Innovative Approaches to Conserving Agricultural Biodiversity

The South Asian network of scientists, activists, NGOs, community researchers and innovative farmers devoted to the pursuit of innovative community-based approaches for studying and conserving on-farm agricultural biodiversity, has come a long way. Over the last two years, the goals have been clearly defined and a participatory process of decision-making has evolved. A grant program has been popularized, research projects by new members have been funded and a decision to support another eight projects has been taken. It has also been decided that a special fund for pilot studies on uncultivated agricultural biodiversity should be created. All awards are being administered by SRISTI (Society for Research and Initiatives for Sustainabe Technologies and Institutions) and IDRC (International Development Research Centre).

The Steering Committee (SC) set up has met five times. All decisions have so far been taken by consensus. The leadership of the SC has passed on from the hands of Dr. S K Sinha (IARI, New Delhi) to Dr. Farhad Mazhar (UBINIG, Bangladesh). Dr Mazhar leads a movement in Bangladesh known as Naya Krishi Andolan (New Agriculture Movement). The SC expressed its deep appreciation of the able leadership provided by Dr. Sinha.

Update of Network Activities

The fourth meeting of the SC was held during October 3-4, 1997 at the Water Technology Center of IARI in New Delhi. The meeting included brief presentations by the awardees of the first round on the progress of their research, discussion of the proposals for the second round and administrative, research and financial issues.

The fifth meeting of the SC and a workshop were held during March 28-30 at Bishnupur in Tangail, Bangladesh. The theme of the workshop was "Using Agricultural Biodiversity: Knowledge, Practices and Ethics". In this meeting the SC members interacted with scientists, NGOs and leaders of farmers' organizations of Bangladesh on common concerns relating to biodiversity and genetic resources.

Round one: Four grants were awarded during round one of the UD Project and all the four grantees were present during the SC meeting in October 1997. They made brief presentations on the progress made and outlined future plans. SC members made the following suggestions:
- More time should be provided for discussing the progress of each project.
- A format should be developed for making the presentations so that comparative lessons can be learned more easily.
- The contribution towards on-farm conservation made by these projects should be highlighted.
Before making a presentation at the SC meeting, each grantee must make a presentation to the community. This will enhance community participation and articulation of its voice in the SC meetings.

Round two: In the second round, 34 proposals were circulated for evaluation by SC members. Four of these, two from India and each Bangladeshi, have been funded. Seven project applicants were asked to modify their projects and resubmit them. These revised proposals were sent for comments to all those who had reservations about the project as submitted in the original form. The others were also informed so that they could suggest improvements.

Round Three: In the third round, 15 new proposals and six revised ones were circulated for evaluation. Three of these have been approved for funding. Another four proposals have been approved for partial funding. Approved proposals include those by Amruthbhai Patel (Grambharathi, Amara-pur), Archana Godbole (Applied Environmental Research Foundation, Pune) and Shivnath Yadav (Bastar). One of the first proposals discussed for partial funding was that of SEVA. Some members were uncomfortable with the part dealing with a visit to Sri Lanka because of the political tensions there. The SC also felt that the request was not a support for research. This proposal was to support the ongoing activity of the network of grassroots innovators and conservators of biodiversity coordinated in Tamil Nadu by SEVA. Most of the SC members wanted to contribute to the SEVA effort in view of the fact that it was a large farmer-supported network and could be instrumental in spreading the message of conservation and biodiversity. The SC agreed to provide institutional support for the Tamil magazine in the form of up to 1000 subscriptions @ Rs.250 per subscription, thereby committing Rs.250,000. The SC reiterated that this kind of support would be given on a case by case basis and will not be made a norm.

The revised proposal by Astad Pastakia was viewed very positively by the SC, which recognized its originality. However, it was felt that the limited resources of the UD should not be directed towards research by institutions such as NIRMA Institute that could instead provide such support. It was decided that support for publishing the research results to the extent of Rs. 40,000 could be given.

LI-Bird's proposal could not receive an award because they already had a Using Agricultural Diversity project. But it was felt that they should be encouraged and supported by the SC to organize a workshop to look at this proposal and any others. Discussions also took place on the issue of SC members applying for grants under the UD programme. It was clarified that in the first round there were not many proposals from outsiders and hence SC members were requested to develop proposals. Hence, this need not be continued.

It was decided that Prof Arora would be requested to undertake a pilot study to determine the endangered species in the environment. He could take one region, do a situational analy-
sis and resubmit the proposal. The SC decided to commit a small grant to cover travel costs, grassroots researchers' expenses and workshop costs. Mr. Satheesh was requested to coordinate with Prof Arora.

The proposal from T N Prakash from Bangalore was kept pending for discussion in the next meeting. This decision was taken in the light of a SC member's argument that a proposal had come from PRAKRUTI, to do similar work in the same geographical location last year and had been referred back to the applicant for modification and resubmission. Mr Satish worked with the researchers for such modification and the group had resubmitted the proposal. Due to some postal problem, it had not reached the UD committee in time. Therefore it was decided that SC would wait for PRAKRUTI proposal to arrive before taking a final decision on this proposal in the next round.

Changes in the Steering Committee: Dr. Sinha requested to be relieved of the responsibility of the Chair due to personal reasons. However, he assured the continued support of CEDAD (Center for Environment, Agriculture and Development) to the committee. Other changes in the SC include the replacement of Prof. Astad Padasta as a SRISTI representative by Dr. S. Murali Krishna. SC members expressed their appreciation of the excellent support provided by Prof. Padasta to the SC as part of SRISTI.

It was decided that members of the SC who did not attend two consecutive meetings would be dropped. In addition, it was proposed that after the completion of two years, new members would replace one third of the steering committee members. The new members would be elected on the basis of suggestions from the SC, keeping in mind balanced representation on the basis of gender, sector, region and client groups. The SC must balance formal and informal sector representation and ensure active representation from the network countries. SC members must be committed to the philosophy and approach of the UD and wish to make substantial personal contributions to the development and implementation of the program. Arun Joshi stepped down from the SC as he had not participated in any meetings since the inception of the project. Evin Weitzen and Prakash Joshi, recognizing that they did not reside in south Asia and did not attend two consecutive meetings, stepped down from the SC. LP Singh stepped down from the SC as he was just substituting for Dr. Chandik and the new director of NBPGR, Dr. Gautam, had indicated an interest in becoming a member. It was decided to invite Dr. Singh to join the Advisory Committee. The resignations of Ashish Kothari and Rajeev Khedkar from the SC were not accepted. It has been decided to invite Dr. Gautam and Dr. Subhan (Bangladesh) to become SC members and Dr. Farhad has been requested to follow up.

Advisory Committee: The SC decided that an Advisory Committee should be created that would bring eminent persons into the network. Their expertise could be utilised for specific purposes. Farhad would follow up this activity.

Financial Clarifications: In view of the legal and technical requirements, some suggestions were made about the way accounts had to be maintained and submitted by each grantee for smooth functioning of the project. All the grantees and SC members agreed to comply with these requirements. It was requested that awardees should send quarterly statements so that financial report to IDRC every year can be made properly. The technical reports approved by the SC should be sent to SRISTI from where it would go to IDRC.

Strengthening the Network: One of the goals of UD was to establish linkages between the people and the formal sector through grants. This would give scientists an opportunity to visit farmers and strengthen their research, at the same time deriving lessons.
for modifying on-station research. Linkages between creative and innovative farmers and their communities must be strengthened and joint proposals from groups of farmers, NGOs and communities must be invited. SC members have been encouraged to play an active role in identifying local initiatives relevant to the UD programme and helping them develop award proposals, thus transforming good ideas into workable proposals. SC members have been encouraged to organize local workshops to bring together potential groups to discuss UD issues and identify candidates for awards. This may include helping with translations and building proposal writing capacity, especially among farmers. Resources for such workshops in terms of direct organizational costs and food, accommodation and local travel for 20-25 people may be provided by the UD. Interested SC members should develop a plan and estimated budget for approval by the chair. Various SC members showed interest in undertaking workshops. It was stressed that the SC members or the institutions with which they work should not apply for awards.

