in your country and also help highlight the intellectual contribution of third world scholars and farmers.

We look forward to hearing from you (and other readers) on how to make this third world based network of creative farmers a truly autonomous and self-reliant platform. Our goal, we have to remember, is to help creative farmers network with each other and also ensure that their intellectual property rights are respected. :Ed.)

My services are available to you!

Mr. Shashank Shekar Jha
Juran Chapra
Muzaffarpur-842 001
Bihar

I have read about Honey Bee Newsletter in the Financial Express. I feel it may be useful for research work.

I live in Himalayas near the border of Nepal. In this area there are many valuable herbs. I am also interested in collecting useful

traditional information. If you need my services, I am ready to help.

(Why not? Please do consider yourself a part of the network and take initiative. We look forward to hearing from you: Ed.)

Ideas not acknowledged?

Dr Rajiv R Jha
Badlao Foundation
Dimka Dist. - 815 354,
Bihar

A few days back my colleague Mr Girdhar Mathur sent me a copy of the **Honey Bee** newsletter. On thorough study, I found that the newsletter can certainly be a permanent guide to practice sustainable methods and is important not only for researchers and students but for farmers as well.

While reading the item on "Indigenous Birth Control..." by Ms Pritishri Parhi *(Honey Bee vol 5(3))* I got the impression that Ms Parhi wants to take credit for documenting this idea. Hence, I enclose a photocopy of the work of the late Mr Lakhashman Mishra Retd. S.P. from his book "*Sahaj Chikitsa*" pp 10-11. Mr Mishra had compiled several tribal medicinal practices in two volumes in 1958. You can find the copies of the volumes in many Oriya families.

Over the last three years, I have been trying to match the authentic botanical names with local Oriya names of plants mentioned by the author. During my stay in Orissa, I found that not only scientists but also the tribals are confused about the identity of the plants mentioned in the books. I strongly feel that Ms Parhi should acknowledge Mr Mishra's work. I am also enclosing a Hindi translation of the chapter on birth control for your perusal.

(Rajiv Bhai, We appreciate your comments and we did share them promptly with Pritishri. We feel extremely embarrassed that such a mistake took place and hope that it will not recur-thanks to vigilant readers and reviewers like you. We will need voluntary help of colleagues from different parts of the country as well as world to review the large number of manuscripts we receive so that such mistakes are avoided. We also hope that other authors will keep this episode in mind and acknowledge the source religiously. :Ed.)

Organic Jaggery on sale!

Dr M Madhukar Reddy
Society for Organic Agriculture
Secunderabad - 500 003.

Society for Organic Agriculture (SOA) is a not-for-profit non-government organisation actively engaged in spread of organic agriculture movement in India.

We are happy to inform you that one of our organic farmers has produced organic jaggery from his farm near Hyderabad. The farm has been organic for last eight years, and farmer has been cultivating sugar cane without application of chemical fertilizers and pesticides. The processing of jaggery is without adding any inorganic chemicals.

(We tried this jaggery and were really impressed with the quality. We encourage other readers to also share with us information on organic product outlets, or their own experience with consuming it or searching it in the markets. :Ed.)

Will Bankers make peoples' innovations bankable?

Dr D C Das
Agricultural Finance Corporation Ltd
New Delhi - 110 058.

Thank you very much for sending copies of "Honey Bee". The endeavors being made through the publication will be bringing in much needed awareness about the traditional knowledge and technology. The innovations brought about by the farming community and the rural people should stimulate all the scientists to look for proper answers for the ground conditions. Similarly the administrators and policy makers would become wiser about the real issues through it than those devised in well groomed meetings held in cozy comfortable rooms. I am circulating these two issues amongst the colleagues and the managers of this organisation for taking further action if any.

(AFC has not become as yet the formal member of the Honey Bee network which of course is also one kind of response. We never give up hoping. We are trying to develop a proposal on SRISTI Venture Capital Fund for small innovations and look forward to hear about that :Ed.)

Will There be Honey Bee in Yoruba language ?

Mr Abimbola A Olusola
P O Box 6019
Ilorin.Kwara State
Nigeria

I am from a village called "Okeso" in the South-western direction of the capital city of my state in Nigeria. I can volunteer to contribute examples of local ecological knowledge & creativity, encourage people to set up a SRISTI-club in my area and even interested in translating into my local language (*yoruba*) the relevant practices in Honey Bee for circulation among the farmers and workers in my region.

(We are very keen to explore the opportunity of bringing out Honey Bee in 'yoruba' language. The whole idea of Honey bee is to link creative communities and people around the world through communication in vernacular medium. English language obviously will not go very far in connecting rural people either in India or abroad. We look forward to hearing from you about this exchange and hope that we can make a modest beginning. :Ed.)

