

*Magazine on Low External Input Sustainable Agriculture*



# LEIS INDIA



Cultivating farm  
biodiversity



March 2014 Volume 16 no. 1

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*Ippapally Tejamma in her biodiverse farm*  
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LEISA India is a member of the global Agriculures Network. Seven organisations that provide information on small-scale, sustainable agriculture worldwide, and that publish:

Farming Matters (*in English*)

LEISA revista de agroecología (*Latin America*)

LEISA India (*in English, Kannada, Tamil, Hindi, Telugu and Oriya*)

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BAOBAB (*East Africa, in English*).

The editors have taken every care to ensure that the contents of this magazine are as accurate as possible. The authors have ultimate responsibility, however, for the content of individual articles.

The editors encourage readers to photocopy and circulate magazine articles.

[www.leisaindia.org](http://www.leisaindia.org)

# Dear Readers

Biodiversity is a nation's heritage, an opportunity and a solution to deal with threatened livelihoods and ecologies. Biodiversity is a reliable adaptive strategy as well as a mitigating strategy. If supported adequately, contextual ecosystem advantages could be leveraged, scarce resources conserved, nurtured and utilized, save culture and agriculture. We hope the selection we made for this issue inspires you to contribute much more to strengthen family farming.

We are happy to announce that MISEREOR has expressed interest in supporting two more local translated editions of the magazine in Punjabi and Marathi while encouraging us to increase the frequency of the present five language editions from two issues per year to four issues per year.

We are extremely grateful to your support which is strengthening the LEISA movement. With challenges including climate, we hope, together, we can strengthen the process.

The Editors

**LEISA** is about Low-External-Input and Sustainable Agriculture. It is about the technical and social options open to farmers who seek to improve productivity and income in an ecologically sound way. LEISA is about the optimal use of local resources and natural processes and, if necessary, the safe and efficient use of external inputs. It is about the empowerment of male and female farmers and the communities who seek to build their future on the bases of their own knowledge, skills, values, culture and institutions. LEISA is also about participatory methodologies to strengthen the capacity of farmers and other actors, to improve agriculture and adapt it to changing needs and conditions. LEISA seeks to combine indigenous and scientific knowledge and to influence policy formulation to create a conducive environment for its further development. LEISA is a concept, an approach and a political message.

**ILEIA** – the centre for learning on sustainable agriculture is a member of AgriCultures Network which shares knowledge and provides information on small-scale family farming and agroecology. ([www.theagriculturesnetwork.org](http://www.theagriculturesnetwork.org)). The network, with members from all over the world - Brazil, China, India, Kenya, the Netherlands, Peru and Senegal, produces six regional magazines and one global magazine. In addition, is involved in various processes to promote family farming and agroecology. The ILEIA office in The Netherlands functions as the secretariat of the network.

**MISEREOR** founded in 1958 is the German Catholic Bishops' Organisation for Development Cooperation. For over 50 years MISEREOR has been committed to fighting poverty in Africa, Asia and Latin America. MISEREOR's support is available to any human being in need – regardless of their religion, ethnicity or gender. MISEREOR believes in supporting initiatives driven and owned by the poor and the disadvantaged. It prefers to work in partnership with its local partners. Together with the beneficiaries, the partners involved help shape local development processes and implement the projects. This is how MISEREOR, together with its partners, responds to constantly changing challenges. ([www.misereor.de](http://www.misereor.de); [www.misereor.org](http://www.misereor.org))

**AME Foundation** promotes sustainable livelihoods through combining indigenous knowledge and innovative technologies for Low-External-Input natural resource management. Towards this objective, AME Foundation works with small and marginal farmers in the Deccan Plateau region by generating farming alternatives, enriching the knowledge base, training, linking development agencies and sharing experience.

**AMEF** is working closely with interested groups of farmers in clusters of villages, to enable them to generate and adopt alternative farming practices. These locations with enhanced visibility are utilised as learning situations for practitioners and promoters of eco-farming systems, which includes NGOs and NGO networks. [www.amefound.org](http://www.amefound.org)

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## 8 Cultivating biodiversity

P V Satheesh

In the Deccan region of India, over 60,000 women peasants are feeding their families, their culture and their pride with biodiverse farming practices. Their knowledge and successes have reached across national and institutional borders, giving them world wide recognition.



## 14 Local seed systems

*For enhancing food security and farm resilience*

M Karthikeyan and C S P Patil

There is a declining trend in the species diversity among small millets. While varietal improvement research conducted by the government hardly reaches those who need them, efforts made by NGOs are sporadic and on a very small scale. There is not only a need to bring in these institutions to work together but work in such a way that the local seed systems are protected and nurtured. RESMISA model is an attempt towards strengthening local seed systems integrating the strengths of various varietal improvement efforts.

## 20 Towards food sovereignty

*Millets based bio-diverse farming system*

Prasant Mohanty

Millets are highly nutritious food crops which are hardy and are resilient to climate changes. Ironically over years, the area under these crops is declining owing to undue focus on monocropping systems and high input agriculture. Tribal communities in Kandhamal have broken the barrier of monocropping by reversing back to millet based bio diverse cropping systems. They are now practicing farming which is more resilient and eco-friendly, producing more quantities, more diverse and more nutritious food.

## 29 Evolutionary populations

*Living gene banks in farmers' fields*

Maryam Rahmanian, Maede Salimi, Khadija Razavi, Dr Reza Haghparast and Dr Salvatore Ceccarelli

Rapidly increasing on-farm biodiversity is a matter of urgency in an era of climate change. Farmers often have limited access to genetic resources. Not only do they need greater access to the genetic material in research stations and gene banks, they also need to collaborate with scientists who are willing and able to draw on their respective strengths to create new knowledge together. The Evolutionary Plant Breeding programme in Iran is one example of what can be achieved when these challenges are overcome.

# CONTENTS

Vol. 16 no. 1, March 2014

*Including Selections from International Edition*

- 4 Editorial
- 5 Agriculture, biodiversity and communities: does it add up?  
Gine Zwart, Sarah Doornbos and Willy Douma
- 8 Cultivating biodiversity  
P V Satheesh
- 11 Conservation by communities  
*The CBM approach*  
Pitambar Shrestha and Sajal Sthapit
- 14 Local seed systems  
*For enhancing food security and farm resilience*  
M Karthikeyan and C S P Patil
- 18 Interview: Phrang Roy  
*"Link biodiversity with the pleasures of food"*  
Janneke Bruil
- 20 Towards food sovereignty  
*Millets based bio-diverse farming system*  
Prasant Mohanty
- 23 Seed sovereignty for food security and livelihood improvement  
Sanjay M Patil
- 26 Adapting to climate variation through crop diversification  
Eshwer Kale and Marcella D'souza
- 29 Evolutionary populations  
*Living gene banks in farmers' fields*  
Maryam Rahmanian, Maede Salimi, Khadija Razavi, Dr Reza Haghparast and Dr Salvatore Ceccarelli
- 31 The Narayana Reddy Column  
Biodiverse farms are sustainable farms
- 32 New Books
- 33 Sources
- 34 Seed festivals promote seed conservation  
*The Nel Thiruvizha in Adirengam*  
Sreedevi Lakshmi Kutty



# Cultivating farm biodiversity

**B**iodiversity is the backbone of ecological and human security. It is the basis of survival of most small farmers. It directly sustains the lives and livelihoods of over 70% of India's population. Even today, agricultural biodiversity is concentrated in regions where small farms still predominate. Local agrobiodiversity is closely linked with the lives, livelihoods and the culture of the rural communities. Rural communities have been conserving and enriching genetic resources of many crops to meet their nutritional, health and livelihood needs, indirectly contributing to the ecological security of the communities.

Family farmers are intrinsically linked to their communities and landscapes, transmitting knowledge, skills, practices and technologies from generation to generation. Family farmers are, often by default, custodians of biodiversity. This especially holds true for those living in poverty, as building resilient farming systems is the most logical choice for them. (Gine Zwart, Sarah Doornbos and Willy Douma, p. 6). Biodiversity based farming is advantageous to small farmers for many reasons. High-diversity farming is generally more labor-intensive than being capital intensive, depends on farmers knowledge and often the only way of farming under fragile and resource poor conditions, where small farmers predominate. However, much of the diversity is lost owing to unsustainable models of development, globalised agriculture, negligence of traditional agricultural practices, demographic changes, destructive policies etc.

Smallholder farmers have depended on the evolutionary service of biodiversity for hundreds of years. Developing new varieties, which is now being considered as the prerogative of the research personnel, has been happening on farmers fields through natural and artificial selection. Small farmers and most importantly women have been a part of this co-evolutionary process. These farmers fields as 'evolutionary gardens' have been serving as living gene banks. (Maryam Rahmanian, p.29). Once again, efforts are being made to help communities gain access and control over their seeds. Local communities are increasingly participating in developing improved varieties, thereby gaining control over the seeds they produce. Community level seed banks are being promoted and strengthened. For instance, in Nepal around 1195 accessions of

local crops and varieties are conserved in the Community Seed Banks (Pitambar Shrestha and Sajal Sthapit, p.11).

Respecting, protecting, and building on traditional knowledge is key to conserving local agro biodiversity. Since women are the most important torchbearers of this traditional knowledge and food tradition, they are also the carriers of the agro biodiversity tradition. The women of the Deccan region have shown that being the seed keepers, they not only conserve seeds, but also decide on the mix and quantity of seeds to be planted at planting time. A win-win system - the women's way of farming supports biodiversity, and biodiversity supports their way of farming. (P V Satheesh, p. 8).

Communities are going back to biodiversity based farming to cope with climate change conditions. Farmers are increasingly realizing that diversification strengthens the resilience of agriculture and reduces vulnerability. Farmers in Kumbharwadi in Maharashtra who adhered to biodiversity concept could beat food shortages during low rainfall years by growing around 24 varieties of crops (Eshwer Kale and Marcella D'souza, p.26)

### Joining hands

As already said, biodiversity is the backbone of ecological and human security. If this is true, then its conservation is everyone's responsibility. While small farmers are providing these services to the humanity for free, it is unfair to expect small farmers alone to bear the burden of conserving biodiversity. Small farmers cannot do it alone: they need allies. Creating awareness and building capacity of all sections of society is necessary to handle various issues of biodiversity conservation. Only an awakened and mobilized public opinion can bring environment friendly policies into being. One fine example is the case of dalit women of Deccan, who with the support of the Deccan Development Society and the Millet Network of India succeeded in including millets firmly in India's public food system.

While small farmers have been providing environmental services at no cost, the national governments have done little to support such small farmers. Rather, they have been promoting or facilitating, a wide range of actions that undermine diversity and threaten farm livelihoods. Such actions and policies are only forcing small farmers to leave their lands. By eliminating the environmental services provided by family farmers, we are only pushing the humanity into deep vulnerabilities. Its time for us to pause, think and share responsibility for the cultivation of agricultural biodiversity.

In India, the genetic diversity within each species is mind-boggling - one species of rice has diversified into at least 50,000 distinct varieties, and one species of mango into over 1,000 varieties.



Photo: BAIIF

*Save seeds, save life*

# Agriculture, biodiversity and communities: does it add up?

**Gine Zwart, Sarah Doornbos and Willy Douma**

In 1905, Einstein published the world's most famous equation:  $E=mc^2$ , which has since become a fundamental principle. A hundred years on, it's time to propose another equation as a fundamental principle of the 21st century:  $A=bc$ . Agriculture (A) equals biodiversity (b) multiplied by communities (c) squared – including both rural communities and the global community at large. While agrobiodiversity holds great promise for the future, unleashing its potential will require a deep transformation in agricultural policy, practice and knowledge sharing.

**A**grobiodiversity encompasses crop, livestock and fish species, varieties and breeds, soil biodiversity and pollinators and the diversity of farming systems and agricultural landscapes. It is the basis of the food we eat. Agricultural biodiversity is also about how, over generations, people have drawn on their accumulated skills and knowledge, building on the natural environment and all its diversity, to utilise, develop and conserve these natural resources and their products – the seeds that grow into our food crops, the livestock and fish, the wild biodiversity that supports key functions of the agro-ecosystem, the diversity of landscapes, farmers and knowledge systems.

Agriculture depends on biodiversity. It is the DNA of the agricultural landscape, both literally and metaphorically, and the cornerstone of food and nutrition security, climate change adaptation, conservation and sustainable livelihoods. However, in practice the vast majority of the world's agriculture and food systems are destroying the very biodiversity on which they rely at a very fast pace. Control over genetic resources is increasingly being placed in the hands of transnational corporations. Farmers' access to these resources is at risk.

## Industrial biodiversity

One of the big debates around agrobiodiversity centres around "land-sparing" versus "land-sharing": either the separation or integration of farming and natural ecosystems.

Proponents of *land-sparing* advocate intensive industrialised agriculture. They argue that this leads to more productivity per hectare, and leaves land for nature and biodiversity conservation. This approach has failed to nourish the majority of the world's rural people, has polluted and depleted vast amounts of natural resources and biodiversity and displaced local communities. Moreover, the homogenisation of agricultural systems has resulted in the increased vulnerability of crops and livestock to the effects of climate change and to pests and diseases. The recent avian and swine flu epidemics are a clear reminder of the latter.

A *land-sharing* approach does not separate biodiversity from agriculture but acknowledges the intrinsic linkages between the two. This approach builds on the productive potential of agrobiodiversity combined with farmer knowledge, cultures and skills. A *land-sharing* approach, translated into policy and support for scaling up, could safeguard the biodiversity base of our food and agricultural system and reduce the risk of (further) surpassing our planetary boundaries and risking the future of farming.

### Scaling up in India

In January 2014, G.V. Ramanjaneyulu and his team at the Centre for Sustainable Agriculture (CSA) in India received the Best Innovation Award for their work on sustainable agriculture, especially on ecological practices to reduce pesticide use. Many farmers have reported on the effectiveness of these practices, their economic viability and how they have increased their self-confidence. Women farmer organisations have even demanded that the programme be initiated in their villages. CSA's goal to mainstream an alternative to pesticides overlapped well with the government's aim to improve livelihoods through cost reduction in farming. Bringing other actors on board scaled up individual islands of success. CSA is currently working in over 11,000 villages! The Maharashtra State Rural Livelihoods Mission award holds further promise for the future, as the state aims to collaborate to scale up the experience in ten districts. Just one week later, CSA received another award, this time in Bihar. Their work clearly is convincing people and changing attitudes.