**Farmer Breeder Workshop:**
The SC recognized the need to have a better understanding of the practices followed by farmer breeders. There is a need to identify the ways in which these practices can be strengthened by support from the formal sector. The SC decided to examine these issues by organizing a workshop of farmer breeders and scientists. Mr. Joshi agreed to develop a concept note on the workshop objectives, design and organization for discussion by the network.

**Uncultivated Foods Pilot Studies:** The SC decided to encourage members and awardees to facilitate pilot studies of uncultivated foods. These should begin with one or two communities and focus on inventory of species using local languages. The UBINIG team offered to share its documentation outline with the network.

**Fund Raising and Long Term Sustainability of the UD programme:** All the members felt that IDRC's commitment to the UD project was extremely vital. Both Dr. Daniel Buckles and Dr. Sinha have made efforts to raise funds. It was not just the raising of resources but the spirit in which the SC mechanism has developed which needs to be continued. The contribution by various members of the SC, not just in financial terms but also in terms of time, was vital. IDRC was requested to continue providing the services of Dr. Daniel Buckles. He was requested to continue contributing his time as a member of the SC, both in his capacity as a researcher and as a representative of IDRC, and help in raising resources.

**Presentations by the Awardees:** It was decided that from next time each awardee would get one hour to present his/her research findings in a format to be devised by the SC. The SC member nearest to the project site would monitor the project. Some thematic papers could be prepared on various subjects to help evaluate the projects and have a common understanding about the issues. Three such themes identified were:

- Participatory technology development
- Networking among formal and informal sectors
- Ethics and accountability towards knowledge providers.

**Methodology:** The methodology of each project should be tailor-made to its objective. Farmers could be brought to the research stations to make selections and compare these lines with the scientists’ selections. Comparative performance of lines selected by both scientists and farmers could then be evaluated in field conditions. The methodology should stress more on the farmers' participation and criteria used.
by farmers in their selections. The researchers could try a parallel selection process. Perceptions of risk by farmers and how they incorporate it in their work should be assessed. While developing a collaborative strategy, gender and ethical issues should be clearly spelt out.

The framework of people’s participation and the benefits to them from the project should be made more explicit. It was suggested that the best strategy for value addition was experimentation by farmers on their own in a small plot. This was better than getting trapped in the long-term validation trials by scientists who may or may not give adequate attention to the peoples’ knowledge. Scientists should of course pursue their own trials on farmers’ innovations. But this need not prevent farmers from pursuing their own trials in the meanwhile. Small seed money grants could be given for cataloguing local information and innovations. Funding for follow up research could even be given to communities themselves.

**Delimitation of the Programme:** Medicinal plants were not included in the purview of the UD project. However, in view of IDRC’s proposal to set up a similar mechanism for medicinal plants, proposals received on the subject by the UD programme could be forwarded to the proposed “Medplant” programme. It was felt that micro propagation (tissue culture) as a technique was already well established for many crops. Unless the variety in question was difficult to multiply through conventional means and was under threat of extinction, the case for micro propagation as a means of augmenting diversity did not sound good. In fact, it might only lead to reduction of diversity and spread of monoculture.

**Documentation, Networking and Training:** The SC recognized the need to facilitate documentation, networking and training support to awardees. Whenever possible, this support should be provided by SC members, awardees and other network members from outside the immediate area of the project. This would encourage sharing of diverse experiences. The SC members would share the responsibility for this. Rajeev would facilitate documentation, networking and training for a number of awardees, including UBINIG (Bangladesh), Hussain (Bangladesh), Anthra (India) and DDS (India). He would be asked to design and implement training activities. The SC developed and approved a concept note on the work to be accomplished and allocated a budget for 60 days of work plus travel and activity expenses. Rajeev was requested to develop a work plan, IDRC would administer support for the activity.

The SC requested Dr. Sinha to support documentation of the Pant Institute Project. Travel costs would be reimbursed by SRISTI. Dr. Chandel was requested to review documentation of the LI-Bird project and help in designing a farmer breeders workshop spearheaded by LI-Bird. Travel costs would be reimbursed by SRISTI. Dr. Murali was requested to facilitate and support documentation of current projects in Rajasthan and Gujarat. Travel costs would be reimbursed by SRISTI and Farhad would provide support in this region in the future. Anil and Daniel were requested to facilitate and support text and

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**Farmer Breeds New Variety of Brinjal**

Kalimuddin Mondal, a farmer of West Bengal, has developed a new variety of brinjal that he claims is less susceptible to pest attack and has a higher yield. He used to grow two varieties of brinjal (egg plant) viz., *Solanum esculentum* (or Desi, as he calls it) and *S. melongena* (or Polyester). Both the varieties were susceptible to attack by *Euzophera Perticella* and *Schizonchla sp.* This meant a loss of 30 percent. Three years ago he planted the Desi and Polyester varieties in alternate rows. Two months later, the Polyester variety started producing normal cream coloured cylindrical fruits with thornless stalks. Fifteen days later, when Desi variety started flowering, he noticed some Polyester plants producing fruits with thorny stalks. He harvested these separately and after sun drying the seeds, kept them in an airtight bottle. Next year he planted the seeds of the unusual Polyester plants separately. The fruits were long and slightly rounded. The plants were relatively free from pest attack and therefore had a higher yield. The taste was the same as compared to the other two varieties.

photo-based documentation of key results of the network for publication in CD-ROM format.

The SC requested Satheesh to document selected research projects through video and provide video training support to awardees so that they could document their own experiences. A concept paper note of the activity was discussed and approved. Satheesh agreed to develop a more detailed work plan in consultation with Daniel and others. IDRC would administer the activity in collaboration with SRISTI.

Web Site: SRISTI has already created a Web page of the project which can be accessed by all the members as well as others interested in the subject. The URL is: http://csf.colorado.edu/sristi/diversity.html. A discussion board has also been started on the subject at the web site from 2nd November 1997 at http://csf.colorado.edu/sristi/discuss.html. Colleagues can post their comments, project highlights and any other insight that they want to discuss at this site. The grantees and the members were encouraged to send short notes with photographs to be displayed at the site to help visitors to the site.

Progress on Grants

1. Farmers’ Perception of Agricultural Biodiversity

P.V. Satheesh
Deccan Development Society, Hyderabad, AP, India

Through this project, the Deccan Development Society documented people’s perceptions on farm diversity. Various social groups based on gender, caste, age and income levels were involved in the study of local knowledge systems. The second phase of this project has been deferred for the time being.

Farmers’ Criteria for Judging Seed Quality and Seed Selection: The criteria employed by farmers to judge seed quality and seed selection include seed odour, colour and appearance. The selection may be done from the entire ear heads, as is the case with sorghum, or through winnowing and handpicking, as is the case with green gram and black gram.

Farmers’ Perception of Hybrid Seeds: The farmers feel that hybrid seeds make the soil lifeless. It was reported that "hybrid seeds are not good for consumption and cause allergic reactions". The yield is unpredictable and they are not ‘good crops’.

Seeds and Cultural Inheritance: Specific grains assume importance in different festivals, e.g. popped sorghum on the day of Nagula Panchami and foxtail millet porridge on the day of Peddala Amavasya. On Soonyam Panduga, the festival which comes at the peak of rabi (winter season), a number of grains and pulses are harvested. Each grain has its own place in the dietary requirements of the people. Rotis are made by mixing the
flour of millet with pulses like black gram. Horse gram rotis and finger millet porridge are supposed to had been the staple food during extreme famine conditions in the past. Rice was considered as 'jeje buvva' - something offered to God and eaten only on special occasions like festivals. At other times, people ate foxtail millet. A variety of sorghum called 'kaaki muttani jonna' (literally translated as the sorghum that even the crows would not touch) is supposed to produce rotis that are dark in color and unpalatable. But it is gareeb jonna- 'poor person's sorghum' since it comes in handy when the rains fail. It is extremely hardy, hence can be sown late in the season, even if the monsoon fails to set in properly. It is a short duration crop.