Getting Innovative farmers their due!

Dr Gail Omvedt
Kasegaon - 415 404
Dist. Sangli
Maharashtra

It seems there is broad tendency to say that germplasm, varieties, etc., should be under control of the national states to protect from multinationals. Local communities are getting short shrift. The new Indian Plant Breeders Act seems to go in that direction, from what I've read. We would like to develop a position that can most helpfully assure the rights to local communities and the actual farmer-innovators.

(Gail, now that you have moved to USA, we have not heard from you lately. But we do see your point about the need for getting farmers' rights operationalised both for communities as well as individuals. This precisely is SRISTI's agenda. We hope that you will continue to share with us your critical comments from time to time. :Ed.)

The following are some of the responses received from farmers when we shared Khedut Vigyan, an experimental issue of Gujarati version of Honey Bee. :Ed.

Sifting Good eggs from Bad and, persuading buffaloes to milk...

Dhoolsinh Bhoolsinh Parmar
Vill: Choriyana Muvada
Post Saand hosal, Tal: Saavali
Dist: Baroda

I have several suggestions to share with the readers of your magazine:

1) To check the quality of eggs: when the eggs are put in water, if they are good quality then they will sink in water and if they are rotten, then they will float on water.

2) Frost makes the atmosphere humid and cold when the wind blows from west to east, making conditions suitable for winter crops like wheat.

3) Electric bulbs are placed at regular intervals in cotton fields. An earthern pot containing water is also placed just below these electric bulbs. Pests and insects are attracted towards the light of these bulbs and they fall in the pot containing water after dashing themselves against the lighted bulbs.

4) Castor oil is coated on 'tuver dal' (***Cajanus cajan:*** pigeon pee) so that it can be stored for a long period of time. The Tuver Daal thus treated does not spoil and it becomes easily digestible to human beings.

5) Small fish, fresh or dry, mixed with '*chapaties*' are fed to animals which are suffering from foot and mouth disease.

6) If the buffalo does not allow you to milk then alum (*Fatakdi*) is dissolved in water and given to the animal to drink.

7) If onions are planted in the second fortnight of the Hindu calendar month i.e when the moon is waxing, then the production as well as the quality of the onions is better.

8) A deep channel is dug around tobacco fields. This prevents pests known as '*katra*' (***Amsacta moorei***) from entering the fields, and the yield is also better.

(One has to be careful about the use of light traps because light does not distinguish between useful as well as not so useful insects. It traps both. It has been seen in some cases that after the use of light trap, the incidence of pest increased because the predators had been killed in greater numbers. Cuation is necessary: Ed.)

Farmers willing to pay for Gujarati edition!

Ramanbhai Chhaganbhai Patel
Vill: Vaktapur
Ujeda, Post: Kherol,
Tal: Prantij
Dist: Sabarkantha

I have received "***Khedut-vigyan***" somewhat late as the copy was being circulated among various farmers. So please forgive the delay in replying to you.

I place before you my opinions:

1) Since the information furnished in "***Khedut-vigyan***" will prove useful to the

farmers community, I would suggest that its publication should continue and in case there is a need to fix a price for the newsletter, please let us know about it.

2) When the farmers of our area take the summer groundnut crop, they apply lime to the groundnut seeds, so that they sprout and grow speedily.

3) The farmers of our area are facing the problems of tackling '*ghodiya iyal*' (castor semilooper: ***Achaea janata***) when the plants of '*divela*' (castor crop: ***Ricinus communis***) have attained some height. At this time instead of using pesticides, they simply scatter popcorn or (puffed maize) in the fields. Popcorn attracts birds to the fields. However, once the birds get to the field, instead of 'eating' popcorns, they

Farmer writes back...

make '*ghodiya iyal*' (the larvae of the pest) their prey. Result: we have not to incur any expenses for pesticides and labour.

4) Please send me the current and the future issues of the magazine. If there are any charges to be paid, please let me know to whom and where the money is to be paid.