## Small farmers, huge potential

According to the FAO, over 1.5 billion people in Asia and sub-Saharan Africa alone live on smallholder family farms. These farmers have the right to a sustainable livelihood in the areas they currently live in and agro-ecological practices building on biodiversity can provide them with a strategy to claim that right.

Family farmers are, often by default, custodians of biodiversity. This especially holds true for those living in poverty, as building resilient farming systems is the most logical choice for them. This is seen in the Deccan region of India. Many family farmers who live on marginal land where climate change impacts and selection pressures are greatest, have become local experts in identifying crop species and varieties resilient to shocks and stresses. Particularly women and older farmers are active breeders of plants and livestock, conserving local landraces and traditional breeds, drawing on wild species and selecting their preferred and adaptive characteristics over generations. Building on the natural capacities of a diverse agro-ecosystem makes these family farmers less dependent on external (chemical) inputs. Agro-ecological practices are also well suited to the smallholder context, as labour use is flexible and used to optimise livelihoods rather than to maximise production.

However, farmers' rights to develop, save, exchange and sell their landraces and traditional varieties is threatened. Under pressure from international trade agreements and conventions such as UPOV (International Union for the Protection of New Varieties of Plants), many governments have started to provide intellectual property rights over seeds to transnational corporations. Legislation increasingly demands requirements of stability, uniformity, and distinctness on seeds that are sold and exchanged. Local varieties used by farmers often do not meet these conditions as they carry high genetic variability. This puts biodiversity, cultural heritage and farmers' rights at risk and stifles the very innovation and development such agreements claim to stimulate.

## Knowledge for transformation

Globally, there is a rich mosaic of locally rooted practices and initiatives that promote and enhance agricultural biodiversity. Together, they make up the ingredients for a transformation of the current system to robust future-proof and farmer-centred agro-ecological systems based on agricultural biodiversity. But such a transformation will not happen by chance. Analysing case studies and learning from emerging successes of scaling up (see box) are essential for understanding the factors that could catalyse large-scale change. Many groundbreaking experiences are or can be the foundation for larger transformations.

Family farmers are, often by default, custodians of biodiversity. This especially holds true for those living in poverty, as building resilient farming systems is the most logical choice for them.

For the past two years, a network of organisations and individuals in the [agrobiodiversity@knowledged](mailto:agrobiodiversity@knowledged) programme has started to address some of the questions around the transformation of our food system and the role of generating, sharing and promoting the uptake of knowledge on agrobiodiversity at different levels. We found that there seems to be a “glass house” that prevents the many positive examples from around the world from taking hold at a larger scale. Scaling includes both horizontal scaling out (spreading of practices) as well as vertical scaling up (uptake in policy and by institutions). The network members identified five interlinked themes that constitute entry points for positive change: markets and trade; policies and governance; seeds, breeds and technology; information platforms, and community resilience.

### Catalysing the process of scaling

Why does change lead to transformation in some regions or systems, but not in others? Social and cultural norms form some of the strongest barriers. Many experiences show that interaction between researchers and local communities plays a crucial role in understanding how landscape and system transformations take place. Scientists can contribute by, among other things, making models for analysing data aggregations, bringing in new germplasm from other areas and providing technological support. Communities naturally have a deeper knowledge and understanding of local conditions, including experience of historical events that have contributed to shaping the current system. And they outnumber the scientists. Their potential contribution to change is enormous. Such collaborations have shown to be effective in a number of experiences.

Furthermore, experience shows that with adequate support and investment from governments, agro-ecology can be efficiently scaled up. This requires political will and, ultimately, a real democratisation of agricultural and food governance. Political will can be created through positive experiences and pressure from civil society. In other places around the world, farmers, indigenous communities, citizens and non-governmental organisations are mobilising to protect the right to save, exchange and sell seeds. As this issue goes to print, farmers and citizens are contesting proposed seed legislation in Ghana and Brussels that would increase corporate control over seeds, threaten the sale of traditional and farmer varieties and, in the case of Ghana, allow the commercial sale of GMOs. Farmers and citizens point at the high cost of GM seeds and the failed promises of better yields and lower pesticide use in surrounding countries. Several months ago, Colombian farmer organisations successfully protested against a resolution that would have made it illegal for farmers to save seeds and handed all control over seed markets to private companies. At the international level, civil society pressure has led to the ambitious reform and significant democratisation of the decision making processes of the FAO’s Committee on Food Security.

We found that it is fundamentally important to invest in knowledge building and sharing among different stakeholder groups and to tailor your messages and means of communication to different audiences. The use of participatory approaches that bring different

knowledge systems together is particularly important, as is the building of partnerships based on trust and equality.

The road to success and scale cannot always be thoroughly planned in advance. Sometimes you need to grab an opportunity when it presents itself by making use of champions, or by recognising windows of opportunity. The Deccan Development Society celebrates successes among women farmers and the Centre for Sustainable Agriculture in India used the opportunity provided by a well-known talk show host to share its case.

### The future holds promise

A transformation towards an agricultural system powered by biodiversity and farmer communities is possible and already happening. Its scaling requires inclusive, community-oriented and knowledge-based approaches that put farmers, rather than corporate interests, centre stage. It builds upon readily available resources: people, their labour, their knowledge and their local natural resources. Local and informal sector networks and initiatives are not only important for promoting biodiversity-based agro-ecological farming and sharing knowledge and skills. They also matter for enhancing farmers’ capacity to stand up for their rights at local, national and international fora. The International Year of Family Farming is an excellent opportunity to acknowledge, celebrate and support such networks and initiatives, and to put their successes in the spotlight.



**Gine Zwart, Sarah Doornbos and Willy Douma** work on the joint [Hivos/Oxfam Novib](mailto:Hivos/Oxfam Novib) knowledge programme [Agrobiodiversity@Knowledged](mailto:Agrobiodiversity@Knowledged), which has been operational for the past two years. They work with a large group of organisations and individuals from around the globe to generate and share knowledge around agricultural biodiversity.

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Photo: DDS

Hothi B Rajamma in her biodiverse field with red amaranthus

# Cultivating biodiversity

P V Satheesh

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In the Deccan region of India, over 60,000 women peasants are feeding their families, their culture and their pride with biodiverse farming practices. Their knowledge and successes have reached across national and institutional borders, giving them world wide recognition.

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**I**t is the year 2003 in Andhra Pradesh, India. A group of more than 50 peasant women gathered in a thatch roofed hall in Didgi village, engaged in a video interface with a group of senior agricultural scientists. Samamma, who owns three acres of rainfed farmland and grows more than 18 varieties of crops,

stands up and starts explaining why she values biodiversity in her farming practices. Quickly a scientist on the other side of the video camera stops her and says “No, no, please do not worry about biodiversity. It is we, the scientists, who should think of biodiversity, and we will recommend a seed for you to use.”

Still, too often scientists believe that agricultural science and knowledge are exclusively their domain while peasant farmers, especially the women among them, are not to be included at all

For women from vulnerable communities, sticking to peasant values and biodiversity in farming has made all the difference between death and life.

when discussing farming approaches. However, the women in the Deccan region proved them wrong in many ways.

## Biodiverse farming systems

The peasant women in Didgi village have developed highly biodiverse farming systems with common characteristics: they all farm on non-irrigated, not very fertile fields of less than two acres; they are all non-chemical farmers; all of them grow 12-23 varieties of crops on their small plot; and none of them need to purchase any of their food from markets. The women of the Deccan region are the seed keepers. They not only conserve seeds, but also decide on the mix and quantity of seeds to be planted at planting time. This is a win-win system: the women's way of farming supports biodiversity, and biodiversity supports their way of farming.

Why is biodiversity so important for these women? Why are they not content with growing just one or two commercial crops as advised by the Department of Agriculture? They have a clear preference for food crops such as Yellow Sorghum, which are totally discarded and discouraged by agricultural scientists for its low price in the market. But for the dalit women Yellow Sorghum means nutritious food, good fodder, crop which grows in dry soil, can be used in fencing and thatching, and many other qualities. All these factors, in addition, can be completely controlled by the women in spite of their low income levels. The reverence that peasant women show for such "orphaned crops" illustrates their special vision on food and farming.

## More than food

Especially for women from vulnerable communities, sticking to peasant values and biodiversity in farming has made all the difference between death and life. Whereas farmer suicides have been prevalent among Indian farmers who suffered from debts as a result of their expensive and risky commodity- and chemicals based farming systems, peasant women farmers who continued to use low cost biodiverse farming principles have not seen a single suicide among them.

Agro biodiversity is a strong part of these communities' traditions, but it is also the only logical way for them to farm. They clearly understand that a bio diverse system is the best security they have against climate vagaries. Moreover, the crops they grow are indicative of their food culture, and the relationships between foods in the kitchen reflect relationships in the field. For instance, food made from sorghum is accompanied by food made from pigeon peas, and in the field sorghum and pigeon pea grow as companion crops. This unique "farm-to-kitchen" model is what has kept agro biodiversity alive on their farms for centuries. Since women are the most important torchbearers of this food tradition, they are also the carriers of the agro biodiversity tradition.

Biodiverse farms not only nurture physical life, but also moral, ecological and spiritual life.

People in this region celebrate biodiversity through several religious festivals where heroes symbolise and bless biodiversity. *Englagatte Punnam*, for instance, is celebrated when the winter

## Reshaping food policy

In India, a select few species are promoted and supported as food crops by governmental institutions. A wide range of millet varieties, which traditionally have nutritiously fed many rural communities, are not among them. In 2013, for the first time in our history the government recognised millets as food security grains of the country by including them in the brand new National Food Security Act. After a decade long struggle by dalit peasant women, the Deccan Development Society and the Millet Network of India, millets are now put firmly in India's public food system. Not only for us, but also for the women this was a great moment to rejoice. They used radio and made short films to share their toils and successes. With grit and determination they overcame their social, economic and gender marginalisation and reshaped a national policy. Also, in 2013 we as milleteers were able to take the message of millets back to their African birthplace by initiating the Africa-India Millet Network and creating a new solidarity between two continents.

crops mature, by tying diverse crops on the door of every home – as if they declare, "*look at the diversity in my field!*" Women treasure these crops more than monetary wealth. Consequently, seeds are neither bought nor sold, but always exchanged.

## Proud to share

The Deccan Development Society (DDS), a grassroots NGO working with peasant women from socially and economically marginalised dalit communities, has facilitated the sharing of farmer knowledge for 25 years. The women from this region, especially those from lower socio-economic classes, have travelled at least 100 times – from Peru to Cambodia – to share their experience and their perspectives on farming with farmers, scientists and policy makers. They have met receptive audiences, among male and female peasants and in international conference rooms alike. In 2003 they addressed the World Organic Congress in Victoria, Canada, where various people in the audience said they felt humbled by the women's experiences.

Brimming with confidence, these women have started celebrating the Mobile Biodiversity Festival. Every year since 1998, they travel to over 50 villages during one month, discussing and celebrating ecological agriculture, control over seeds and organic markets in a way that expresses the deep relationships between the farmer and soil, agriculture and environment. They reached over 150,000 farmers in the region, showing them the richness of the traditional seeds and crops from the area. The Indian government has recognised these Biodiversity Festivals as the most important community cultural campaign on the issue.

## Worldwide recognition

The Deccan peasant women, who were so easily dismissed by the scientists in 2003, are now receiving national and international recognition for their work on biodiversity. Anjamma for instance, a 55 year old peasant woman who has never gone to a school and cannot read and write, is now a member of the expert panel on



Photo: DDS

*The selection of seeds requires complex knowledge that is held by women like Basantppur Narsamma*

agro biodiversity in the state of Andhra Pradesh. Government officers, scientists, civil society activists and media come to the region regularly to look at the women's farms and seeds. Their stories regularly appear in newspapers and on television channels.

Today, the region comprising of about 50,000 hectares of land is about to be recognised as an Agricultural Biodiversity Heritage Site by the Indian National Biodiversity Board – the first in the country. The international Convention on Biological Diversity (CBD) developed the concept to honour the sites where biodiversity is practiced. The Heritage label would place the area and its biodiversity at the same level of protection as national parks and offers special status, privileges and incentives to the farmers and communities. The label would convey a strong message that the Indian government supports marginalised family farmers and recognises their contribution to protecting biodiversity. When asked what the Heritage label means to them, the peasant woman Mahbatpur Swaroopa answers, “*We are totally disinterested in any monetary benefits. It is the recognition that we cherish.*”

### The power of women

The attention for their farms and perspectives has added tremendously to the women's self esteem. Paramma, a farmer-seed keeper in Khasimput village, once demonstrated this confidence as she confronted the government officials who came

to visit her: “*Every month you get your salaries and fill your pockets with currency notes. But come to my home. I have filled it with seeds. Can you match me?*”

Given their marginalisation in other spheres of life, the women feel that their practice and conservation of agro biodiversity has bestowed them with a new stature in the country, in their communities and in their homes. Most of the peasant women in this area say that more often than not, they are consulted and play a key role in making choices for their family farm. Cheelamamidi Laxamma cultivates her three-acre farm with dozens of food crops along with her husband. When her husband was counselled that he should become progressive and plant some hybrid crops on the land, he – completely against the grain of his social milieu – first wanted to consult his wife. When he did, she burst out: “*Have you gone mad? Why do we need hybrid seeds and a monoculture? Are we not happy with what we are growing?*” And he gave in. Sharp and alert women such as Laxamma enjoy far more respect from their husbands for the recognition they have gained in the community and beyond.