The farmers classify commercial crops as 'masculine' and food crops as 'feminine'. There is a similar categorization of land needing more inputs as 'masculine' and land easier to plough with seeds sprouting faster as 'feminine'.

**Traditional Land Races:** Some land races continue to be grown for very specific reasons, for instance:

- Soil types determine growing of certain crops e.g. winter sorghum and lentils
- Crop duration is an influence e.g. gareeb jonna is an early maturing variety
- Need to raise two or more crops during a year e.g. green and black gram
- Need to make money e.g. bishop's weed

One of the interesting reasons why some land races have been lost is that even the farmers who wanted to continue growing traditional seed varieties could not do so, if the neighbors had all gone for monoculture or hybrid varieties. In such cases, naluguri kannu dani meede- all the people set their eyes on the local varieties of crops. People would start stealing from the farm. This meant the need for intensive watch over the crop and nobody had that kind of time.

Other factors in favour of local land races are satyam gala panta (hardiness) and barkath gala panta (huge output). A local variety with hardy qualities is taida or fingermillet. The women explain how the ear heads can be threshed many times over and the grain keeps coming endlessly! Similarly, the shoots sprout many times over, even when they are cut.

**New Broad Bean Variety: Dhularam’s selection**

Two types of broad bean varieties, altapati and midnapuri, are cultivated locally in the ‘24 Paragasas’ region of West Bengal. Midnapuri variety is planted early, at the end of August, and bears smaller and thinner pods. Altapati variety is sown late i.e. at the end of September. It bears larger pods than midnapuri.

Three years ago, Dhularam Mandal noticed a broad bean plant with pods of a different kind. He collected them and after drying them in sunlight, preserved them in a glass bottle. He used them for sowing in subsequent years.

The new variety bears larger pods with a thick cover. There are a large number of pods per plant and each pod bears more seeds as compared to the altapati variety. The sowing is done in the last part of Ashadh (June–July). Flowers appear towards the end of Ashwin (August – September).

According to Dhularam, the pod yield per plant has been very high in the last two years, the variety being sown during Aghrahayan (November – December) and Poush (December–January). He feels that the new variety has evolved due to out-crossing, when the midnapuri and altapati varieties were sown side by side in the farm. The pod borer and white fly were the two types of pests observed affecting the flowers and vegetative buds of the new variety.

Dhularam says that the broad bean (Dolichos lablab L.) plants were slightly stunted this year due to absence of winter cold just after Durga Puja (October).

*Source: Dhula Ram Mandal, Baradrodne, 24 Paragasas. Honey Bee 1998, Vol. 9(1) 13*
sorghum in the next season. The intercropping helps to protect crops over successive seasons. Similarly, linseed is planted along the boundaries of a field as a protection against cattle as it acts as a repellent. But linseed attracts rodents. Therefore it is not planted as a line crop but is grown on the boundaries.

Safflower planted along with chick-pea is a good way towards off pests. Similarly, coriander in a chick-pea field attracts predatory insects that feed on Heliothis, the chickpea pest. While mangold planted densely along the boundaries of a chili crop is considered to ward off any “evil eye”, it actually performs the role of a pest repellent with its pungent smell. Farmers also use castor plants along the boundaries to act as trap plants. Castor with its large leaves is ready on the fields before the main crop, because of its quick growth. When the pests lay their eggs on the castor leaves, the leaves start drooping with the weight of the eggs and get discolored. That is the time when farmers can pluck the castor leaves off the plants and destroy all the millions of eggs.

**Traditional Seed Storage Practices:** Sun drying precedes the actual storage for almost all the seeds. This is to destroy the eggs laid on the seeds by pests and also to reduce moisture content. Pulses like green gram and black gram are stored along with foxtail millet and sealed in air tight baskets made of palm or vitex. The reason is that foxtail millet is coarse and would damage the tender underside of any pests left inside the basket. Women also realize that the ash from different sources has different qualities. For instance, the ash of cowdung collected along stream banks, after the cattle have grazed on fresh green fodder, is a more powerful pest repellent compared with cowdung collected from any other place.

2. **Indigenous Ghaiya rice Culture in Parts of Grouch and Lamming Districts, Nepal**

Krishna D Joshi and Ram B Rana, Li-Bird, P.O. Box 324, Nadipur, Pokhara, Nepal.

Nepal covers about 0.1 per cent of the world’s land area whereas it is home to over 2 per cent of the world’s flowering plants. Nepal is rich in diversity of both cultivated and wild rice. It is estimated that about 2000 different land races of rice exist in Nepal. Upland rice locally known as ghana dhan is grown on flat land, terraces or hill slopes of newly cleared forests under rainfed conditions. This crop is mainly grown on tars (unirrigated ancient alluvial river beds) and represents the crop of socially and economically disadvantaged ethnic communities like Dear, Kurpal and Bote. Traditionally, tars have been associated with the ghaiya crop. Ghaiya bhat (cooked rice) and sesame cake curry were the common foods of tar areas. Most of the varieties of rice grow in the hills where there is no standing water at any time. Hill rice is broadcast. It is estimated to cover 9 per cent of the total rice area in the country of about 126,000 ha. Ghaiya plays a significant role in household food security of subsistence farmers in unirrigated tars where the prospects of irrigation facilities and alternative, more profitable crops are not bright. It is preferred to maize because it is considered both a good grain for human consumption and good straw for animal feed. It can be maintained in marginal growing conditions such as under shade, water logged conditions (after the onset of monsoon rain) where maize cannot be grown and in areas where maize cultivation becomes unsuitable because of the monkey problem.

**Mixed Cropping:** Farmers believe that mixed cropping of ghaiya with maize is advantageous. A few rows of maize in the flat tars also facilitate in broadcasting ghaiya more uniformly. The farmer’s decision to plant a succeeding crop after ghaiya depends on the moisture condition in the field. The strategy is to grow both niger and black gram in almost equal proportions. Manipulating the plant population of the two component crops depends upon the situation of terminal rainfall. In case of good moisture conditions, more of the niger plants are thinned out retaining the black gram and in poor moisture conditions, more of the black gram is thinned out.

**Diversity of Ghaiya Land Races:** Diversity still exists among indigenous ghaiya land races. In most areas, farmers maintain at least two varieties with different maturity periods. The number of ghaiya land races was found to range between one and four per farming household. Generally farmers with very small land hold-
ings were found to maintain a single land race. They always chose a stable variety such as sunakhari, panthe, chobo and masino thanhtar. The number of land races increased with the increase in land holding. Those who maintained more land races said that they did so mainly to utilize the varying fertility status of the land, to control volunteer plants, spread labour, minimize risk from biotic and abiotic stresses and meet the different household needs for rice such as for beaten rice, good eating quality, early maturity, easily threshed and so on. For example, land races such as kali nathre and kalo dhan were maintained for controlling volunteer plants, chobo for less fertile lands and for its early maturity, sunakhari for its high yield potential and panthe for beaten rice and for less fertile lands.

Indigenous knowledge of soil: Ghaiya growing farmers were found to possess a wealth of knowledge in managing their soils to maximize the output. The major soil types as described by the farmers reflected their relative importance. The major soils described were rato raja (red is king), kalo kaji (black is Prime minister) and phurso paji (ash coloured soil is useless). The darker the colour of a soil, the more fertile it is. Farmers categorize kalo kaji as the best soil as it performs well even with less manure. Rato raja is second to kalo kaji. Farmers also reported that rato requires more water, is less fertile, requires more manure and is difficult to work. Phurso soils with poor soil structure are least fertile.

Farmyard manure was found to be a major source of nutrients for the ghaiya crop. Farmers mentioned that cattle manure is most fertile followed by goat manure while buffalo manure is considered inferior in terms of its fertility value.

Farmers adopt a number of practices for maintaining soil fertility or realizing stable yields. They recognized that ghaiya varieties differ in terms of fertility requirements, yield potential and stability. The general tendency was to replace ghaiya that requires intensive management, with those varieties that need low or moderate soil fertility and are stable. Varieties such as pakhesali which require high soil fertility were less commonly grown. The practice of changing ghaiya varieties periodically to realize better yield was also found in some cases. It was a common practice to grow maize and ghaiya alternatively on the same piece of and in order to utilize soil fertility. This practice was reported to significantly control volunteer plants.