(Raman Bhai, we have recently strengthened the Gujarati version of Honey bee and inducted two editors exclusively for this purpose. Cooperation of Gujarat Agricultral University is still available to us like before. We hope that we will be able to send you the future issues more regularly. Please keep sharing your insights with us regularly :Ed)

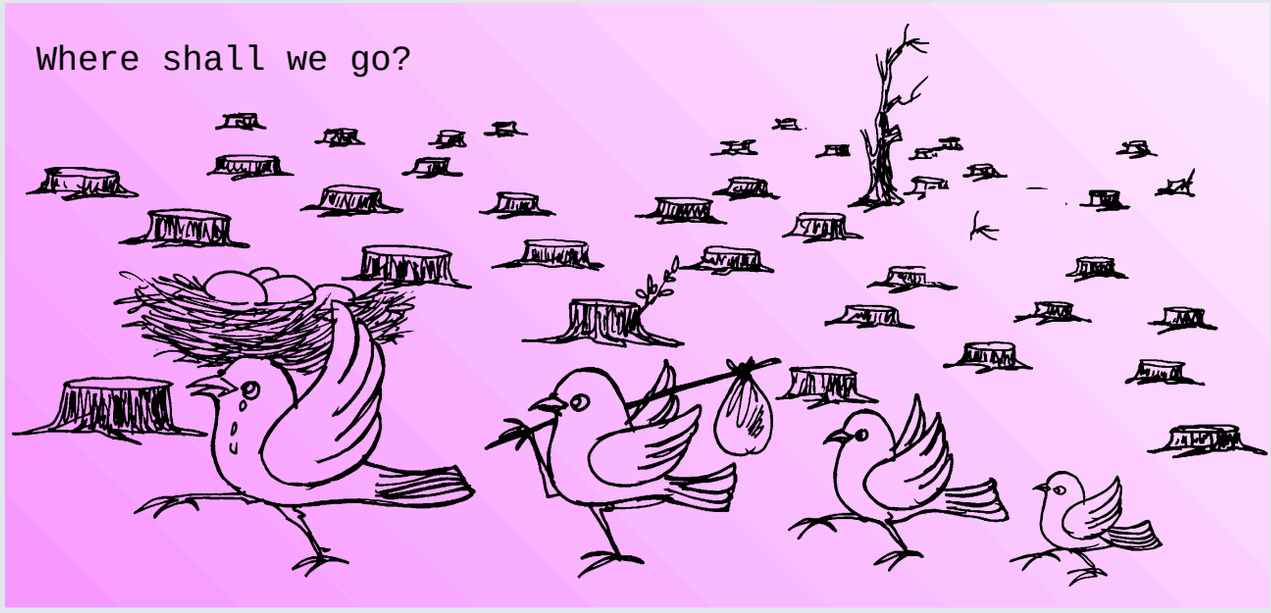
Blessings from a farmer!

Navulubhai S Bhusara
Vill: Umarkui, Post: Gangpur
Tal: Vaansda, Dist: Bulsar

Blessings. I received your issue of "***Khedut Vigyan***" and learnt many things from it. God bless you with more intelligence so that you can give and share more knowledge with the farmers, by bringing out such issues in the future also.

I grow mostly beetroots in my lands. Considerable damage is done to my crops by rats as they eat the basic raw materials. Please show me some way to tackle this problem. Since the creepers of the beetroot spread on the lands, the rats damage the creepers.

(Naval Bhai, we have published several practices on rat control. I am getting these practices sent to you. Please do not mind the delay. Working with volunteers, we do miss certain things. But we hope, your blessings will remain with us despite our failings: Ed.)



Membership Fee for Honey Bee Network

Dear Readers

We have shared with you more than four hundred innovations and illustrations of farmers' wisdom in the last fifteen issues of **Honey Bee**. If you have found the newsletter interesting, we invite you to join the **Honey Bee Network** by sharing the cost of keeping network active.

Please write back suggestions for improvement and how you can share the burden of strengthening this global but third world based network of scientists, NGOs, farmers, artisans, professionals, activists, political leaders etc.

Category	National	International	
		Developed Countries	**Developing Countries**
Annual Membership			
Patron	Rs 2000 or above	US$ 200 or above	US$ 100 or above
Supporter	Rs 500	US$ 50	US$ 30
Scientist/Professionals	Rs 120	US$ 30	US$ 10
Foreign aided NGOs	Rs 200	US$ 25	US$ 10
Farmers/NGOs (without foreign aid)			
-Large	Rs 100	US$ 50	US$ 10
-Small	Rs 50	US$ 25	US$ 5
Students	Rs 50	US$ 20	US$ 5
Unemployed Worker	Rs 5	Free	Free
Institutions/Libraries	Rs 2500	US$ 100	US$ 50
Life Membership			
Individual	Rs 1500	US$ 250	US$ 40
Institutions/Libraries	Rs 10000	US$ 1000	US$ 150

This membership entitles you to receive the newsletter and other information about the network. Please send your contributions through bank draft/postal order/money order in favour of **A/c SRISTI Innovations** at the editorial address; C/o Prof Anil K Gupta, Editor, Honey Bee, Indian Institute of Management, Vastrapur, Ahmedabad 380 015 India.