◆  
**P V Satheesh** is one of the founders of DDS and its General Secretary. For more information: visit <http://www.ddsindia.com> or e-mail: [satheeshperiyapata@gmail.com](mailto:satheeshperiyapata@gmail.com)



Photo: Pitambar Shrestha, LI-BIRD

# Conservation by communities

Community seed bank

## The CBM approach

### Pitambar Shrestha and Sajal Sthapit

To help farmers conserve and use genetic resources on their farms, LI-BIRD is working with farmers in Nepal through the community based biodiversity management approach. Today, more than 11000 farming households in Nepal are engaged in revival and conservation of local seeds.

Loss of agricultural biodiversity on farmers' field and natural habitats is one of the many persistent challenges that farming communities face, particularly in developing countries like Nepal. While efforts to preserve local genetic resources are negligible, the government of Nepal and many civil society organizations are promoting improved and hybrid seeds, to improve food production. This is often done undermining the farmers' traditional practices of saving and exchanging seeds within their network. Neglected by formal research and development, farmers have to rely on their own networks to continue to have access to this diversity. To promote sustainable conservation and use of genetic resources, Local Initiatives for Biodiversity Research and Development (LI-BIRD), a non-governmental organization in Nepal, has been promoting an approach called community-based biodiversity management (CBM) in different geographic regions of Nepal since the late 1990s.

CBM is an approach that empowers farming communities to manage local genetic resources for sustainable livelihoods through collective decision-making. Empowerment of farming communities, conservation of agricultural biodiversity and supporting biodiversity-based livelihoods are the three building blocks of CBM approach. CBM can also be considered a processed methodology that builds on the capacities and interests of farming communities and on the prevalent community structures. This approach was an outcome of Bioersivity International led project 'Strengthening the scientific basis of *in situ* conservation of agricultural biodiversity', jointly implemented by LI-BIRD and Nepal Agricultural Research Council (NARC) from 1998 to 2006 in mid-hills of Begnas, Kaski and terai flat land of Kachorwa, Bara in Nepal.

### Organizing farmers for self-directed decision making

In 2009, in order to further refine and scale up the approach, LI-BIRD collaborated with a Norwegian NGO, The Development Fund. The CBM approach was implemented in 8 additional districts of Nepal covering high hills, mid-hills and terai flat land.

Local aromatic rice varieties called *Tilki*, *Kalonuniya Shivagunj*, which were about to disappear, have now become a commonly grown variety.

Collective decision-making process is central to CBM as it believes in the principle of locals taking the lead in their own development including on-farm management of agricultural biodiversity. This is possible only if farmers are organized to understand, articulate and implement their own self-directed goals. In each site, farmers were organized in ward level groups (ward is the lowest political unit in Nepal). These groups were further federated into an umbrella organization called Biodiversity Conservation and Development Committee (BCDC), to serve as a nodal agency for implementing CBM at local level. BCDCs plan their annual activities in a way that ensures continued conservation and use of local genetic resources of the locality.

Building capacities of farmers is considered the primary activity of CBM. Capacity building is usually geared towards empowering farmers' organization to make informed decisions for planning and implementation of on-farm management of agricultural biodiversity and improving their livelihoods.

Till now, more than 11000 farming households are organized in 30 BCDCs and are engaged in implementing CBM approach across Nepal. The number of members is on the rise year after year.

### Community Seed Banks

Owing to reasons like farmers tendency to adopt what fellow farmers introduce, market forces, other social and economic reasons, many local varieties and breeds have already been lost.

And many are on the verge of extinction. Hence, on-farm management of agricultural biodiversity is promoted in areas which are diversity rich as well as diversity poor. In areas which are poor in diversity, new varieties, breeds and trees are introduced to bring in resilience into the system. It aims to have varieties of seeds, planting material and animal breeds under farmers' control.

In CBM approach, while the process is initially facilitated by external agencies, the community members are trained to get involved in the documentation of local genetic resources, associated traditional knowledge and information. Such data base is not only necessary to identify common, rare and unique genetic resources but also to understand the existing and potential value of available genetic resources of the area. Participatory four-cell analysis is employed as a tool to assess the status of agricultural biodiversity in each CBM site and understand dynamics behind the changes in local crop populations. Based on such study, analysis and enhanced knowledge, CBM plan is prepared for a specific crop or variety or breed, year after year.

Community seed bank (CSB) is considered as a major activity to promote on farm management of agricultural biodiversity. Till now, 15 community seed banks have been established in different geographical locations of Nepal with financial and technical support from LI-BIRD. CSBs also provide easy access to diverse types of seeds at local level, since the market offers only a handful of varieties. Around 1195 accessions of local crops and varieties

*Biodiversity Fair*



Photo: LIBIRD



Photo: LIBIRD

*Taro diversity block*

are conserved in the CSBs. And, nearly 2000 farmers use diverse types of local seeds from these community seed banks, annually.

### Enhancing rural livelihoods

In order to generate economic incentives from conservation of local varieties and breeds, CBM approach promotes biodiversity-based income generating options. Based on value of local genetic resources and analyses of its potential, activities such as seed production, expansion of area of local varieties, increasing number of local animal breeds, breed purification, value addition and marketing of traditional and local food items, introduction of new processing units and other small enterprises are designed, both at the individual level as well as at the community level. To ensure quality of produces and sustaining production mechanisms, necessary knowledge and skills transformation related activities are conducted.

The successes, innovations and transformations resulting from CBM are diverse and are worth mentioning. Local aromatic rice varieties called *Tilki* and *Kalonuniya* at Rampur in Dang district and Shivagunj in Jhapa district, respectively, which were about to disappear, have now become a commonly grown variety. People are able to earn income from selling it at a premium price. The population of local chicken have increased in Kunjo and Mustang. Farmers are also self-sufficient in chillies, instead of buying from the market. In Agyauli, Nawalparasi, *Hurra*, a rare local breed of pig has become common and is now an important source of cash income for over 100 poor households of *Majhi* and *Bote* indigenous people. In the same village, communities have come together to regenerate over 10 hectares of public grazing land that had been damaged by flooding to improve fodder and forage security for the farming households.

In Talium, Jumla, CBM has set an example of its effectiveness in reducing drudgery of women. *Dhatelo*, a native plant in the area that is commonly planted as a fence is also used for extracting edible oil from its seed. Because of the laborious oil extraction process and need to walk hours for its collection, mostly, women from poorer families used to collect it and extract oil by hand.

Normally, it takes a day to extract 2 liters oil for a woman with the traditional process. Now, with support from CBM and community efforts, the situation has changed. There is an oil press machine, which can extract 10 kg *Dhatelo* seeds that produce about 3 to 5 liters of oil within 30 minutes. This has not only reduced the drudgery and workload of women but also increased income of poor women from selling the oil. Now the interest on *Dhatelo* is not limited to poor women, but villagers have come together and planted 2200 saplings this year in the wasteland nearby the village. *Dhatelo* with its robust root system, is being considered to serve as a landslide barrier.

### Sustaining CBM

A CBM fund is created as a mechanism for local financing, with contributions from the community and LI-BIRD. The CBM fund is a revolving fund operated and managed by a farmers' organization to provide easy access to small credit for resource poor farmers. By investing in additional agriculture based livelihood assets, farmers can improve household income and resilience. Interest generated from its mobilization is used to cover the operating cost of the farmers' organization including continued regeneration and distribution of seeds of local varieties.

The CBM fund created in 21 villages has crossed USD 100,000. Annually, more than 2000 members get a small loan from the fund in order to start a small enterprise and support household economy. Records show that more than 50 percent of users are from a resource poor category. CBM fund has become a permanent source of generating financial resources for sustaining CBM activities and institutional sustainability.



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### References

- Shrestha P., Sthapit. S and Paudel. I., **Community seed banks: a local solution to increase access to quality and diversity of seeds**, in *Community Seed Banks in Nepal: Past, Present, Future*, 2013.
- R. Vernoooy and P.Chaudhary (eds)., **Proceedings of a national workshop**, LI-BIRD/USC Canada Asia/The Development Fund/IFAD/Bioversity International, 14-15 June 2012, Pokhara, Nepal.
- Shrestha P., Sthapit. S., Paudel I., Subedi S., Subedi A and Sthapit B., **A Guide to Establishing a Community Biodiversity Management Fund for Enhancing Agricultural Biodiversity Conservation and Rural Livelihoods**, 2012, LI-BIRD, Pokhara, Nepal.
- Shrestha P. and Chaudhary P., **Managing Biodiversity: Nepal's BCDC**, *Farming Matters*, Vol. 28.3, September 2012, pp 22-24.



Photo: Dhan Foundation

*Baby trial plot at Bero, Jharkhand*

# Local seed systems

## *For enhancing food security and farm resilience*

**M Karthikeyan and C S P Patil**

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There is a declining trend in the species diversity among small millets. While varietal improvement research conducted by the government hardly reaches those who need them, efforts made by NGOs are sporadic and on a very small scale. There is not only a need to bring in these institutions to work together but work in such a way that the local seed systems are protected and nurtured. RESMISA model is an attempt towards strengthening local seed systems integrating the strengths of various varietal improvement efforts.

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**S**mall millets are hardy, superior in nutritional qualities, meet food and fodder requirements, require few external inputs and also sequester carbon. More importantly they have significant cultural value due to their long history in the South Asian Region. Despite these advantages, there is a drastic decline in the area under small millets along with loss of varietal diversity. In the last two decades decline in inter and intra-species diversity among small millets is being observed in various degrees in India. Further, the released varieties, output of varietal improvement research from national agricultural research systems, have not penetrated most of the cultivation areas.

Presently in India, the national agricultural research system (NARS), is the primary actor focusing on varietal improvement and comes out with broad general recommendations. The research is conducted in research stations located far away from the cultivating locations, with limited participation by farmers. Their

The varietal diversity in each project site was enhanced within a span of 3 years, while it would require 8-10 years for improved seeds to reach the farming community in a conventional breeding programme.

penetration to major cultivating regions has been very limited. On the other hand there is limited number of non-governmental organisations (NGO) which focus on on-farm conservation of local varieties, working with farmers in the remote areas. These are very location specific and project specific programmes and have limited spread. Besides these two, informal seed systems prevail in the villages. These systems have an essential role in promoting food security, and are central to the conservation of biodiversity, in the face of rapidly dwindling global genetic diversity. While all the three systems having their own strengths are playing significant roles, which are complementary in nature, they have been doing so independently within their frameworks. There is a need to bring them together, and build on their strengths so that a synergy is created in achieving the needed varietal improvement and enhancing varietal diversity of small millets in the cultivating regions.

Understanding the need for integration of these complementary roles, an integrated model was designed and attempted by DHAN Foundation, a development NGO, under 'Revalorising Small millets in Rainfed Regions of South Asia' (RESMISA) project funded under CIFSRF by IDRC and DFATD, Canada. The project was initiated in 2011 and focuses on four small millet crops, namely, finger millet, little millet, barnyard millet and kodo millet in five sites (3 in the state of Tamil Nadu, one each in Odisha and Jharkhand states) located in different agro-climatic regions of India. The project has created a platform where in farmers and their organisations like federation/ association of self help groups

(SHGs) from the sites, scientists and field staff of DHAN Foundation, and scientists from Tamil Nadu Agricultural University and All India Coordinated Small Millets Improvement Project of ICAR are involved to continually interact through the course of study. The guiding methodology of the project is farmer-led research that builds on indigenous knowledge systems and is complemented by gender sensitive scientific and participatory methods.

### RESMISA model

RESMISA model (see flow chart) integrates on-farm conservation, participatory varietal selection (PVS) and community based seed systems. The research begins with understanding the present status of varietal diversity and seed dissemination system in the sites. Different tools such as field surveys, transect walks, biodiversity contests and interaction with the local farmers were used for scouting the varieties of focused crops that are under cultivation in each of the study sites. This is followed by biodiversity blocks and morphological characterisation of local varieties. The varieties identified are classified into popular and vanishing varieties. While special attention is given for on-farm conservation of the vanishing varieties through nodal farmers, the popular varieties enter the PVS trials as local checks. In PVS, experimentation on acceptability of suitable materials in farmers' fields included mother trials, baby trials and informal research and development. Mass multiplication and promotion of preferred varieties emerging from PVS and on-farm conservation of vanishing local varieties are carried out in community seed systems.

### Varietal diversity and seed systems

Though there were many small millet varieties in the sites, not more than two varieties covered majority of the area in each of the four crops studied. Further varietal diversity at hamlet level was very limited in all the sites. This situation clearly indicated the need for increasing varietal diversity of small millets in the sites.

*Ragi varieties evaluated at Anchetty, Tamil Nadu*



Photo: Dhan Foundation

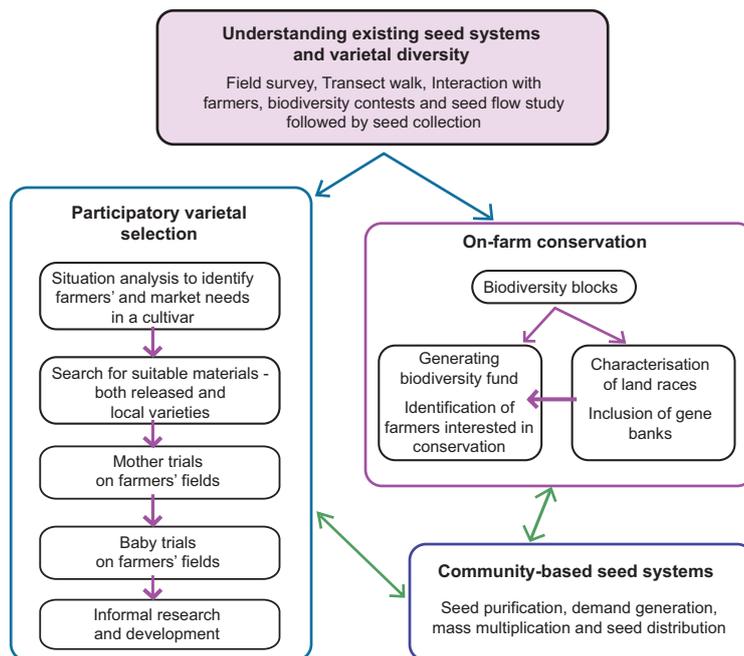
Further, more than 90% of the farmers use farm saved seeds of small millets. They do not follow seed selection procedures leading to mixing of varieties. Under these conditions the best strategy for varietal improvement and enhancing varietal diversity is creating more options at the individual farmer level regarding the preferred varieties and promoting simple quality seed selection methods among the farmers. For generating more options of preferred varieties, PVS was attempted in the sites.