3. Agricultural Diversity in the Central Himalaya


Agriculture in the mountains is practiced on terraced crop fields carved out of hill slopes. The preliminary analysis of grasses and farms on terrace risers indicated that terrace risers act as a rich gene bank of natural vegetation. Diversity of food grains and pulses is much greater in the mountains i.e. Shiwaliks and Lesser Himalayas. However, the diversity of cultivated oil crop species was more in the Terai region. Distribution percent of plant species in various families indicated that Poaceae and Asteracea are dominant among the documented families. Higher species richness was found at the lower altitudes. The density and diversity index of each crop species also follows a similar pattern i.e. higher at lower altitude.

An interesting observation was the impact of remoteness on the number of land races under cultivation. As the distance of a village from the road increased, there was an increase in the number of land races for a given crop. Total diversity of cultivated crops of different land forms also indicated that the mountain villagers have traditionally maintained a huge number of plant species for food and related purposes.

In the lesser Himalayan regions, a typical traditional pat-
tern of crop rotation is practiced which enhances soil nutrient status, checks diseases and pathogens and diseases of the previous year. Crop rotation pattern in the higher elevations is different.

4. Farmers' Perceptions of Biodiversity in Livestock Feeding Systems

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The study focuses on poor and marginal livestock herders. Accessibility of land and fodder emerges as the major problem faced by this segment of herders, while it is noted that they have immense knowledge of feeding systems.

The key issues:

- Define the problem as perceived by farmers in Mulshi and Velhe Taluka in the Western Ghats and East Godavari district,
- Document traditional feeding strategies
- Find out possible solutions for the current problems drawing upon traditional practices

The study is being carried out by Anthra in collaboration with the Village Community Development Fund (VDCA) located in Pune and Girijan Deepika in the East Godavari district of Andhra Pradesh. The methodology adopted includes questionnaire and participatory techniques.

Among the problems identified were the change in agricultural systems. Due to cultivation of high-yielding crops and hybrid seeds, the crop residue has reduced considerably. The hybrids are not considered palatable and the practice of monoculture has resulted in lessening varieties. Due to the disappearance of many of the native varieties of feeds and the increase in the cost of oilseed cakes, the traditional feeding practices were not viable. Secondly, environmental degradation and destruction of natural forests and common grasslands have taken place. Disappearance of traditional fodder species and infestation of the fallow lands by weeds along with rapid destruction of the forests have reduced the availability of fodder for the livestock.

Farmers indicated trees and shrubs as the most preferred species among the traditional varieties of fodder. Natural grasses in AP and crop residues in Maharashtra came a close second. Climbers in AP and natural grasses in Maharashtra took the third place.

The feeding practices in different seasons involve a judicious mixture of crop residue, cultivated fodder and natural fodder. Fodder is stored in lofts made of bamboo or tree leaves and fed in mangers and feeders, designed to avoid wastage. The farmers, however, wish to learn improved ways of storage.

Grazing practices: Open grazing is preferred for livestock except in the case of milch buffaloes and prize bulls. It provides exercise to the animals, prevents hoof problems and helps fertilize and renew grasslands, but it needs to be managed more effectively. Growing pressure on land and poor management is leading to a crisis. However, within this
There have been very definite grassland protection systems which have been observed, especially in the Western Ghats. Certain plots of land are demarcated as grass lots and animals are not allowed to graze on these. These plots are later harvested and the grass from these is made into hay. In the Eastern Ghats, farmers deliberately leave parts of their land uncultivated so that their animals can graze on them.

One traditional practice observed which needs to be better understood is the traditional burning of grasslands in the Western Ghats before the onset of summer. While this promotes the growth of grass, it destroys trees and other life forms, thereby adversely affecting the local environment.

Screening of local fodder species, sharing of information regarding methods of propagation and growth patterns, developing methods of storing hay, developing farmer nurseries and seed banks and involving farmers and village communities in arriving at better farm management practices are some of the future plans of the organization. It is desired that cross regional sharing and transfer of traditional practices and technologies be taken up.

New Proposals Sanctioned in Phase Two and Phase Three

Phase Two Proposals

(1) Conservation of local land races of Vegetable crops and Associated Women's Knowledge System

Govind Bhai Raval

This project mainly focuses on cataloguing on-farm vegetable and spice agro-biodiversity in North Gujarat, specifically in Mehsana and some areas of Banaskantha and Gandhinagar districts. Farmers of North Gujarat are very famous for their vegetable and spice farming. During the last decade, the area under vegetable farming has increased due to access to surrounding city markets. Many farmers, communities and villages are well known in the region because of their expertise in selecting seeds and skill in growing specific crops like chilli. Vegetable crops are very profitable and attract intensive use of external inputs like pesticides, fertilizers and seeds. This has adversely affected the diversity of local land races in cultivated as well as uncultivated vegetables.

This area is well known for many uncultivated vegetable land races like kankoda, galaka and turia. Women of the Raval and Vaghari communities who are involved in the traditional business of selling vegetables locally, collect such uncultivated vegetables from hedges, common land and other uncultivated lands. Neither scientific institutions nor development agencies have made any effort to conserve the knowledge of these women.

This project aims at conservation of local land races of cultivated and uncultivated vegetable crops along with the knowledge associated with their cultivation, preservation, processing and use. Other goals of the study include in situ conservation of local land races by creating seed exchange arrangements among farmers, identifying niches for uncultivated vegetable species and understanding the farmers' criteria for selection of seeds under various crop management conditions.

The study aims to disseminate and collect information through various fora like cultural festivals and agricultural fairs. Competitions will be organized for various purposes like indigenous recipes of cooking vegetables, methods of making pickles, identification of medicinal and other properties of vegetables and so on.

A catalogue and other publications illustrating various land races, their location, availability, important properties, processing, use and preservation will be published. These publications will be used for teaching in Vidyapeeth besides being used for generating market based incentives (through creation of demand) for conservation. Direct linkages between suppliers...
and consumers of lesser known uncultivated vegetables may provide incentives to conserve these unique species and their habitats.

(2) Participatory Characterization, Conservation and Utilization of Germplasm/land races by Farmers in Sikar District of Rajasthan

Sunda Ram Varma
C/o Shri. Tulisiram Varma, Vill. & PO: Danta (Ramgrah), Sikar District 332 702, Rajasthan

The project will be implemented in Sikar district and the surrounding regions of Western and Central Rajasthan. Although the project aims at conservation of diversity of all the crops grown in this region, it will be more focused on chili, coriander, fennel, fenugreek and onion for which this region is famous.

Sunda Ram Varma’s family owns a farm of about 17 ha in the arid region of Rajasthan which experiences extremes of temperatures and erratic and low annual rainfall of about 25-30 cm. The dry climate is excellent for growing quality spices and medicinal plants like chili, cumin, coriander, fennel and fenugreek.

The main aim of this proposal is to systematize efforts of collection, characterization, selection and conservation of local land races by involving other innovative farmers in the region. The project will support various initiatives undertaken by Sunda Ram in collaboration with other farmers in developing new varieties by selection, crossing different varieties and introduction of local land races from other dry regions and research stations. A sample passport sheet has been made in consultation with SRISTI to record characteristics of different crops. Efforts will be made to maintain collected germplasm scientifically with the help of scientists and research stations. A map of different land races of crops in Sikar district will be prepared which will be helpful for developing sites for in-situ conservation.

A publication (in Hindi) documenting the initiatives undertaken by various innovative farmer breeders in the project region will be brought out. SRISTI will help in bringing out publications in English and other languages.

(3) Uncultivated Foods and Biodiversity Conservation

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The food security of poor and marginal populations is directly linked to the availability of food, not only by cultivation but also from sources in and around the immediate common property environment. During conditions of stress and famine, survival is often determined by the availability of unconventional "wild" food. The distinction between cultivated and wild foods is not clearly defined given the continuum of relationships that exists between humans and the environment. Species that have long been considered wild are actually carefully nurtured by people.