### Participatory varietal selection

A set of promising varieties (8-10), comprising both traditional as well as released varieties of each small millet crop, were short listed based on farmers preferences for the desirable traits. In 2011 and 2012, these varieties were evaluated in each site on farmers field following farmers' management practices (Table 2). These varietal trials, known as mother trials, were monitored by the trained field staff of DHAN Foundation under the guidance of technical personnel. The participating farmers, numbering on an average of 15 to 20, took the responsibility of raising the crop and harvesting, apart from participating in the evaluation process. Varieties suitable for the site were identified based on the results of quantitative analysis and farmers' preference analysis. In quantitative analysis, the standard procedures in collecting and interpreting the data of growth and yield parameters were followed. The preference analysis used the preference scores given by the groups of farmers, male and female groups separately, for each of the varieties in the trials.

From two cycles of varietal evaluation in mother trials it was possible to identify 1 to 4 most preferred varieties (both released and traditional varieties; see Table 1) in each crop for respective sites. The performance of these identified varieties was further assessed individually against the farmers' varieties in more number of farmers' fields (34-64) in baby trials under farmers' management

### Integrated model for On-farm conservation, Varietal improvement and locally embedded seed systems



practices. The plot size for each variety was larger (minimum of 200 m<sup>2</sup>) than in mother trials. Such of the varieties whose performances were accepted by majority of the local farmers were finally selected, mass multiplied and promoted by reaching more number of farmers under informal research and development activities. Hence, it was possible to enhance the varietal diversity in each project site within a short period of 3 years. Also, a large number of farmers had seeds of their preferred varieties in their possession. This is in contrast to conventional breeding programme, wherein it would take a minimum of 8 to 10 years for improved seeds to reach the farming community.

Table 1: Status of varietal diversity in small millets at the study sites

Project sites	No. of varieties present		Popular varieties	
	Traditional	Released	Number	Name
<b>Finger millet</b>				
Anchetty	2	3	2	GPU 28 (R), INDAF 5 (R)
Bero	4	-	2	<i>Demba (T), Lohardagiya (T)</i>
Jawadhu Hills	2	-	1	<i>Muttan kelvaragu (T)</i>
Semiliguda	19	2	4	<i>Bati (T), Mati (T), Kalakarenga (T), Sunamani (T)</i>
<b>Little millet</b>				
Jawadhu Hills	9	-	3	<i>Sittan (T), Karusittan (T), Vella samai (T)</i>
Semiliguda	8	2	1	<i>Bada saon (T)</i>
<b>Barnyard millet</b>				
Peraiyur	3	-	1	<i>Sadai (T)</i>
<b>Kodo millet</b>				
Peraiyur	4	-	1	<i>Siru varagu (T)</i>

R- Released variety; T- Traditional variety

## On-farm conservation

To conserve the local genetic resource of a crop, two bio-diversity blocks were established in the fields of interested farmers. These blocks also served as a means to create awareness among the farmers to witness the varietal diversity available within their own area. Seed purity is maintained by collecting selected panicles during harvest. Also, the seeds of these varieties are sent to the research centres for further purification and for conducting morphological characterization studies. Further, to support interested farmers in on-farm conservation, an initiative to generate biodiversity funds in each of the project sites, has been undertaken.

## Community based seed systems

Specific efforts were made for involving local community organisations like SHGs and their federation /associations, in the project sites. Exposure trips were organised for the trial farmers to widen their awareness on the loss of varietal diversity. They were also involved in managing the biodiversity fund. Federation/association of SHGs are in a position to take the responsibility for on-farm conservation and promotion of preferred varieties emerging from PVS due to their social and financial capital accrued over the years. Interested trial farmers from these SHGs from various parts of the research site formed into a farmers' group named RESMISA research coordination committee (RCCC). RCCC will handle the responsibilities of quality seed production, seed purification and seed dissemination on a sustainable basis.

## Learnings

The integrated model is unique in several aspects. It is a model where in large number of farmers (578 men and 333 women) were involved at various stages of the whole process, which helped them to understand the basic and simple principles behind each of their actions. Opportunity for the scientists and farmers to work together helped to produce meaningful results through better understanding and appreciating each others experience. Though yield appeared to be the main criteria for assessing the superiority of a variety, the trial farmers also took into consideration several other traits/dimensions before preferring a variety like crop duration, non-shattering of grains at maturity, non-lodging, uniform maturity, and good fodder yield. Women farmers, in particular, were more concerned with grain quality traits, such as colour, taste, grain hardness and keeping quality.

The experience proved that the traditional varieties have potential to address the needs of farmers which is generally ignored by the formal system. Collaboration of partners made it possible to share elite germplasm across the states, thereby widening the varietal options available for the farmers living in remote sites. The model also made it possible to integrate varietal improvement and varietal development with the existing development activities of SHGs, like microfinance.

Varietal improvement has to be a continuous process to meet emerging requirements of the farmers (though happens on an episodic manner in the project). Housing it within the community seed systems gives scope for continuing the same beyond the



*A woman farmer doing preference analysis in Anchetty, Tamil Nadu*

Photo: Dhan Foundation

project period. Further this model creates space for inclusion of potential local germplasm in the formal research stream of NARS and for productive collaboration between formal and informal seed systems.

Integrating on-farm conservation, PVS and community seed systems can effectively result in varietal improvement and increasing varietal diversity of small millets. Collaboration of multiple stake holders namely farmers' organisations, development organisations and research organisations are prerequisite for implementing the integrated model. Further strong adherence to gender sensitive farmer-led participatory research methodology and facilitation to set an effective working relationship by overcoming the existing power equations are essential for making the collaboration successful. This approach is replicable across the geographies and across the crops. Recognising the need for integrated approach and collaboration across the partners, there is need for institutionalising these in the ongoing efforts for enhancing the livelihoods of small farming households. In the process, necessary efforts need to be taken for including potential traditional varieties in the formal public seed system and in other State funded crop support systems, and securing farmers' rights related to them.



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## References

Gill, T. B., Bates, R., Bicksler, A., Burnette, R., Ricciardi, V., & Yoder, L., **Strengthening informal seed systems to enhance food security in Southeast Asia**, *Journal of Agriculture, Food Systems and Community Development*, 2013, 3(3), 139–153.

# “Link biodiversity with the pleasures of food”

By Janneke Bruil

“When you look at the map of global agrobiodiversity hotspots you realise that they are identical with indigenous people’s habitats. These 370 million people in the world have been agrobiodiversity custodians for millennia,” says Phrang Roy, co-ordinator of the Indigenous Partnership for Agrobiodiversity and Food Sovereignty. “Regretfully, their practices, such as shifting cultivation and their selection of socially relevant local crops and breeds, are not understood by many development workers, researchers and governments.”



Photo: Annelie Bernhart (NESFAS)

With his modest appearance and warm voice, often weaving in a joke or two, Phrang Roy is one of the world’s leading advocates for the rights of indigenous peoples and agrobiodiversity. A member of the indigenous matrilineal Khasi tribe in India himself, he now lives in Rome. Between 2002 and 2006 Mr Roy served as the Assistant President of IFAD (the International Fund for Agricultural Development).

“In my experience with international organisations, I realised that there is a need for a more inclusive approach that treats custodians of traditional knowledge and modern day researchers as equal but diverse knowledge holders. The well-being of future generations cannot be sustained if we continue to marginalise indigenous peoples, fail to learn from them about their cultural ways of

respecting agrobiodiversity and do not defend their food sovereignty to practice their farming systems.”

So in 2010 Mr Roy established the Indigenous Partnership for Agrobiodiversity and Food Sovereignty. The Partnership promotes a dialogue between indigenous peoples and agricultural research and advocacy groups and strives for local knowledge to gain a place on the agenda of international institutions. In addition, Mr Roy is a prominent member of the International Slow Food movement and an advisor to the International Fund to Amplify Agro-Ecological Solutions.

## What is blocking the mainstreaming of agrobiodiversity?

Current agricultural trends are all about moving towards a cash economy rather than subsistence farming. Unfortunately, the question is often not “how can I grow healthy food for my own family” but “how can I grow crops that will reap monetary benefits”. In the current system, we don’t look at hidden subsidies or at the cost of ill health that comes with a long dependence on chemical supported commercial production. The narrow focus on production, the obsession that we cannot feed the world without chemicals and the ignorance about traditional systems are some of the biggest challenges to transformation.

Creating local livelihoods based on agrobiodiversity is one strategy to respond to this situation, but this is easier said than done. It is crucial that farmers pro-actively share their successful experiences. But many farmer groups have limited opportunities to make their distinctive ecological practices known, or they lack the leverage to influence policy makers. We should be more proactive to connect these dots. We also need to “glamorise” local economies. This would also help the younger generation feel more attracted to farming. Finally, farmer organisations must push more pro-actively for a thorough and true cost accounting of commercial agriculture.

## Who are the “shakers” of the system?

These are the farmers and communities who maintain their local agrobiodiversity despite climate change and modern influences, including those who adopt modern technologies and adapt them to local conditions. One entity that I think we have seriously overlooked in our search for sustainable agriculture are the cooks. Agriculture starts with seeds and ends on the plate. In the middle stands the cook. By influencing our food habits to become more respectful of family farmers, cooks have the potential to be great “shakers”.

In addition, I think that scientists are an indispensable partner. Agricultural research must be driven more by communities and public funding instead of by commercial groups who see agriculture as a strategic investment opportunity. Mechanisms such as Citizen's Juries can enable farming communities to set the research agenda. We are currently involved in a research project on agro-ecological indicators of how indigenous knowledge is sustaining agrobiodiversity. What is most important about these initiatives is that we do it in a participatory manner. Knowledge should not be simply extracted from grassroots peoples but they should be actively involved and informed.

### **What are effective ways to promote agrobiodiversity?**

By linking biodiversity with the pleasure of consuming local food, we will gain a lot. Food connects communities and shapes their environment, economy and culture. Recent research has confirmed the importance of pride and cultural re-affirmation in encouraging communities to continue their roles as custodians of biodiversity. In that regard, food festivals have proven to be meaningful entry points. In our last festival we attracted 10,000 visitors who exchange knowledge. We displayed as many as 200 edible local plants out of which more than one third derived from the wild. We invited local chefs to celebrate local dishes, adapted to modern standards of hygiene and aesthetics. The result is that many formerly neglected foods are now promoted by farmers and in urban areas.

Another effective strategy is to link local biodiversity to local food shops. For example, in Meghalaya we set up the first rural indigenous café. It sources products from nearby farmers and foragers and presents local dishes in an appealing way. This gives income opportunities for farmers and sustains the cultivation of local, nutritious crops. We have also worked with schools to enhance children's knowledge about wild edible plants by organising educational walks and "biodiversity picnics". Children are more willing to appreciate their local food through such initiatives.

Documentation is another important strategy to raise awareness. In the Northeast of India, participatory plant breeders are documenting farmers' agrobiodiversity management practices. One of the farmers is now working with her community to promote local agrobiodiversity in surrounding villages and in schools. What we learn from all these examples is that it is crucial to work with culture, pride and local knowledge.

### **How do you view the promotion and rise of GMOs?**

I am not against biotechnology as long as its development has the prior and informed consent of all involved, and as long as the impacts are robustly and honestly considered. Unfortunately, GMO crop technology, as it stands today, is owned and driven by very few companies who mainly seek to maximise their profits. Moreover, by replacing diverse multicropping systems with monocultures of seeds that cannot be sown year after year, we risk losing important agrobiodiversity that is the result of thousands of years of intergenerational knowledge transfer. As a result, we risk entering into a fragile system where we have to rely on fewer crops that may depend on more chemical inputs.

### **An indigenous lesson**

"There is a lot we can learn from indigenous communities. For example, they have helped us to discover the important role of pollinators such as bees as agents of biodiversity. If we want to support pollinators, we have to increase the amount and diversity of food plants in our ecosystems. This integrated approach, where food production and biodiversity conservation naturally come together, is very natural in many indigenous farming systems."

Indigenous peoples are very clear that the existing Intellectual Property Rights regime does not provide adequate recognition or protection of their collective rights. The regime is designed to foster commercial growth, while the intellectual property system of indigenous peoples is based on the collective rights of communities. They are very closely linked to their lands and territories, the environment and biodiversity and their cultural heritage. This unique system needs to be upheld. The UN Declaration on the Rights of Indigenous Peoples does recognise the collective rights of indigenous peoples. That declaration needs to be supported, as well as the ongoing work that is taking place between indigenous communities and UN Agencies like UNESCO and the World Intellectual Property Organisation.

### **What appeal would you make to young people?**

There is an emerging trend of localism when it comes to food. Especially in Europe, young people have come up with very creative ways to set a trend that is defined by fresh, local and tasty food. Disco Soups is one activity that we have borrowed from Germany and Netherlands to create an interest amongst young people. I believe that if we have a passion and share it with others, we will be able to inspire others around us. Even small initiatives such as kitchen gardens, food festivals or informal chit chats can be strategic entry points to important changes in society. If young people don't make that change, we will lose everything.

### **What difference could this International Year of Family Farming make?**

The International Year can highlight the role of women and young people as the future custodians of agrobiodiversity. It should generate greater respect and empowerment of family farmers, especially the indigenous communities, whose world view is very different from other families, and who are often ignored.

My hope is that we can create a platform that recognises the important role of the silent and the marginalised, allows grassroots peoples to voice their opinions, facilitates exchange of knowledge and that re-affirms pride in local food systems. Food, when responsibly produced, protects the environment, enhances our health and well being and highlights the role of women as custodians of our agrobiodiversity and our food traditions. I therefore envision a future where our food systems are defined by a strong bond between people, planet, plate and culture.