The Nayakrishi Andolon (New Agricultural Movement) of the Bangladesh peasants is dedicated to a holistic approach in agriculture, based on strengthening community knowledge and living a “happy life”. Food security is based on enhancing biodiversity conservation and genetic resources. Peasant households are aware of the possibility of procuring food outside agricultural production.

Protecting Amaranthus: Drinking so much that one dies

Farmers of Karuppankulangara, a remote village in the Alleppey district of Kerala, have hit upon a unique, non-chemical way of dealing with the menace of leaf-hoppers and locusts. These pests used to eat the leaves and destroy a sizeable part of the Amaranthus crop, grown as a vegetable in the fallow paddy fields.

Now farmers spread powdered groundnut cake on the Amaranthus plots in the evening. The insects that come in droves to the field are attracted to the groundnut cake and consume it instead of the Amaranthus. The ingested cake expands and owing to the high oil content, the insects feel thirsty. They are driven to drink a lot of water in the small ponds nearby. The next morning the farmers see a large number of dead insects around the ponds. They drank so much that they died!

Not only does groundnut cake protect the Amaranthus crop, it is also a good organic manure.

Source: Suresh Muthukalam, Honey Bee 1998 9(2)
cycles as well as the market, but there is a lack of information about such practices. This project aims to investigate a few selected rural Bangladeshi communities of Nayakrishi farmers and to compare their livelihood with that of conventional farmers.

Objectives of the Project:

1. Carry out field research and review existing literature to understand the nature of uncultivated foods and contribute to national planning of food security and biodiversity conservation.

2. Examine the connections between the culture of food, cooking and food preparation and consumption as it relates to biodiversity with regard to both cultivated and uncultivated foods.

3. Research the role of women in ensuring food security and the maintenance of biodiversity; examine the labour gender divisions in the livelihood strategies of farming households and the technology used by women; highlight the connections between food, health and nutrition.

4. Contribute to the understanding of ecological agriculture by studying the agricultural practices of farming households and connect wild foods context with the general food system.

5. Provide the Nayakrishi Andolan with appropriate strategies for food security that will enhance the community's understanding of the issues as well as its capacity to address future food security crises.

The project will be carried out over 16 months with the institutional support of UBINIG and the network UBINIG maintains with scientists from agricultural research institutions and universities as well as with people active in areas related to ecology, food production, culture and indigenous knowledge.

(4) Participatory Rice Breeding, with Special Emphasis on Fine Grain and Aromatic Rice in Southwest Bangladesh

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Recipe for Sanai Chutney

Sanai (Crotolaria juncea) is a popular fibre crop. People in the Garhwa and Palamu districts of South Bihar use the flowers of sanai as a vegetable. Sanai chutney is a popular preparation

Ingredients: Freshly cut sanai flowers, tomatoes, garlic, mustard oil, green chillies and salt.

Preparation: Boil the sanai flowers and dry them in the shade. This is called 'sanai sukti' and can be stored for many months. Fry the tomatoes and mash them. Soak the sanai sukti with the mashed tomatoes for ten minutes. Mix garlic, mustard oil, green chillies and salt with the sanai sukti and grind all the ingredients together. The sanai Chutney is ready!

The number of (about 15,000) traditional varieties of rice that were grown in the region earlier in this century rapidly diminished by the mid 1980s and the Bangladesh Rice Research Institute could salvage only 4,500 varieties in its gene bank. Traditional varieties are mostly grown under low input, rainfed conditions and their yield is low. These are the varieties that are most threatened because the farmers' concern with food security has led them to abandon them and to start using modern high yielding varieties. It is estimated that only a few dozen mostly high yielding homogeneous varieties are currently grown in the country (actual number may be much larger but the majority of the area is under a very few varieties :Ed).

High yielding varieties require high input and intensive management including the use of chemical fertilizers, pesticides and irrigation. Many small farmers are unable to get the required inputs for high yielding varieties, leading to low yields and over-exploitation of natural resources. Bangladesh Academy of Agriculture has been seeking other options for cultivators that may fetch a better price in the market and put less strain on the resource base. For this reason, some villages in southwest Bangladesh are ready to undertake innovative technologies to initiate a participatory rice selection and breeding program with special emphasis on fine grain and aromatic rice.

Objectives of the project:

1. Conserve biodiversity in the farmers' fields

2. Develop/improve varieties that allow farmers to adopt them without major restructuring of their production systems and crop field environments
3. Enrich and broaden the gene pool of crops by enhancing farmers’ access to and control over genetic resources.

4. Develop field tested methods for improving farmers’ skills in crop variety and conservation development.

5. Produce better quality rice for the market.

6. Develop community seed bank networks for seed exchange within and between communities leading to improved seed supply systems and wider agro-biodiversity in farmers’ fields.

7. Strengthen the morale of innovative farmers by integrating their indigenous knowledge practices with scientific plant breeding.

Four villages, each with different ecological conditions and different rice based cropping patterns will be involved. An inventory of rice germplasm will be taken in the farmers’ fields, farm households and market places. Major constraints in local production will be identified and breeding programs will be undertaken in the different agro-ecological conditions with different rice based cropping patterns. Selected farmers will be trained in rice breeding techniques. Aromatic and fine grain rice will be collected, identified and conserved on-farm.

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**Biodiversity Contest Among School Children of Virampur**

A biodiversity contest was held among 250 students between 7-14 years of age of Lokniketan Ashram School in Virampur village on September 25, 1997. Before the competition, the SRISTI staff explained to the local people, children, teachers and women the aim, importance and utility of the competition so that they would be encouraged to participate. Karimbhai, a medicinal practitioner (associated with SRISTI for the past 5 years), helped in contacting and explaining the competition to the local people.

The winners were selected from each class after an interview. The deciding factors were the number of samples they had, the list of plants, identification of the maximum possible uses of these plants and the extent of knowledge the children had about the habitat. Shek Madinaben a girl student of 7th standards and Rathod Indrajeeet of 6th standard have brought lists of 300 and 283 plants and their uses respectively. Further, 11 students brought list of more than 200 plants and four of them were girls.

From a list of 52 vegetables and 35 weeds collected during the competition, a few are listed below.

**Uncovventional uses of little known vegetables:**

- **Kothinida:** The juice of the fruit is given to cure cough and a sore throat.
- **Thor:** The milky latex of the plant is applied to soothe toothache.
- **Cihilada:** Leaves are crushed and the juice is applied to treat minor skin diseases and pimples.
- **Purvadiyo:** Leaves are crushed and applied on mosquito and other insect bites.
- **Lesser known uses of weeds:**
  - **Peshi:** Leaves are given to goats to increase the quality and quantity of milk.
  - **Bhoi-ringani:** The pulp of the fruit is applied on decaying teeth to cure toothache.
  - **Dhaman:** Leaves are given to cure urinary infection.
  - **Saragavo:** Leaves are dried and kept in grains for storage. Used as an insecticide.
  - The gum of Saragavo is mixed with curd and used to treat diarrhoea.

**Source:** SRISTI Report 1998
Thakershibhai of Junagadh district, like many other farmers in Gujarat, suffered great hardship in 1987, the worst drought of the century. After the drought, he sowed ‘tanagi’ groundnut crop and chanced upon five plants that were different from the rest. He collected and planted the seeds of these plants at different places. He developed a new variety of groundnut crop by recurrent selection of the seeds of these plants. He gave seeds to the farmers of 15-20 neighbouring villages. Dr M S Basu, Director, National Groundnut Research Centre, Junagadh, says ‘In the history of integrated groundnut research project this is the first instance of a farmer contributing to the quality improvement programme.’ The decision to accept the said variety for testing was taken at the Annual Kharif groundnut workshop at Bhubaneshwar. If the new variety gets through the multi locational testing at all India level it is likely to be recognized as an officially approved variety.

In the monsoon season of 1994, Thakershibhai sowed his new variety of groundnut in 32 bighas of land. By this time the story of his successful variety had spread to the surrounding villages. Other farmers started purchasing the seeds of this variety from him. Since the fruit of this groundnut is shaped like a peacock, farmers called this variety of seed ‘morla’ (translated as peacock in Gujarati). Later at a meeting of farmers, this variety was renamed ‘thakershi’ after him. Thakershibhai has made the following observation on morla:

1. A 31 inch inter row space must be maintained while sowing the seeds. If the monsoon is delayed and arrives in July, only 18 inch space may be maintained.

2. In comparison to the other varieties of seeds, ‘thakershi’ is ready for harvest in a shorter period i.e. in 95 to 100 days.

3. Morla can survive even if there is less moisture in the atmosphere and does not turn yellowish even in excessive rainfall.

4. The plant is taller and its leaves are bigger and thicker in comparison to the veldi variety of groundnut.

5. This variety is relatively free from pest and insect attack.

6. The monsoon season of 1993 was poor and other farmers of the village could not get more than 6 to 7 maunds (One maund=20 kg) per bigha of land. But Thakershibhai could get 17 to 18 maunds per bigha of land from his crop.

Source: Anil K Gupta (1996) Diversity Vol.12 (3) 76-78 and Honey Bee Database.

Diversity of local land races of pulses, oil seeds, millets, sorghum and horticultural crops such as custard apple and sapota is very high in arid and semi-arid regions of Gujarat. Tribal communities play a pivotal role in the conservation of agro-biodiversity in forests and hilly regions.

Different villages and areas have over time become famous for certain crops, local varieties or land races. For example, the jamfal of Dholka and the sapota of Valsad are famous. Identifying the places famous for a particular variety may be the best way of approaching the centers of agro-biodiversity for detailed documentation work. This work has assumed special significance in view of the upcoming Narmada Irrigation Project in the wake of which large-scale genetic erosion is expected to take place.

Gujarat is fortunately blessed with a strong network of Gandhian educational institutions called Gram Vidhyapeeths that specialize in training rural youth for self employment and developmental work in rural areas. Currently this project is collaborating with 12 such institutions spread in the project area. The project will take advantage of the situation to convert the documentation work into an educational exercise for the students of the Vidhyapeeths.
The main objectives of the project would be to identify the villages or areas that have become famous for certain indigenous varieties of crops. The project aims to document the knowledge of cultivation, storage, processing and conserving the seeds and finally select samples to establish a gene pool at Vidyapeeths.

The methodology would mainly be based on interactions with the Vidyapeeth students, seed merchants, retired agricultural extension workers and gram sevaks. Attempts will be made to conserve indigenous land races. Finally, meetings and exhibitions will be organized for knowledge sharing and spreading awareness on biodiversity among villagers.

Cooking recipe competition for women at Virampur

A different type of competition was held for women along with the biodiversity contest for children. It was a competition for discovering unusual recipes that are very different from our normal diet. Recipes used different parts of plant i.e. stem, leaf, flowers and root that are common in the village but uncommon in our knowledge base.

There was a good response given the fact that such a competition was organized for the first time. Some women brought only recipes while others actually prepared the dish. The winners were:

1) Damor Nayana ben Jaintilal brought 3 recipes - dhokala made from mahanda flowers, curry made from the leaves of chana (gram) and curry made from the leaves of pervadiyo and maize corn.

2) Jadav Pushpaben brought muthiya made from the leaves of phang (Rivea hypocrateriformis).

3) Aanjana ben Balabhai Solanki prepared a curry made from onion and lunibodi leaves.

Source: SRISTI Report 1998

Shifting cultivation is a supplementary agricultural activity mainly on the hill slopes in Konkan district. Majority of the crops raised this way are for household consumption. The local varieties chosen for cultivation are traditionally preserved.

The project proposes to undertake a systematic study of the shifting cultivation practices. It will also undertake the documentation of agro-biodiversity and indigenous knowledge and its use in shifting cultivation. Another objective would be to study the effect of recent developmental activities on agriculture. The project also proposes improvement in agriculture practices, which will result in biodiversity conservation and sustainable resource use. Efforts will also be made to generate awareness about biodiversity and agrobiodiversity conservation, particularly among children.

The data generated will help in understanding the system of shifting cultivation and the agro-biodiversity of the area and help in assessing whether improved methods of shifting cultivation and a stable agro-forestry system are feasible or not.
Sunda Ram Verma, a young educated farmer from Sikar, Rajasthan, may perhaps be the first farmer to have received a competitive research award. He has been trying for the last few years to find new options for agro-forestry and developing new varieties of different crops with tolerance to drought, frost, pest and disease. He has done research on improving qualities of chilli like colour, aroma and suitability for various management practices like intercropping. He has developed a new variety of chilli i.e. Danta Selection-1 named after his village. This variety has a higher yield and four times the colour value of the best variety released in India. He developed this variety by crossing between Simla chilli and ordinary chilli. It has the size of the Simla chilli and the pungency of ordinary chilli. Farmers and consumers pay up to double the market price to purchase it.

Sunda Ram Verma has a large collection of the germplasm of most of the crops growing in his field, like chilli, cumin, coriander, gram, fennel and fenugreek. He has recently received the Jagjivan Ram Kisan Puruskar (Award) of Rs. one lakh in recognition of his contribution to agricultural research. It is hoped that he will provide a new model approach to participatory breeding, independent of formal scientists. UD Network congratulates Shri Sunda Ram on being honoured by Indian Council of Agriculture Research. Other awardees of the UD project, we hope, will also distinguish themselves and help in spreading the idea of conservation by local communities and individuals.

Source: Kirit Patel, Honey Bee 1997 Vol. 8 (1), 3-4 & Honey Bee Data base

Participatory Programme for Biodiversity Management, Conservation, Regeneration and Documentation of Local, Traditional Crops mainly Rice and Minor Millets.

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The present trend of agriculture development does not give importance to diversity. Propagation of high yielding varieties at an alarming rate has led to neglect of naturally existing germplasm.

The project proposes to undertake the conservation of traditional species of paddy in Bastar through collection, identification and propagation through farmers. Apart from that, the data on classification, preservation, selection, germination trials and characteristics of the varieties will be documented scientifically. Finally live gene banks will be established on lands of motivated farmers by providing support in the form of indigenous seeds, manure, equipment, biopesticides and indigenous technologies.

The proposed project will help in collection of authentic data on biodiversity in rice in Kodagaon block of Bastar district and also bring to light valuable information on indigenous knowledge of local people and their practices. Establishment of live gene banks will help in propagating utility of traditional rice varieties and lead the farmers towards self-reliance and food security in the future.
Suggested Ethical Guidelines for Accessing and Exploring Biodiversity

This note is based on a “Pew Conservation Scholars” initiative to develop ethical guidelines to access biodiversity. Several other scholars also participated in the discussion. There were three background notes prepared i.e.: ‘Ethical Issues in Prospecting Biodiversity’ and ‘Dilemma In conservation of Biodiversity: Ethical, Equity and Moral Issues-A Review’, both prepared by Anil K Gupta and a note prepared by Bernard Nietschman and Tegan Churcher summarizing various guidelines. There were seven dimensions identified in the first note used as a background for discussion. Only three of these are covered in this note. Other scholars who participated in the discussions leading to the development of guidelines included: Kamaljit S Bawa, Ashok Gadgil, David Downes, Melissa Nelson, Kathy Saterson, Phillippe Fernside, Gary Nabhan, Salwaser, Astad Pastakia, Kirtil Patel, Tegan Churcher, Bernard Nietschman, Bob Johanness and Katy Moran. This draft is an outcome of collective effort of several Pew conservative scholars. Comments on the draft guidelines may be forwarded to Prof Anil K Gupta, Coordinator, SRISTI, and Professor, Indian Institute of Management, Ahmedabad 380015, India email: anilg@iimahd.ernet.in, Fax: 91 79 6427896

Ethical Guidelines:

Preamble

Biodiversity in both developing and developed countries has been accessed for a long time by outside researchers and corporate prospectors as well as by local communities. Such activities are carried out for various purposes. Sometimes plants, animals and habitats are merely described, at other times the goal is to extract for profit. These activities have helped to advance knowledge and create awareness of how precious biodiversity is. These activities have also generated many products that contribute to the health and well being of global consumers, but they do not necessarily provide benefits to their original stewards.