# Towards food sovereignty

## *Millet based bio-diverse farming system*

**Prasant Mohanty**

Millets are highly nutritious food crops which are hardy and are resilient to climate changes. Ironically over years, the area under these crops is declining owing to undue focus on monocropping systems and high input agriculture. Tribal communities in Kandhamal have broken the barrier of monocropping by reversing back to millet based bio diverse cropping systems. They are now practicing farming which is more resilient and eco-friendly, producing more quantities, more diverse and more nutritious food.

**K**utia Kondh is the predominant tribal community living in the villages surrounding Tumudibandha Block in Kandhamal district in Odisha. Characterized by persistent and widespread poverty, *Kutia Kondh* communities earn their livelihood through rainfed agriculture and shifting cultivation along hill slopes (locally known as *poduchasa*). They also depend on forest produce and around 15% of their annual income is derived from collection of Non-Timber Forest Produces (NTFP).

### **Farming as traditional livelihood**

*Kutia Kondh* community has rich experience in mixed farming. They were growing 40-50 varieties and crops in mixed farming.

*Women harvesting varieties of millets*



Photo: NIRMAN



*Millets are hardy and survive under water stress conditions*

These practices were widespread around 20-25 years back. With government's massive promotion of paddy cultivation through green revolution technologies, the crop diversity on the farm, which included millets and legumes, started eroding. Also, as the Public Distribution System too became predominantly rice oriented, farmers increasingly shifted to paddy cultivation at the cost of other crops. Presently, only 12-13 varieties of crops are being grown in the region.

Local communities are forced to purchase food to meet the food needs for at least 200-210 days per year. This makes them dependent on local money lenders and other external sources to meet the rest of their food grain needs. On an average, each household has a debt of Rs. 2800. The loans are taken primarily to meet food shortages. In return they mortgage their piece of low land (usually used for paddy cultivation), livestock, matured fruit trees (mango, jack fruit etc.) or crops (turmeric & mustard) at a throw away price.

During 2011, NIRMAN, an NGO, conducted a study on millets in Dupi village in Guma gram panchayat of the block. NIRMAN has been working on sustainable agriculture, conservation of bio-diversity and rural livelihoods in the region and started working in Kandhamal on millets based farming, since 2011. The study revealed that the area under millet based bio-diverse farming system has been declining having a serious impact on food and nutrition security at the household level. NIRMAN made several consultations and found that millets were hardy enough to survive under conditions of increasing temperatures and water scarcity while providing nutritious food. NIRMAN started encouraging farmers to re-establish millets based farming system. It also facilitated the formation of millet farmers' network/organisation for influencing policy advocacy.

With the revival of millets based farming system, the crop diversity increased from 13 to 25 and enhanced the household level food security by 45 to 60 days. The seed-scarce community has moved towards seed-sufficiency within one cropping season.

### Restoring millets based bio-diverse farming

NIRMAN conducted village level meetings with communities in 14 villages covering around 306 households. Issues like food and nutrition insecurity and changes in the farming practices were discussed extensively with the communities. Communities realized the need for revival of millets based farming. The major strategy of intervention for NIRMAN was community led approach where village level institutions were facilitated to assert their control over food production system and improve livelihoods by establishing seed bank, sharing knowledge with community through learning sessions and exposures, and revival of millets based bio-diverse farming system.

In each village, a village level institution was formed. It was agreed that the village level institutions will assess the seed requirement and procure seeds for the whole community. These village institutions were oriented on millet seed bank and its management. The focus was on open pollinated varieties, which can be regularly multiplied by farmers particularly by women farmers.

Community groups assessed the requirement of seeds of millets and pulses. Initially, NIRMAN provided 12 varieties of seeds as a one-time support to the community. The seeds were then transferred to the village level institution (VLIs) as seed capital to establish seed bank, multiply it and fulfill the seed requirement of the community.

Women owing to their knowledge on seed selection and storage were given a major role to play in the implementation of the program. In selection of variety of seed and household requirement, women were actively involved in the discussion of assessment, procurement and distribution among households. At village level institution meetings, community selected women as office bearers eg. President and Secretary.

In a single crop season, a total of 25 crop varieties were revived. The length of planting calendar increased and community got more yield. This ultimately enhanced the food security levels at the household level.

### Celebrating bio-diversity

*BurlangYatra* is a community festival celebrated by *Kutia Kondh* community at the village level after the crop harvest. NIRMAN facilitated the celebration of the festival at village level. Also, to build solidarity among people from various villages, the *Burlung Yatra* was organized for the first time at the Gram Panchayat level. The festival was used as an opportunity to celebrate the revival of

agro-biodiversity in the form of displaying various local seeds, farming practices and their life style. There was a humble attempt by the community for displaying conservation of local seeds; farming systems and how this enhanced crop diversity improved food and nutrition security. The seeds displayed were millets, pulses, rice, oilseeds and vegetables grown by local community. There was exchange of seeds, experience and knowledge on farming practices. Also, farmers from other parts of the state and neighboring state i.e. Andhra Pradesh, participated. Farmers of Guma gram panchayat shared their rich experience of how they are strengthening their food and nutritional security through the revival of millets mixed bio-diverse farming. The community used this opportunity to articulate and influence the mindsets of those concerned, on the necessity to include millet foods in the menu of mid-day meal of the schools and Anganwadi centres.

### Benefits and way forward

Reestablishment of millets based farming system has increased crop diversity from 13 to 25 in agriculture fields of 14 villages and has added to the food basket. The food security at the household level has extended for another 45 to 60 days. The seed-scarce community has moved towards seed-sufficiency within one cropping season. The most important accomplishment has been restoration of traditional knowledge base which eroded along with degradation of crop diversity. Organic Certification under Participatory Guarantee System (PGS), value addition, market linkage and strengthening Women's Collective are being planned for the future.

Efforts are made to spread the multiple benefits of millets based farming system on human and environmental health, as well. Communication materials are developed and distributed. A newsletter titled Krushak Swaraj is also being brought out focusing on millets and crop diversity.

This model promoted by NIRMAN offers solutions in today's crises in farming, meeting the food and nutritional needs of the communities in semi-arid areas in Kandhamal district. The model has greater adaptive strengths against erratic rain fall and climate change while increasing the resilience of agriculture system. The hands-on-experiment is in the second year and it has up-scaled to 27 villages covering 445 households. Efforts are being made to include millets in the midday meal programme of the Anganwadis. Active engagement with government officials, opinion makers and media, is initiated towards achieving this.

### Acknowledgements

NIRMAN sincerely acknowledges Action Aid & Millets Networks of India (MINI) for collaboration and support for revival of millets based farming system in Kandhamal.



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## Call for Articles

### Family farmers in living landscapes

*Vol. 16 No. 3, September 2014*

"Landscapes" come in different shapes and sizes: mountainous areas, drylands, forests, coastal areas, watersheds, and many more. They are always changing, and so are the strategies of the people living in them. Growing pressures on the land lead to competing claims for resources, within and between communities of farmers, pastoralists and forest dwellers, but also increasingly from pressure by larger external forces including expanding cities, tourism, mining and agro-industries. Family farmers, pastoralists and forest communities depend on their landscapes for food, fuel, fodder, timber, medicines and more. For many rural communities, landscapes also have cultural and religious significance. Landscapes are intrinsically connected with the local culture and the regional economy. Yet, these communities are often excluded from land governance structures, natural resource management and policy development.

In recent years, landscape approaches or territorial approaches have gained popularity as tools to enable researchers, policy makers, NGOs, activists, private sector players and rural communities to better understand the multiple functions of landscapes and the competing

demands of different landscape users. This issue of LEISA India will look at the efforts of family farmers, pastoralists and forest communities in shaping resilient and living landscapes. How do communities deal with the increasing pressures on their landscapes – whether internal or external, local or global?

Send us your articles on the struggles to defend these landscapes from the threats of large-scale industries, mining companies and other forces. What governance mechanisms and policies are needed to ensure that the rights of rural communities are respected? Can win-win arrangements be reached with other landscape users, allowing local communities to strengthen their agro-ecological production systems? What future do rural communities envisage for themselves and their landscapes? We look forward to reading about your experiences.

*Articles for the September 2014 issue of LEISA India should be sent to the Editor, before June 1st, 2014.  
E-mail: [leisaindia@yahoo.co.in](mailto:leisaindia@yahoo.co.in)*

# Seed sovereignty for food security and livelihood improvement

Sanjay M Patil

Seed which was a 'community resource', carefully bred, conserved and evolved over thousands of years, has transformed into a 'commercial proprietary resource'. Farmer led conservation and development of improved varieties gives hope for not only nurturing agro biodiversity but also for providing food security and sustainable livelihoods.

**J**awahar block in Thane district in Maharashtra is a hilly region. Being a part of the Western Ghats, the region is considered to be a biodiversity "hot spot". The area is a host to an amazing diversity of rice and other food crops like finger millet, sorghum, pigeon pea and black gram.

With an intention to conserve the diversity of rice and other food crops, BAIF Development Research Foundation along with Maharashtra Institute of Technology Transfer for rural areas (MITTRA) initiated community-led conservation and revival of crop landraces. The initiative focused on building on local knowledge by encouraging farmers to develop productive cultivars through trials and organic farming methods.

## Participatory varietal development

Initially, farmers were organised into groups of 5-10 members. These groups of farmers were given exposure on the ways and methods used for conserving varieties. They visited *insitu* germ plasm centres where a number of landraces of paddy, finger millet, proso millet are planted in different land types. The farmers interacted with each other, saw crop performance and assigned a score based on criteria such as grain and fodder yield, resistance to pests and diseases, tillering, suitability to land, drought tolerance etc.

About 225 farmers, including youth and women farmers were trained in participatory seed and varietal selection. The training programmes helped in educating farmers on maintaining seed purity. Around 360 farmers were trained on various aspects of crop production of finger millet and proso millet, like seed treatment, nursery raising, paddy transplantation by single seedling method, ridges and furrows method.

After series of experiments for characterization and purification, upgraded and elite germ plasm of promising local cultivars were given to selected farmers for seed production. Organic methods of cultivation were followed. During kharif 2013, 26 farmers were



Photo: BAIF

Community level seed production of Proso millet

involved in seed production of paddy, finger millet and proso millet. Worthy crop landraces based on certain criteria are selected by participatory method and are saved in community seed banks.

## Biodiversity conservation and livelihood improvement

Earlier to this initiative, farmers had to depend on the market for seeds. Now they have a range of paddy, finger millet, proso millet landraces which are drought resistant, pest and disease resistant and nutritionally rich. Paddy landraces like *Kolpi (Early)*, *Kasbai*, *Lalya*, *Juna Kolam*, *Rajghudya*, *Masuri*, *Dahvul*, *Banglya* have been accepted by farmers for large scale cultivation. In finger millet, landraces like *Kalperi*, *Dhavalperi*, *Shitoli*, *Nagali (Late)*, *Dasarbendri* and in case of proso millet, *Dudhmogra*, *Ghoshi*, and *Sakali varai* landraces are now quite popular among farmers.

Combined with better crop production practices, farmers have been able to realize improved yields. The grain yield of paddy has

Farmers now have a range of paddy, finger millet, proso millet landraces which are drought resistant, pest and disease resistant and nutritionally rich.



Photo: BAIIF

*Selecting seeds from foxtail millet*

increased to 20-25 q/acre from 12-15 q/acre. Similarly, in finger millet, the yields have increased from 10-12q/acre to 17-22q/acre.

Farmers are producing and using quality organic inputs like vermicompost, vermiwash, natural pest repellents which have considerably reduced their costs of production and also dependence on external inputs. The cost of cultivation has reduced - from Rs.12400/ac to Rs.7500/ac in paddy and from Rs.7500/ac to Rs.5300/ac in finger millet cultivation. Use of organic inputs have also enhanced the soil fertility and water holding capacity.

### Community level seed production

Sustainability of seed conservation programme requires a mechanism at the community level for seed selection, seed production and exchange and to establish an independent seed security system at the village level. A seed saver committee has been formed to ensure quality seed production, management of seed exchange and establish market linkages. Seed production and seed selection methods are assured by seed saver committee through *Shivar Feri* (field visit) wherein they promote suitable methods to participating farmers. Seed saver committee has an authority of monitoring seed plots for quality seed production. Now these seed saver committees are capable of managing insitu conservation centres of paddy, finger millet and proso millet landraces. Presently 3 seed savers committees have been formed covering 11 villages. More than 250 landraces of different crops paddy, finger millet, proso millet, maize and sorghum are being conserved by community seed banks.

Around 724 farmers from 11 villages are directly involved in conservation, seed production and community level seed banking programme. To have wider spread, around 10 youth are trained for dissemination of these technologies in different villages. As “seeing is believing”, field exposure and field days are conducted regularly. Community-level seed exhibition is an important tool for increasing awareness of the farming communities about crop diversity in their area and the need for conservation. Community seed fairs, seed exhibitions and field days have helped reach up to 4200 farmers in different parts of Maharashtra.

**Table 1: Paddy landraces conserved for their various characteristics**

Character	List of Landraces
Resistant to Drought and short duration	Kali Kudai,, Kali Khadsi , Dula-1, Dula-2, Hari bhat Dhaval, Dangi (Red), Dangi (White), Dhaval
Better Yield	Kopi(Early), Kasbai, Raghudya, Surti Kolam, Lalya, Javyachi Gundi
Market value	Banglya, Kasbai,Chimansal, Surti Kolam, Zini(Wada), Kolpi,Dangi (White), Raghudya, Mahadi
Medicinal value	Mahadi (weakness, wound recovery, fracture recovery),Kali khadsi (weakness recovery), Dangi (White) (Used to prepare liquid gruel), Dangi (Red) (increase lactation for nursing mothers), Malghudya (weakness recovery from delivery)
Fodder value	Kolpi, Raghudya, Pacheki, Vakvel Dangi (Red and white),Kasbai, Zini (Wada), Banglya, Mahadi
Deep water	Kasvel
End use	Biryani, pulav, special dishes - Banglya, Kasbai, Kolpi, Masura, Rajghudya, Surti Kolam,Raghudya Liquid Gruel (kanji) – Dangi (Red) and Dangi (White), Mahadi Papad – Dhundune, Rajghudya, Malghudya. Beaten rice (poha),puffed rice (kurmura) - Dula-1,Dual-2,Sagg bhat

*Sunil Kamadi with 'Ashiwini' Variety of Paddy*



Photo: BAIIF

## Seeds of hope, Seeds of future

Sri. Sunil Kamadi, is a young farmer aged 35 yrs, from Kamadipada village (Taluka Jawahar District Thane). His family of seven members is cultivating 3 acres of rain fed agriculture land. In the year 2008, he realized that fertility and water holding capacity of the soil is degrading rapidly because of excessive use of chemical fertilizers. With technical support of BAIF-MITTRA, he learnt the technique of improving soil fertility and use of organic fertilizers. He also received training in production of organic fertilizers and cultivation of paddy with SRI method for higher production.

In the year, 2010, Sunil got involved in BAIF's 'Crop Germplasm Conservation Programme'. He conserved about 21 landraces of paddy through *insitu* conservation of the germ plasm and became an expert in 'participatory seed selection' in paddy, finger millet and proso millet.

He also collected local varieties of tubers (*karande, kochi, suran*), fruit vegetables (bottle gourd, bitter gourd, ash gourd, brinjal, pumpkin), leafy vegetables (cow pea, alu), lablab beans and tondli, which he cultivated for home consumption. Whole family was involved in this work.

Sunil, while inspecting his paddy crop, observed an unusual panicle of paddy in the field. The panicle had more number of grains and the

grain size was bigger. He removed the panicle carefully and then planted seeds from this panicle in four successive seasons *i.e.* summer 2010, kharif 2011, summer 2012, kharif 2013. After three years of successive purification and up gradation under the guidance of BAIF experts, he was successful in developing new selection having specific characters.

Farmers in the area have favored this variety because of grain yield, short slender grains, non lodging nature and resistance to pests and diseases. In the kharif season of the year 2012, Sunil produced five quintal seeds of this paddy selection variety and supplied it to the seed bank for distribution, so that it reaches many farmers.

Sunil is an active member of *biyane savardhan samiti, Dengachimeth* (Seed savers farmer's group). The efforts of Sunil in developing the variety through selection method has been appreciated and conferred 'Plant Genome Savior Farmer Recognition Award' for the year 2011-12, at New Delhi. Sunil has named the paddy variety as '*Ashwini*' after his daughter. Sunil is helping fellow farmers in conserving crop diversity in the area.

## Nurturing diversity in home gardens

Tribal communities have diverse food resources in their backyards which are rich sources of nutrition and healthy food. The tribal communities have traditionally been establishing a complex backyard garden at each household. They are small plots next to houses of tribal families, which include multiple, multi layered and multipurpose indigenous trees, plants, herbs and shrubs. The home gardens mostly consist of seasonal and nutritious vegetables, medicinal plants grown during monsoon as well as few perennial big trees on borders. The trees and vegetable types are local. The produce of this small plot is sufficient to meet nutrition and food security needs of a family for entire year.

## Gaining recognition

The seed saver farmer's group has been awarded the "Plant genome savior community award 2011-12" by the Protection of Plant Varieties and Farmers Rights Authority (PPV & FRA), Ministry of Agriculture, Govt. of India. This is a prestigious award for conservation of crop genetic resources. Also two innovative farmers Mr. Mavanji Pawar, Chowk village and Mr. Sunil Kamadi, Kamadipada village, received the "Plant genome savior farmer recognition 2011-12", for their valuable contribution in conservation of crop genetic resources.

## Way ahead

Strengthening farmer's knowledge on seed production and improved crop production practices has proved to be successful in

improving their livelihoods. In future, widening the focus on conserving pulses, vegetables and wild food resources could provide enhanced food and nutritional security to tribal communities.

Developing network of community seed banks will help in further reaching out to larger groups of farmers. Further, the network could facilitate better access to markets through collectivization and value addition. However, this also calls for improved storage facilities at the community level.

Though farming communities are involved in conservation and sustainable use of land races, they require some support to safeguard these resources. Registration of farmer's varieties under PPV & FR Act becomes important. Also further studies at chemical and molecular level are needed for validation of people's knowledge about nutritional values and for DNA finger printing and bar coding of crop landraces.



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Farmer showing his pomegranate plot in summer 2012

# Adapting to climate variation through crop diversification

**Eshwer Kale and Marcella D'souza**

While farmers everywhere are struggling to cope with the changing agro-climatic conditions, a few farmers in Kumbharwadi village in Maharashtra are adapting to the situation by diversifying their cropping systems. The diversified cropping systems have not only minimized the climatic and market risks, but has also resulted in providing diverse and nutritious food at the household level.

Weather aberrations are being experienced by farmers more frequently in the recent years. This is manifested in different forms like delayed and untimely rainfall, floods, increase in temperature etc., resulting in crop losses. For example, in villages of the Akole block in Ahmednagar district, for instance, most of the wheat and chickpea seed sown in *rabi* season were lost due to water logging conditions, owing to unseasonal heavy rains late in November 2010. Resowing during the month of December resulted in 50% reduction in *rabi* harvest. Similarly, heavy rains in the last week of May 2011 coinciding with the harvest time of pearl millet and groundnut, caused an approximate 50% crop destruction. Again on the 9<sup>th</sup> February 2012, the unseasonal frost damaged crops like groundnut, the seeds of which had just started sprouting. Farmers are therefore finding it increasingly difficult to cope with uncertain monsoon behaviour which has become more frequent.

During 1996-2001, WOTR, an NGO implemented the Indo-German Watershed Development Program (IGWDP) in many parts of Maharashtra including Kumbharwadi village. In 2012, WOTR conducted a GIS based study in the village to assess the change in vegetation and cropping pattern after completion of watershed development project (WSD). Despite low rainfall in that year, diversity in crops was observed. This stimulated WOTR to probe further to understand reasons for crops diversification in the villages. We used comparative method of crop-data in village at various periods. We tabulated the crop data in three phases 1996 (Pre-WSD), 2011, and 2012.

To understand high diversification of crops in the year 2012, we adopted a survey method. In the survey, we included farmers who have shifted to cash crops, horticulture crops, fodder crops, and vegetable crops. Also included selected representative sample farmers for understanding changes in cultivation of pulses and food grains. Additionally, we conducted group discussions with village farmers to understand their experiences and perceptions on shifting cropping patterns.

## Water conservation brings in crop diversity

Kumbharwadi village is situated about 45 kms southwest of Sangmaner taluk of Ahmednagar district in Western Maharashtra. The village has 145 households, distributed in various hamlets. Although agriculture is the primary occupation in the village, a significant number of households are in dairy business; therefore the livestock rearing (cross breed cows) is the major subsidiary occupation. Kumbharwadi is located in the rain scarcity zone

(average 500mm per annum) of Maharashtra, with drought being a regular phenomenon.

Before implementation of the Indo-German Watershed Development programme in 1996, the annual cropping pattern in the village included only two main crops - pearl millet (*kharif*) and sorghum (*rabi*) - with a little of moth bean, green gram, horse gram and sugarcane for fodder. A total of 325.5 hectares was cultivated under rainfed conditions, while a substantial area (66 hectares) lay fallow. Pearl millet (168 ha) in the *kharif* season, and sorghum (149 ha) in *rabi*, were the main crops. These were grown for household consumption (food and fodder) only. Cultivation of wheat was unheard of.

Post WSD, from 2002 onwards, owing to increased water levels, farmers started cultivating cash crops, like wheat, tomato and onion. During our study we found that in 2011 the annual rainfall was near normal with good amount of rainfall being received in the first and second week of June (sowing period in *kharif*) and mid of September (sowing period in *rabi*).

Owing to good amount of rainfall, a total area of 414.75 ha was cultivated. Farmers cultivated 15 different crops. In *kharif* pearl millet (40 ha) onion, tomato and soya were taken in large areas, while in *rabi* wheat (80 ha), sorghum (60 ha), onion and tomato were the major crops. In summer, farmers grew tomato (10 ha) and forage (25 ha). Besides these, during the 3 seasons, they grew around 4 varieties of pulses and some vegetables. A couple of farmers had initiated pomegranate cultivation, too.

### Adapting to low rainfall conditions

Rainfall in 2012 (287mm) was considerably less than in 2011 (450mm). Besides, the total annual rainfall, there was a drop in the number of rainfall days - from 60 days in 2012 to 86 days in 2011, with high variations and gaps between two rainy days. In 2012, the arrival of good rainfall for sowing in *kharif* season was late, as it occurred in first week of July, and even for *rabi* season it was late i.e towards September end and October first week.

Owing to changes in rainfall pattern, the response of farmers to crop selection was also different. In spite of low rainfall received, farmers were still able to grow a number of crops. While the cultivated area was less at 318 hectares, farmers practised extensive diversification of crops across all three seasons. Around 24 types of crops were cultivated. These included coarse cereals, pulses, vegetables, fodder crops, fruit trees and even fibre (cotton and sun hemp). Sorghum was the main crop cultivated on 142 ha, almost double that of 2011.

In *kharif* 2012, because of the low rainfall and delayed monsoons the familiar pearl millet (*bajra*) was cultivated on almost twice the area as compared to 2011. Being unsure about the possibility

In spite of low rainfall received, Kumbharwadi farmers were still able to grow around 24 varieties of crops.

of growing two crops (*kharif and rabi*), farmers wanted at least an assured *kharif* crop. They wanted crops for household needs, besides income. Hence, together with bajra, they grew small amounts of moth bean, moong, soya, tomato and green peas. Farmers associate moong with the '*bevad*' (crop rotation) system, for as they quoted, "following its cultivation in the *kharif*" the *rabi* sorghum crop yield greatly increases". A couple of farmers experimented with growing cotton and sun hemp. Sun hemp was cultivated by one farmer for green manure to enhance the water holding capacity of the soil. According to him, due to lack of timely rains, it was not ready for mulching, so he grew it for seed.

In *Rabi* 2012, sorghum was cultivated only for household consumption, as a little water was available. Sorghum in 2012 would provide people with their staple food and fodder for livestock. Farmers said, "*fakt ek paus padla tari jwariche pik hamkhas, aani jar paus nahich padala tari janavarana chara hotoch*" (If there is just one rain after sowing, there will be some production of sorghum. In case the rains fail later, the production will be low, but it will provide fodder). Crop residue has a good market, too. With regard to wheat farmers shared, "*panyachi ek pali jari kami padali tari gavhache pik hatache jate* (If we miss irrigation even once, wheat production is seriously affected). Minor changes in the temperature also affect wheat production.

Farmers had greatly reduced the area under tomato and onion cultivation, replacing these with pulses and oil seeds, besides sorghum. They shared, that pigeon pea has a low water requirement, high market value and the residue is useful as fodder. Some farmers said that pigeon pea benefits from higher temperature as there are less pest attacks. Chickpea was cultivated on almost 8 hectares solely for home consumption. This also has a low water requirement. Where wheat requires 7-8 irrigations, only 1-2 is required for a relatively good chickpea yield. A few vegetable crops were introduced in small proportions, such as cabbage, lady finger and chillies, besides a little of onion and tomato. These were for home use as well as for the market.

The higher cash income from summer crops attracted a couple of progressive farmers. A few other farmers followed them. However, as onion and tomato are water intensive, the area under cultivation was minimal. Instead they grew forage and fodder (maize, carrot and sugarcane). Maize cultivation was greatly increased from 10 ha. to 23 ha. Horticulture which was completely absent in the pre-WSD period has been initiated. The area of pomegranate plantation was increased to 10 ha in 2012, despite the low rainfall. The reason given is that in addition to its high market demand, when drip irrigated, it requires less water and is also more temperature tolerant. Besides, cultivation of pomegranate is less labour intensive as compared to other crops, which is important for farmers. Mango plantation was introduced on 0.33 ha. Between the 3 farmers who have horticulture and summer agriculture, during March-May (2012) they invested Rs 80,000/- in total, to obtain water (50 tankers) for the fruiting pomegranate plantation.

Livestock population in the village is around 156 comprising of cross-bred cows, with a daily milk production of an average 500 litres per day. This summer, due to the drought conditions,

production had reduced to approximately 350 litres per day. As farmers believed that milk yield is reduced in higher temperatures, they bathed the cows more frequently to keep them cool, which helped increase milk production. To meet the green fodder needs for livestock, maize and *Kadaval* a local variety of sorghum, which requires less amount of water were cultivated. Farmers also started feeding the livestock with sugarcane and carrot stalks which they believe increases milk production.

### Biodiversity fulfils diverse needs

Household food security was given priority in view of the uncertainties in production. All the farmers who cultivated cereals, did so solely for home consumption. Of those who grew pulses like pigeon pea and moth bean, used primarily for home consumption while selling the little excess they had. The total soya bean produce was for the market, whereas all the groundnut produce was for home consumption.

Farmers who cultivated vegetables or edible cash crops in 2012, retained sufficient quantities for home consumption. While sale of sun hemp seed brought in some income, those who grew cotton on experimental basis, earned around Rs.4000/- per quintal. Thus crop diversification during this drought year ensured food and nutritional security and also brought income into the village (see Table 1).

### Conclusion

Water availability in this scarcity zone since WSD, has built the confidence of the farmers and encouraged them to 'experiment',

in judiciously using the resources to meet their diverse needs. During the drought year too, farmers reverted to the traditionally known crops. Food security and household needs (fodder) were given priority while not ignoring the income needs.