Research has also focused attention on particular features of biodiversity. For example, we realize today that many regions with high biodiversity are inhabited by people considered to be economically poor by international standards. We also recognize that, in many cases, the biodiversity will diminish if the economic conditions of the communities do not improve. Biodiversity has been conserved, both by local community traditions and by more formal means, with varying degrees of effectiveness.

One recently proposed means is the Convention on Biological Diversity. The convention has been ratified by a large number of countries and has stimulated global concern over this issue. It has provided a framework for conserving biodiversity. At the same time many local communities, NGOs and people’s organizations are advancing alternative ways to conserve biodiversity and cultural diversity. In many places, the conservation of biodiversity and the protection of cultural diversity are inescapably intertwined. Despite strong links between biodiversity and the land and water management traditions of the 6000 linguistically distinct cultures, the Convention on Biological Diversity focuses on nation-state sovereignty over biodiversity. We believe that local communities should have greater say in whether and how diversity is studied, extracted and commercialized. We consider prior informed consent and equitable sharing of any benefits necessary requirements of such explorations.

The Convention on Biological Diversity generated a lot of hope, but also some concerns. For instance, should researchers who merely want to understand the lives of certain plants or animals be treated differently from those extracting raw material for corporations? Will the convention generate ethically responsible behavior from those who wish to benefit from developing new plant and animal products for sale? Will local communities and indigenous people really be accorded more than token participation?

There is a clear need for clarification of ethical norms to guide all those involved in the exploration of biodiversity. While knowledge may be advanced, profits earned and new products made available from such exploration, this does not guarantee that the conditions of the communities will improve. In many cases, their conditions have become worse due to depletion of local resources. Many researchers have obtained knowledge about biodiversity and its uses from local innovators, communities and institutions, but have not adequately acknowledged their contribution or shared with them the benefits accruing from their research. Some researchers may have done so without any intention of betraying the trust of the people; ironically they have actually conformed to the prevailing professional norms. These norms must change, for they have been inadequate in ensuring equity and respectful exchanges.
Principles Underlying the Guidelines

- Research is an educational process leading to mutual learning among researchers and the collaborating individuals, communities and institutions.
- Just as the proprietary rights of scientific knowledge are well established and respected, such rights are due to the producers and providers of traditional knowledge and contemporary innovations from local communities.
- Research should be based on respect for the local cultural values and norms.
- Benefits should accrue to all partners in a fair and equitable manner.

Scope of the Guidelines

In these guidelines, the term "researcher" refers both to the individual conducting the research and to the sponsoring or contracting institutions on whose behalf the individual conducts the research.

Several other aspects of ethical obligations of or towards local communities, nation state governments, consumers and future generations remain to be explored. However, in these guidelines, we recommend protocols of conduct by researchers (academic or commercial) and professional societies, bodies or institutions. It should be pointed out that some studies carried out with no commercial motive may produce results that subsequently acquire commercial value and protocols must take this into account.

These guidelines are intended to cover many types of research, including:

(a) Non-extractive non-commercial research: Biologists document the evolution of species and ecological patterns and processes through observation and simulation without collection of samples.

(b) Extractive but with primarily non-commercial research: This might involve collection of samples of organisms for description or for analysis of the interrelationships among species.

(c) Non-extractive research with possible commercial potential: Ethnobiologists may study plants and animals without collection of samples. These studies may involve documentation of local innovations, traditional knowledge and practices, development of databases of such knowledge, publication of books, films, or other forms of dissemination of local knowledge, for instance electronic communication and CDs. This local knowledge may be documented to preserve or share within the community or beyond it.

(d) Extractive research intended for commercial development: Extraction could be in small quantity such as for bio-technological laboratories or in large quantities for natural product development. Such research done by students, academic researchers, corporate researchers or local communities may be intended to develop new products based on biodiversity traditionally used by local communities or elaborated by individual innovators. It may also involve screening and analyzing biodiversity without making any reference to local uses.

We offer this note of caution as we attempt to respond to indigenous peoples' concerns. These guidelines are not intended to provide a definitive set of procedures which every biodiversity accessor must follow to ensure appropriate ethical standards. The objectives of researchers are highly varied, as are the political, cultural, social, environmental and economic contexts in which they work. These make it difficult for a single set of guidelines to be universally applicable.

These guidelines are intended to promote good, ethical and responsible research as well as equitable exchanges among the communities and institutions which access biodiversity: industries, professional organi-
izations concerned with conservation, indigenous or local communities, government and inter governmental agencies as well as donor or philanthropist supported research and conservation. These guidelines must be adapted to function in a wide range of political circumstances. For example, indigenous communities may be governed by national or state governments that are either sensitive or insensitive to their needs and rights. In addition, explorers may be engaged with either private, public or commercially owned natural resources. They may be involved in projects which are small or large, and this will obviously affect how these guidelines can be implemented. The reader can undoubtedly think of economic, cultural or geographic variables that could generate similar lists.

In light of these diverse circumstances, we classify each recommendation in these guidelines into one of three categories:

1. Actions that all ethical biodiversity assessors must carry out

2. Actions that are usually, but not always, appropriate

3. Actions that are sometimes but by no means generally appropriate

We distinguish between these categories as follows:

1. Some recommendations will hopefully be universally applied. For example, few would disagree with the contention that all accessors of biodiversity must reveal their methods and objectives to the local people on whose land or in whose waters they are proposing to work. We thus preface our descriptions of these actions with the phrase "accessors must".

2. Some actions appear to be of wide but not invariable applicability. In such circumstances, we preface our recommendation with the phrase "accessors should".

3. Finally, there are actions that are clearly required of ethical biodiversity assessors in some circumstances but not in others. For example, monetary compensation is often appropriate for those who provide valuable knowledge or access to biological resources that belong to them. Sometimes, however, such compensation is refused. Here we preface our recommendation with the phrase "accessors should consider". Compensation can be considered in alternative forms such as a trust fund or scholarship to benefit the community involved.

Another issue involves placing conditions on compensation, such as requiring that it is not used for socially or environmentally destructive purposes. Conservation organizations tend to favor such arrangements, but communities often believe that they should have the right to use compensation for use of their biodiversity as they see fit. Thus we recommend that biodiversity assessors consider such restrictions.

Guidelines

In cases where local communities have their own guidelines, these may have precedence over what is discussed below. Guidelines under sections 1 and 2 apply to all researchers and explorers with or without commercial motives. However, sections 3 and 4 apply more particularly to those researchers who have commercial interests and motives. Section 5 deals with the obligations of professional societies and academic institutions.

1. Approval: In most cases the researchers should obtain clearance from the appropriate central or state government authority and, where applicable, from institutions of indigenous

Nurturing Diversity: A seed fair in quispillacta, Ayacucho

The essence of the seed fair is to strengthen the breeding of seeds and culture, and to rekindle intra-ethnic (intra-ayllus) and inter-ethnic relations. In earlier years such relations had been more fluid and stronger. For example, in the past the goal of exchanging seeds had brought together the Quispillacta people with the nearby communities of Ocros (Andahuaylas) and Acocro (Ayacucho).