The watershed development besides increasing water availability and land productivity, contributes greatly towards enhancing the risk taking ability of farmers. The eagerness of the Kumbharwadi farmers to learn and experiment even in a drought year has shown their ability to make calculated decisions. When agro-advisories and guidance in sustainable agriculture methodologies is provided, these would contribute greatly to building farmers resilience in the face of extreme weather variations, preparing them to adapt to climate change

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Table 1: Distribution of farm produce for home consumption and market

Crop	Farmers (No.)	Area (ha.)	Total Production (Kg)	Home consumption & kept as seed (Kg)	Market (Kg)
<b>Cereals</b>					
Pearl millet	13	1.58	5800	5800	0
Sorghum	14	2.04	440	440	0
Wheat	5	0.88	400	400	0
<b>Pulses and Oil seeds</b>					
Moth bean	4	0.60	25	25	0
Moong	5	0.50	400	200	200
Soya bean	1	0.10	80	0	80
Pigeon pea	18	3.63	3370	860	2510
Groundnut	3	1.45	200(nuts)	200	0
Chickpea	5	1.09	175	175	0
<b>Cash crops and Vegetables</b>					
Cabbage	1	0.29	100	10	90
Lady Finger	4	0.10	200	5	195
Onion	11	1.83	2100	340	1760
Tomato	10	2.33	44400	100	44300
Greens peas	3	0.40	125	0	125
Chillies	9	0.90	310	60	250
Cotton	5	0.89	1280	0	1280
Sun hemp	1	0.19	400	25	375

# Evolutionary populations

## *Living gene banks in farmers' fields*

**Maryam Rahmanian, Maede Salimi,  
Khadija Razavi, Dr Reza Haghparast and  
Dr Salvatore Ceccarelli**

Rapidly increasing on-farm biodiversity is a matter of urgency in an era of climate change. Farmers often have limited access to genetic resources. Not only do they need greater access to the genetic material in research stations and gene banks, they also need to collaborate with scientists who are willing and able to draw on their respective strengths to create new knowledge together. The Evolutionary Plant Breeding programme in Iran is one example of what can be achieved when these challenges are overcome.

Access to genetic resources and genuine collaboration with scientists is lacking in most parts of the world. The Centre for Sustainable Development (CENESTA) in Iran developed a model that has given a large number of farmers access to a great amount of biodiversity in a relatively short time – Evolutionary Plant Breeding (EPB). A dynamic and inexpensive strategy, EPB quickly enhances the adaptation of farmers' crops to climate change. It builds on our experience with Participatory Plant Breeding (PPB), where farmers plant a number of different varieties of the same crop and, after several years of selection, choose a small number of varieties for multiplication and use. In EPB, farmers start planting a much larger mixture of hundreds or thousands of different varieties, and do not necessarily aim to arrive at single varieties.

### **Our ideas evolve, as do our seeds**

EPB relies on mixing as many different types of a particular crop as possible, and leaving them to cross freely between each other. Genetically, the seed which is harvested is never exactly the same as the seed which was planted. Several farmers in different regions plant and harvest a small sample of seed (4-5 kg) in the same 250 m<sup>2</sup> plot for successive years. These plant populations then evolve under different types of agronomic management and in the face of specific combinations of stress coming from diseases, insects, weeds, drought, extreme temperature and salinity. In this way, the frequency of genotypes adapted to local conditions gradually increases.

The idea of EPB is not new. As early as 1929, methods were developed for generating heterogeneous populations of barley

where locally adapted varieties were needed. In 1956, the idea was labelled as the “evolutionary plant breeding method”. Yet already in 1956 there was a strong demand for uniformity in the most important food and feed crops. This was justified by the growing use of chemical inputs, which required uniformity to give a consistent response. In addition, emerging seed companies attempted to protect their breeding programmes and associated products by promoting this uniformity. Therefore it was only in 2008 that EPB was first implemented in a formal project.

Before CENESTA launched participatory breeding projects, all the breeding programmes in Iran had excluded farmers from the most important stages of the breeding process, and the final products of these programmes were often not adopted. EPB follows a completely different approach with farmers at the centre of producing new varieties and by applying the principles of natural selection.

### **Sowing the seeds of success**

In 2008, with support from Dr Salvatore Ceccarelli, CENESTA started with EPB by providing five farmers in Kermanshah and Semnan provinces with mixtures of 1600 different types of barley supplied by the International Center for Agricultural Research in the Dry Areas (ICARDA). This mixture included a wide range of germplasm – the wild progenitor, *Hordeum spontaneum*, landraces from several countries and modern breeding material. Within such an “evolutionary” mixture, different plants cross naturally to produce new types. Each year, the types produce more seed and gradually the population becomes better and better adapted to the specific and changing circumstances of farmers.

The success of EPB spread far beyond these first five farmers. Based on the success of the barley population, the Dryland Agricultural Research Institute (DARSI) established a similar programme for bread wheat. Evolutionary populations of a variety of crops are now also grown in several other countries. Also, the Iranian farmers of the first years were so satisfied with the population's performance that they shared their mixtures of barley with other farmers in four provinces, both through CENESTA's PPB programme and informally with neighbours, friends and relatives. The populations now cover several hundred hectares and are planted in 17 provinces by about 150 farmers.

While gene banks perform an important role in the conservation of species, they freeze not only seeds but also their evolution at the time of collection.

## Living gene banks

“Thirty years ago we used to have many different varieties,” said Abdol-Reza Biglari, a farmer in Garmsar. “Most of the new varieties introduced to us were not suitable for more than one or two years. This shows that we have to return to biodiversity.” While gene banks perform an important role in the conservation of species, they freeze not only seeds but also their evolution at the time of collection. Local varieties and wild relatives must therefore also be conserved *in situ*. By combining participation and evolution in breeding programs, farmers can guide the evolution of their crops mixtures in the most desirable way for them.

The evolutionary populations can be considered as a living gene bank. Farmers (by themselves or with scientists) select the most desirable plants and use them in participatory breeding programs. For farmers who prefer to sow mixtures rather than single varieties, the evolutionary populations serve as a source of genetic resources for creating new mixtures. The importance of having secure access to such a collection of seeds became apparent in Jordan, for instance, where farmers and scientists turned to evolutionary populations once the civil war in Syria disrupted their regular source of breeding materials. Farmers become the owners of their future – with the best varieties evolving in their fields, there is less or no need to buy seeds.

## Better seeds

Nemat Salemian, a farmer in Anjirak, recalls his first encounter with EPB. “We received this wheat seed from another farmer who told us that it’s a mixture of hundreds of different varieties and that we should plant it in our worst soil. My father said that in the 80 years that he has been a farmer, he has never seen better plants, despite the very bad soil and the climatic conditions this year.”

The EPB mixtures have shown to produce higher yields and perform better in adverse conditions than their local or improved counterparts. Despite late sowing, in the first year of CENESTA’s programme, the evolutionary populations of barley out-yielded the local barley and performed almost as well as the improved barley cultivar. In the following year, the evolutionary populations of wheat yielded more than twice as much as the local varieties.

The EPB populations are also more resistant to weeds, diseases and pests. In 2011-2012, a farmer in the district of Garmsar witnessed that his evolutionary population of wheat had higher yields than the local improved variety and the evolutionary population did not need to be treated with pesticides and herbicides. This suggests that evolutionary populations could be very useful in organic agriculture and cheaper to grow.

Farmers can face some challenges with EPB. Very small plots of land may not be enough to grow their own evolutionary population. To resolve this, in a community of small farmers, the evolutionary population could rotate among them. Also, in the case of severe climatic events, only a small fraction of the population may survive – leaving too little diversity in the mixture to continue to adapt. In this case it may be necessary to supplement the mixture with new types. Nevertheless, in such circumstances the farmers growing

the evolutionary population will have more chance of harvesting some of their crops, while fields with only one variety may be entirely destroyed.

## Unexpected growth

After receiving a small amount of seed in the first year of the EPB trials, we expected farmers to continue to sow just enough to allow the population to evolve and to act as a source of locally adapted varieties. One of the most unexpected outcomes of the evolutionary population trials was that some farmers decided to sow *all* the seed they had harvested, multiplying and cultivating the seed as their main crop.

## The question of the consumer

Many people are concerned if the final product from EPB mixtures is of a suitable quality to use and sell. In Iran, with wheat and barley, there has been no reason for worry. A protein analysis of the barley varieties, which are mostly used as an animal feed in Iran, showed that the evolutionary population had more protein than the local improved variety. For wheat, farmers and bakers have been pleased with the bread they made from the evolutionary populations.

The suitability of evolutionary populations as the main crop depends on the use of the crop and the cultural preferences of farmers and consumers. Even when the crop does not lend itself to being consumed as a mixture (like with many vegetable varieties), the evolutionary populations still serve as living gene banks for farmers to source individual varieties.

## Where next?

The evolutionary populations of wheat and barley continue to be spread throughout Iran, both through farmer-to-farmer exchanges and through exchanges organised through DARSİ, the Department of Agriculture of Fars Province, and CENESTA. The main challenge is to keep up with the fast spread of these seeds, to track the spread and the outcomes and to support farmers. The first national workshop on EPB was organised in Shiraz in January 2013 where farmers from several provinces shared their experiences. Regular local, regional and national workshops and field visits are needed to strengthen farmers’ knowledge about how to use these populations. At the same time, we try to develop awareness of the potential impacts of different seed laws and policies on farmers’ rights to save, exchange, develop and sustainably use their seeds.

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# Biodiverse farms are sustainable farms

I very well remember my father, who could produce food enough to feed his 94 member family from 30 acres of rainfed farm and 5 acre irrigated garden. He used to grow 5 varieties of micro millets, 3 varieties of oil seeds, 5 varieties of pulses, 12 varieties of vegetables and 6 varieties of fruits. He had a shallow and vast water pond in the garden where we used to get 4 varieties of fish, 2 varieties of crabs and a variety of prawns. Many times we used to catch plenty of fish and also crabs from a perennial stream beside our garden. We had 600 pongamia trees shedding 3 tons pongamia seeds apart from 800 cubic meter of dry leaves and 200 cubic meters of dry flowers. We had 400 animals like bullocks, cows, sheep, goats, buffaloes and even donkeys which provided manure and served other needs. All the above crops were for home use. The only crop for sale was tobacco on 4 acres that was enough to meet the costs of very few needs for the family.

Now after 60 years, we, his 12 sons, 48 grand sons living in 45 families do not have so many animals or crop diversity. We purchase BPL card rice at Rs. 10.00 per kg as beneficiaries of food security act. Most of us are doing agriculture though it is not economically viable as compared to a security man's job or a real estate agent. However, may be owing to my grandmother's blessings or her ambitions made me to become a self reliant farmer and lead a comfortable and an honourable life.

At our farm, we grow 3 types of micro millets, 2 types of oil seeds, 3 types of pulses, 10 varieties of vegetables, 8 kinds of fruits, most of the spices, coffee and 60 coconut trees. We have 7 cattles, 8 goats and 10 chicken and 2 kinds of fishes in our water tank apart from 150 green fodder bushes and around 750 trees including 200 silver oaks and 100 teak trees. We grow food for 20 persons, 3 meals a day. From the trees, we sell 6000 to 7500 coconuts, 2 tons of sapota, 600 kgs of banana, 60 kgs papaya, 1000 kg avocado, 2 tons of vegetables each year. At our farm we have 30 different crops, 20 varieties of trees. We produce compost and vermicompost in plenty. Most of the seeds and seedlings are produced in our own garden.

Recently, I had been to several villages in Tiptur taluk, in Tumkur district. Most of the farmers have only coconut cultivation. They have not received even 40% of their usual 500 mm rainfall during the past 14 years. Coconut yields are only 10 to 15% of their potential. More number of bore wells are being drilled which are also drying up due to receding under ground water table level. Farmers are in deep debts.

Similarly, I am familiar with Kustagi taluk in Raichur district. Here, farmers went for Bhaguva variety of pomegranate. They faced worst results in 3 years. Now farmers and even doctors, advocates, IT professionals and real estate people are jumping into pomegranate cultivation as monocrop. I pray for them to be saved from disasters like in Kustagi.

I know an IT engineer from Kolar district who cultivated hybrid tomato. Due to glut in the market, he incurred huge loss and had to auction his ancestral property. I can give you 20 such examples. Let people cultivate many varieties of crops and adopt integrated farming systems with trees, animals and crop cultivation for eco friendly, sustainable and peaceful life.

*Shri Narayana Reddy is a legendary organic farmer and is one of the most sought after resource persons on ecological agriculture.*

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## State of India's Livelihoods Report 2013

ACCESS, 2014, SAGE Publications Pvt. Ltd., 168 p., £47.50, ISBN: 9788132116622

The State of India's Livelihoods Report (SOIL Report) is an annual publication that aims to document recent trends and issues in the sphere of livelihoods promotion of the poor. A one-of-its-kind report, it is the only document that aggregates the experiences and challenges of the livelihoods sector, analyses case studies and reports the progress of both government and privately run programmes.

This volume of the SOIL Report provides an annual policy update in the context of livelihoods promotion of poor. It reviews the existing primary research on the agricultural sector to highlight key trends, identify the main livelihood gaps, and give an overview of key livelihood interventions that seek to address these gaps. It covers the current state of skills policy in India and the evidence that we have so far, of its impact and effectiveness, the current economic scene and employment prospects and industry demand in 2013. It also explores the links to livelihood outcomes and behaviour from a social protection perspective, especially for the poor and the workers within the informal sector. As a new feature, the SOIL Report 2013 also carries a Statistical Atlas of Livelihoods, which illustrates some of the major indicators of the status of livelihood using disaggregated data at the state level.

## India Rural Development Report 2012 -13

IDFC Foundation, 2013, Orient Blackswan Pvt Ltd, ISBN 978 81 250 5392 7

The first edition of the *India Rural Development Report* prepared by the IDFC Rural Development Network, is presented in two parts – the first is a review of the state of rural development while the second is an in-depth study of a particular area of focus for the year. This year's focus is on MGNREGA. The recurring themes that underpin this report are sustainability, inclusion and governance.



Another underlying question throughout the Report is why, in six decades, have results fallen short in public delivery of services and why have some states done better than others? Lack of accountability is clearly a key reason. Social audits, increased use of performance-based incentives, and conditional cash transfers would significantly improve outcomes. Administrative capacity too must be strengthened and institutional overlap and fragmentation of responsibilities streamlined for effective delivery. Fundamental to all change lies the question of the political economy, of the motivation of *sarpanchs* to release the stranglehold of caste and class inequalities and for them and other rural development agencies to see past more myopic short-term gain.

## Alternative Paths to Food Security

Norman Uphoff, Jan 2014; 10.1093/oxfordhb, ISBN: 9780195397772.013.012

This chapter is from the forthcoming *Oxford Handbook of Food, Politics, and Society* edited by Ronald Herring. This chapter examines an agroecological approach to agricultural development called the System of Rice Intensification (SRI). SRI can boost paddy yields by 50 to 100 percent using less inputs of seed, water, fertilizer, and labor. The article first considers the opportunities offered by SRI methods compared to current agricultural practices. It then looks at the effects of agro ecological management with other crops and the dynamics of an agro ecological innovation. The concluding section discusses broader implications for politics and society.

## Custodian farmers of agricultural biodiversity Selected profiles from South and South East Asia

Proceedings of the workshop on custodian farmers of agricultural biodiversity, *11-12 February 2013*, New Delhi, India

Sthapit, B.; Lamers, H.; Rao, R. (eds.), *2013*, Bioversity International, Rome (Italy), ISBN-13: 978-92-9043-933-2

The publication presents the proceedings of the Workshop on Custodian Farmers of Agricultural Biodiversity, 11-12 February 2013, New Delhi, India. About 20 farmers from five countries (India, Indonesia, Malaysia, Nepal and Thailand) participated in the workshop and shared their experience and motivations. The workshop also debated on the challenges faced by such farmers and discussed the ways to strengthen and/or support them so that they continue to use, conserve and promote agricultural biodiversity. The meeting also produced recommendations to policy makers to support on-farm conservation efforts.



The Future We Want: Biodiversity and Ecosystems – Driving Sustainable Development. United Nations Development Programme Biodiversity and Ecosystems Global Framework 2012-2020.

UNDP, *2012*, Roots Advertising Services Pvt Ltd, New Delhi, India

Human survival and wellbeing depend upon biodiversity and healthy ecosystems, and the goods and services they provide. Yet, in recent decades, the world has experienced unprecedented biodiversity loss and ecosystem degradation, undermining the very foundations of life on Earth.

The loss of ecosystems and biodiversity is a challenge for us all, but it is a particular challenge for the world's poor. Many of the 1.2 billion people living in severe poverty, on less than US\$ 1 a day, depend directly on nature for food, clean water, fuel, medicine, shelter, and reduced vulnerability to climate change and natural disasters. Dependent on ecosystem goods and services for their livelihoods and subsistence, the poor stand to suffer disproportionately from potentially catastrophic changes to fragile ecosystems in coming decades. Ultimately, however, all societies stand to lose.

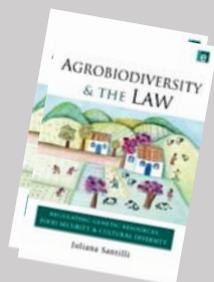
Despite concerted efforts by the international community and by national governments, biodiversity loss and degradation of ecosystems continue. To reverse this trend, there is a need to intensify efforts and find new ways of financing biodiversity and ecosystem management. This UNDP Biodiversity and Ecosystems Global Framework is a response to the need to scale up action and make it more effective. In addition, the framework represents a shift in focus towards the positive opportunities provided by biodiversity and natural ecosystems, in terms of harnessing their potential for sustainable development.



Agrobiodiversity and the Law: Regulating Genetic Resources, Food Security and Cultural Diversity

Juliana Santilli, *2011*, Routledge, 348 p., £65.00, ISBN: 978-1-84971-372-6

This book analyzes the impact of the legal system on agrobiodiversity (or agricultural biodiversity) – the diversity of agricultural species, varieties, and ecosystems. Using an interdisciplinary approach, it takes up the emerging concept of agrobiodiversity and its relationship with food security, nutrition, health, environmental sustainability, and climate change. It assesses the impacts on agrobiodiversity of key legal instruments, including seeds laws, the International Convention for the Protection of New Varieties of Plants, plant breeders' rights, the Convention on Biological Diversity (regarding specifically its impact on agrobiodiversity), and the International Treaty on Plant Genetic Resources for Food and Agriculture. It also reviews the options for the implementation of these instruments at the national level in several countries. It discusses the interfaces between the free software movement, the 'commons' movement, and seeds, as well as the legal instruments to protect cultural heritage and their application to safeguard agrobiodiversity-rich systems. Finally, it analyzes the role of protected areas and the possibility of using geographical indications to enhance the value of agrobiodiversity products and processes.





Annual seed festivals have helped in conserving paddy varieties

Photo: Author

# Seed festivals promote seed conservation

## *The Nel Thiruvizha in Adirengam*

**Sreedevi Lakshmi Kutty**

There is renewed interest in conserving seeds and growing traditional paddy varieties among the farmers in South India. The annual seed festivals have played a significant role in bringing about this change. This initiative by Save our Rice Campaign has resulted in improving agro-diversity of paddy, re-introducing healthy red rice into the diet and also rebuilding the germplasm of climate resilient paddy seeds.

**M**ay 25<sup>th</sup>, 2013 was an occasion for celebration for farmers in Tamil Nadu. It was an occasion for celebrating biodiversity in paddy. More than 3000 paddy farmers from all the 32 districts of Tamil Nadu joined the two day paddy seed festival in Adirengam village in Tiruvarur district in Tamil Nadu. Besides exchanging information and experiences, farmers

also shared 61 traditional varieties of paddy, largely brought from Tamil Nadu, Kerala and Karnataka. Farmers in the festival share seeds in good faith that they will cultivate the seeds organically, share the seeds freely and return double the quantity during the next festival.

### **Genesis of Nel Thiruvizha**

The seed festival which has become a prominent event for many paddy farmers in Tamil Nadu, had its humble origins in 2006, two years into the Save Our Rice (SOR) campaign in India.

The CREATE team, an NGO, that runs the SOR campaign in Tamil Nadu, began its seed conservation work under the aegis of Mr. Jayaraman, the Tamil Nadu State Coordinator for the campaign. Initially, the team just began collecting traditional/indigenous paddy seeds from various groups and growing them in their training centre at Adirengam village. They began with three varieties of paddy seeds including the famous *Jeeraka Samba*. The team had no idea about purification of seeds or the selection process. Seed multiplication and conservation was the focus.

In 2006, the idea of a seed festival originated to bring together interested paddy farmers. The first *Nel Thiruvizha* (paddy festival in Tamil) was born. Organised during the month of May, the first gathering in 2006 saw 425 farmers who chose from sixteen traditional paddy varieties. Two kilograms of paddy seeds were distributed to all the farmers.

As Mr. Ponnambalam, Trustee, CREATE says, “The seed festival was not the result of a long term plan or strategy. The festival was a result of the interest of the SOR team to involve the farmers in the village and surrounding villages in the indigenous paddy cultivation effort; then it took a life of its own, growing bigger each year. The late Dr. Nammalvar, the legendary organic farmer in Tamil Nadu began talking about it at every meeting and slowly the word spread.” The festival and seed conservation work grew organically with Jayaraman taking the lead with guidance from partners of the campaign and many other seed savers.

Further impetus for the festival came with coverage in the Tamil media. The story of *Aruvatham Kuruvai* (a paddy variety which matures in 60 days, as its name suggests), the seeds of which were procured by SOR from a farmer in one of the meetings and multiplied over years, made a cover story by Pasumai Vikatan, a Tamil magazine on agrarian issues. This brought considerable attention to the existence and need for revival of traditional paddy seeds. It aroused the interest of many farmers who read the story. The interest on traditional varieties grew. Today, around 2000-3000 farmers cultivate *Aruvatham Kuruvai* variety. Similarly, *Kattuyanam* and *Mappilai Chamba* are two other varieties which have gained immense popularity through the campaign.

### Growing seed diversity

Tremendous efforts are required to multiply and conserve seeds. Seed festival provides an opportunity for farmers to share and multiply traditional varieties. Though, initially only some farmers who took seeds from the festival cultivated, now, most farmers collect the seeds and plant them. Every year, more number of farmers return double the amount of seeds taken from the seed festival.

Among the 61 varieties being distributed, some are more popular than others. According to an analysis done by SOR, it was observed that 19 varieties are most popular, which include *Mappilai Sambha*, *Jeeraka Sambha*, *kattuyanam*, *Kattu ponnai*, *Aruvadam Kuruvai* and others. Farmers have reported good yields for the traditional varieties they have grown and have observed high resilience during adverse climatic conditions.

Sometimes SOR made extra efforts to multiply seeds. For instance, in the last two years, when the Kaveri belt in Tamil Nadu was reeling under drought, the SOR team had to lease-in land with

Starting from a little over 400 farmers in 2006, the number of farmers participating in the festival has increased to more than 3000.

Table 1: Number of farmers who procured seeds during the seed festivals

Year	Varieties	Total Farmers
2005-2006	16	425
2006-2007	26	1116
2007-2008	28	1629
2008-2009	47	2016
2009-2010	51	2320
2010-2011	53	2860
2011-2012(Nov 2011)	61	2900 +
2013	63	3000+

Source: PADDY, July 2103

irrigation facility to produce the required quantity of paddy seeds for the festival.

### Growing popularity

The festival has gained tremendous popularity among farmers with the 2013 festival witnessing farmers coming from Kanyakumari district in the south to the Tiruvallur district at the northern tip of the state. Starting from a little over 400 farmers in 2006, the number of farmers participating in the festival has increased to more than 3000.

With growing popularity, the support for the festival has also been pouring from numerous organizations and individuals. Many organizations and individuals have been supporting the festival and the two day event has seen many illustrious people come to address the farmers. Many banks including NABARD have been supporting the festival since many years. Presently, the government is also showing interest. Last year, the agriculture department took the responsibility of sending invitations to farmers across the districts of Tamil Nadu which resulted in farmers being represented from Kanyakumari to Thiruvallur.

The support from farmers is also worth mentioning in organizing this event. Though initially farmers did not bear the costs, gradually they started paying an entry fee to cover some costs. The entry fee which was Rs 10, has been increased to Rs 50 and to Rs.100 last year. In spite of the fee, there has been tremendous response to the festival. Now the festival is so much in demand that in the last two

### Save Our Rice Campaign

The Save Our Rice campaign was initiated in India by Thanal (Kerala) with CREATE (Tamil Nadu), Sahaja Samruddha (Karnataka) and Living Farms (Orissa). Subsequently the campaign also moved to West Bengal in 2009 with a new formation called the Save Our Rice, West Bengal. The campaign is founded on five objectives: (1) conserving rice ecosystems (2) sustaining rice culture and diversity (3) protecting traditional wisdom (4) preventing GMOs and toxics and (5) ensuring safe and nutritious food. The groups have been working in their respective states on all these areas.

years small seed festivals were held in other districts to reach farmers who could not attend the seed festival at Adirengam.

In addition to the thousands of farmers who come directly, many more thousands are involved in organic paddy cultivation, by further sharing of seeds. In many cases, a farmer from a far away district comes on behalf of more than one person.

## Outcomes

The farmers who are cultivating traditional paddy through organic means are finding a distinct economic advantage as well. “ *While conventional farmers spend around 15,000 – 20,000 rupees on inputs and reap around 32 bags of paddy (each bag containing 60 kilos) these farmers are on an average spending 5,000 as input costs and reaping around 24 bags of paddy. In addition, their paddy fetches 1,200 rupees per bag as against the Rs 800 that conventional paddy fetches in the open market*” says Jayaraman. However, the sad reality is that the Government does not procure traditional paddy and procures only high yielding varieties or hybrids.

Many families of small farmers earn their livelihood by processing traditional red rice, creating value added products and selling it. Further, many people in Tamil Nadu across different cross sections of the society have started talking about traditional red rice and its benefits. Anecdotal observation is that now supermarkets in many or most towns are stocking red rice, a marked change from the times when one would find only white rice. Also, another interesting outcome is that all the paddy farmers who are growing

traditional paddy varieties, the seeds of which they had collected during the festivals, are now using these varieties for home consumption too. They also preserve some quantity for special occasions like weddings and festivals. Earlier, most of these paddy farmers sold the paddy they grew and bought white rice from the market for household consumption.

According to Usha, the National Coordinator for the SOR campaign, “*The interest shown by farmers to grow traditional paddy is encouraging. It shows that farmers still value their traditional agro biodiversity and given a choice they will adopt it. The experience of these farmers also shows that these varieties have a great potential for good yield, quality in terms of nutrition and climate resilience*’.

The traditional seed festival has achieved the very important purpose of popularizing traditional paddy among many farmers all over Tamil Nadu. There is a clear revival of traditional paddy cultivation and renewed interest in conserving seeds and growing them. This is a great step in improving agro-diversity of paddy, re-introducing healthy red rice into the diet and also rebuilding the germ plasm of climate resilient paddy seeds.

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**Sreedevi Lakshmi Kutty** is a consultant with the Save Our Rice campaign and works and writes on issues related to safe food and sustainable agriculture. She can be contacted at [slakshmikutty@rocketmail.com](mailto:slakshmikutty@rocketmail.com)

## PHOTO COMPETITION

*Visualizing the potential and contributions of family farmers worldwide*



The International Year of Family Farming (IYFF) highlights the decisive role of family farming in the sustainable production of 80% of the world's food and in the conservation of ecosystems and biodiversity. The IYFF-2014 photo competition collects visual expressions to build stronger recognition and support for family farming, and encourage broad participation in the IYFF.

The IYFF-2014 photo competition is calling for photos that represent the motto: Family Farming: Feeding the world, caring for the earth.

Entries must visualize the strength, potential and challenges of sustainable, multifunctional family farmers worldwide, in all their diversity and contexts.

A jury consisting of Angèle Etoundi, Bernward Geier, S Jayaraj, Tomás Munita, Deo Sumaj and Jun Virola will choose the winning photos. The deadline for entries is 1 May 2014, but we appreciate receiving photos earlier. The winning photos will be announced in October 2014.

The photo competition is an initiative of the AgriCultures Network and the World Rural Forum, in close collaboration with the Asian Farmers Association, CLOC/La Via Campesina and the More and Better Network.

Read more and submit your photo at [www.agriculturesnetwork.org/photocompetition](http://www.agriculturesnetwork.org/photocompetition)