The goals of the Quispillacta Fair were to show the potential of the native seeds bred (criadas), exchange seeds and wisdom, emphasise the role of Quispillactans who nurtured greater genetic variability, give incentive to and expand the nurturing (crianza) of Andean seeds diversity, and to show the nutritional richness and the diversity of dishes based on Andean crops. Participation took place at two levels: individual (family, aylla) and collective (barrio). At the individual level, 67 out of 574 active comuneros participated in the exposition of their respective crianzas (breedings). Pastor Galindo Callocunto, one of the winners, had bred 64 ecotypes of potatoes.
2. Initial disclosure of Information: When first contacting a community or individual to seek access, the researcher:

- should carry out all communications in the local language
- must explain the nature and purpose of the proposed research, including its duration, the geographic area in which research would take place and collecting methods
- must explain the foreseeable consequences of the research on resources, people and accessors, including potential commercial value
- should explain the potential non-commercial values such as academic recognition and advancement for the researcher
- should explain any social and/or cultural risks
- must notify the community by some means, e.g., public meeting
- should consider explaining the guidelines that the researcher is following, as well as his/her practice in previous similar research projects
- should be willing to provide copies of relevant project documents, or summaries thereof, preferably including the project budget, in the local language. In the case of commercial prospecting, researchers must share such documents.
- must agree on a protocol of acknowledgments, citation or authorship, as applicable, either citing local innovators and conservators, and respecting request for anonymity.
- must share findings at different stages with the providers
- must not engage in bribery or making false promises

3. Involvement/Negotiation

In negotiations, the researcher:

- must make a reasonable effort to identify and negotiate with those with the proper authority to negotiate.
- should conduct initial discussions with small groups (but obtain final approval from higher legitimate authority wherever applicable)
- should consider, where there is no existing authority or capacity for such negotiations, helping the community develop the institutional capacity to appraise and (if it chooses) enter into such agreements.
- should be willing to provide copies of relevant project documents, preferably including the project budget
- must disclose commercial interest or other possible interest of present or future third parties
- should include a local institution as a partner in research where an appropriate one exists

Indigenous Selection Criteria and Processes: Recognising Farmers as Breeders

Farmers’ own selections from local material as well as other materials have led in the past to development of new varieties. This is a potential which is grossly underutilized.

In a study, it had been found that even among the released varieties of paddy, rich and poor may use different criteria for adopting varieties among the available choices. From among two particular varieties of Paddy in Bangladesh viz: BR 10 and BR 11, some poor farmers preferred one of these, mainly because it swelled much more in the belly after eating. Therefore farmers could overcome pangs of hunger by eating smaller quantities of such rice. Without passing any moral judgment over such a choice, what is implied is that ecological and economic contributions in choice of technology—in this case the crop diversity—can be disentangled through systematic trials.

Variations in crop populations can be reduced or enhanced by various innovative strategies. Dr Richaria has given many examples, of which two will illustrate the point. He showed that in a tribal region of Madhya Pradesh, a traditional healer after following certain rituals gave a particular kind of seed to different farmers after worship, as a sort of blessing. These seeds were to be grown along with whatever variety of paddy the farmers grew. It was later discovered that these were the seeds of a male sterile line which the healer was giving to farmers to enable a kind of hybridization in the farmers’ field.

In another example, he showed that by following clonal propagation method, farmers selected the best plant and filled the entire field by the tillers of the same mother plant. He also showed that this technique created a positive stress and enhanced the yield compared to the cultivation of the same variety by another method. Conservation of germ plasm will also require careful study of such strategies of enhancing or reducing diversity in a field but perhaps increasing diversity in the populations.

source: Honey Bee database and Honey Bee 1996 7(2), pp 17
should consider drawing up a collaborative agreement
- if such an agreement is made, the researcher should consider depositing a copy of it with a relevant regional/sub regional body
- should ensure that the actual entity that is directing the research is a party to the agreement whether it is carrying out the work itself or through contractors

4. Compensation and Other Terms of Access The researcher:
- must make every effort to ensure that providing communities and counterpart institutions share equitably in the benefits.
- shall make every effort to develop effective mechanisms for benefit-sharing, (recognizing that no proven universal methods exist, and that cultural and other circumstances will vary widely from one case to the next).

Parties should arrive at the scope, extent and form of compensation keeping all the following stages in mind.
(a) when accessing is done, (b) when a new use is discovered (c) when a product is developed (d) when commercialization is done

Arrangements for compensation should incorporate the following obligations:
(i) The community’s right to any organism or part thereof extracted by any biotechnological or other method must not be exhausted merely by publication or collection. The community can assign these rights or associated intellectual property rights (IPRs) to anyone it feels appropriate. (ii) The community has the right to refuse collection by any researcher even after the initial research has shown its utility. (iii) Any research collecting from an alternative location/community/species/country should take into account the contribution of the original source in generating commercial returns. (iv) The period of production should be considered to be valid as per the law in force for the property or form of accessed material being commercialized. (v) At stage ‘b’ or ‘c’ above, researchers must negotiate with the source community the terms of profit-sharing from commercialization, even when knowledge is provided by an emigrant belonging to that community. (vi) Researchers should consider helping to set up local/community-managed institutional funds or other augmentative mechanisms for local community development in cases where individuals/communities refuse(s) monetary compensation.

5. Professional Societies, Academic institutions and Funding Agencies:
- should encourage citation of intellectual contributions of local innovators, communities and groups
- should ensure sharing in the local language the insights gained from local communities or innovators either by prior agreement or by the time of publication, or within reasonable time but not beyond one year of publication.
- should help set up a system of registration of innovations/practices so that IPRs of local communities or innovators are not exhausted
- should set up rules of good conduct and practice by researchers
- should recognize, support and reward ethical practices in research
- should set up bioethics committees to protect the rights of researchers, communities and individuals contributing to the conservation of biodiversity.

UD Network welcomes comments, suggestions and ideas on items to be included in the forthcoming issues of the news letter. We welcome contributions from other colleagues including those who are not formally involved in the UD project so far. We are thankful to Ms Rati Mehrotra for editorial assistance.

Next SC meeting will be held at Pastapur, Andhra Pradesh on 15-17 January 1999. During this meeting new proposals will be reviewed. For further information contact P.V. Satheesh, Deccan Development Society, Hyderabad, Andhra Pradesh, India

All the communications regarding Newsletter may be sent to:
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Fax: 91-79-6427896, email: honeybee@imahd.ernet.in, sristi@ad1.vsnl.net.in
Invitation for the proposals

USING AGRICULTURAL DIVERSITY RESEARCH AWARD

The Using Agricultural Diversity Award assists local groups and institutions in South Asia to undertake applied research on the use of agricultural diversity to meet the needs of farm households and protect the environment. The award is intended to encourage research collaboration, exchange and dissemination of information on practical means to enhance the sustainable use of agricultural diversity by farm households. It recognizes the role that cultivated and non-cultivated agricultural diversity, including livestock, play in the livelihood strategies and food security of rural people.

ELIGIBLE FIELDS OF STUDY

Applications will be accepted for applied research on topics related to:

- Documentation of the varied uses (e.g. pest control, drought tolerance, taste preferences, etc.) of on-farm biodiversity in high biodiversity areas.
- Understanding of perceptions and value of the biodiversity among men and women.
- Identification of socio-cultural factors influencing the use of diversity.
- Application of participatory approaches to plant breeding, management and use of biodiversity.
- Informing policy of the role of farmer participation in on-farm conservation and enhancement of agricultural diversity.

ELIGIBILITY

The award is targeted toward local organizations or innovative individual supported by such organizations. However, it seeks to enhance collaboration between the informal (NGOs, innovative farmers, etc.) and the formal sector (plant breeding institutions, national germplasm banks, etc.). Collaborative proposals are strongly encouraged.

VALUE

The Award will cover justifiable applied research expenses to a maximum of Rs 3,50,000 (Indian Rupees). The award cannot be used for long-term salaries, institutional support or for the purchase of vehicles and other major fixed assets.

DEADLINES

There are two cycles of competition yearly. The next deadline is November 30, 1998 (awards will be announced mid-January, 1999)

APPLICATIONS

The Award is governed by a Steering Committee consisting of experts from national, regional and grassroots organizations in India, Nepal and Bangladesh as well as representatives from the international community. It is administered jointly by the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI, P.O. Box No. 15050, Ambawadi, Ahmedabad) and the International Development Research Centre (IDRC, Canada). Proposals for Awards should indicate:

1. The project title
2. Name and full address of the principal researchers
3. Description of the agricultural biodiversity in the region where the research is to be undertaken.
4. Research objectives and general workplan
5. Involvement of local people in the research, with clear evidence of men and women participation.
6. Ethical consideration towards knowledge providers and conservators.
7. Budget, linking expenditures to objectives and work plan.

Applicants should send their proposals to

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ubinig@citco.net,

C/o International Development Research Centre (IDRC), 17 Jor Bagh
New Delhi, 110 003, India
Fax: 91-11-4622707

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