

On farm Conservation of Indigenous Seeds

The Revitalizing Rainfed Agriculture Network (RRAN) is a growing network of civil society organizations, research institutions, policy makers, donors and individuals engaged in evolving a differentiated agricultural policy with enhanced public investments and support system for rainfed areas in India. The Comprehensive Pilots (CPs) are part of the RRA Network's action research programme that seeks to establish evidence and experience on the ground, in support of the various propositions that the Network has developed. In order to offer support for CPs a set of organizations have been identified as Nodes on specific identified themes such as – seeds, soils, water, millets, fisheries, livestock, credit, markets and institutions.

The Centre for Indian Knowledge Systems (CIKS) has been identified and functioning as the nodal anchor for the theme of seeds. A series of booklets is being published on various technical and institutional aspects of seed systems to build the capacity of the CPs as well as various field groups who are involved in the efforts to build community managed seed systems.

This book details the principles of on farm conservation of indigenous seeds. Experiences about on farm conservation efforts from the field has been presented. It also has a compilation of organisations involved in on farm conservation efforts giving a brief outline about their work and the ways in which farmers are benefitted by such efforts.



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Revitalising Rainfed Agriculture Network
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PREFACE

The Revitalizing Rainfed Agriculture Network (RRAN) is a growing network of civil society organizations, research institutions, policy makers, donors and individuals engaged in evolving a differentiated agricultural policy with enhanced public investments and support system for rainfed areas in India. Based on the vast experience on the ground and analysis of issues, RRA Network is evolving specific propositions on various aspects of rainfed agriculture such as seeds, soils, water, crop systems, millets, livestock, fisheries, credit, markets and institutions. The Comprehensive Pilots (CPs) are part of the RRA Network's action research programme that seeks to establish evidence and experience on the ground, in support of the various propositions that the Network has developed. In order to offer support for CPs a set of organizations have been identified as Nodes on specific identified themes such as – seeds, soils, water, millets, fisheries, livestock, credit, markets and institutions.

The Centre for Indian Knowledge Systems (CIKS) has been identified and functioning as the nodal anchor for the theme of seeds. The CPs started functioning in the year 2012 and in June 2012 the seed node convened a meeting of representatives of CPs for an inception workshop in Chennai. During this workshop the CPs shared their proposals and plans of work as well as their thinking about the work that they plan to undertake in the area of seeds. Presentations were made during the workshop on how to undertake a situation analysis with respect to seeds, the elements of designing a robust seed system for rainfed areas and also about undertaking a planning exercise through which each CP can proceed towards the establishment of a robust community managed seed system in its area of work. A part of the workshop was to identify the specific needs expressed by each of the CPs in terms of the support and help they would need in the area of seeds. A beginning was made in terms of the capacity building exercise through a series of presentations.

Beginning from the early part of the year 2012 Dr. G. Venkat Raman of the Seed node had started making a series of visits to various CPs. During the visits he provided help and assistance to the CPs for performing situation analysis, evolving a plan for a robust seed system for the area undertaking capacity building exercises and also trying to create linkages between the groups and scientists and institutions who could provide technical support. During this process he also identified various needs in the form of topics on which training and capacity building was required.

Subsequently, on two different occasions when the seed node team met the CPs – in Bagli in Madhya Pradesh in November 2012 and in Tiptur in Karnataka in December 2012 there were opportunities to review the progress of each CP as well as provide technical inputs and training. Earlier this year, towards the end of July 2013 a workshop was held by the seed node in the CIKS Technology Resource Centre in the Kancheepuram district of Tamil Nadu. In this workshop a series of technical trainings were provided on various aspects of seeds. The training was not only in the

form of lectures and presentations but also included field work, experiments, visits to government and private seed farms and seed production centres as well as meetings with the officials of the Directorate of Agriculture and Seed Certification departments. During these meetings drafts of some of the technical training modules that were prepared were circulated and comments and suggestions were sought from the CPs. Based on these efforts and also building upon discussions that took place during the visits to CPs a set of topics had been identified to produce training modules. We expect this process to be dynamic and interactive so that changes can be made based on the suggestions received from the various user groups. A series of reports and books that have been circulated and discussed as drafts and presentations are now being brought out as publications.

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Chennai, December 2013

About this Book

This book details the principles of on farm conservation of indigenous seeds. Experiences about on farm conservation efforts from the field has been presented. It also has a compilation of organisations involved in on farm conservation efforts giving a brief outline about their work and the ways in which farmers are benefitted by such efforts.

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INTRODUCTION

There are two types of seed conservation efforts possible. One is the *ex situ* conservation and the other is the *in situ* conservation. *Ex situ* method of seed conservation is a formal method where seeds are preserved in gene banks in cold storage. Conservation is done outside the natural habitat of plants. *In situ* conservation maintains plants and crops in their natural habitats. This allows the evolutionary process that shaped their genetic diversity and adaptability to continue and develop. This is extremely important for areas where traditional farming is still prevalent and also for crops that are often enriched by gene exchange with wild relatives. In the context of agriculture *in situ* conservation is basically on farm conservation of cultivated crops. This type of on farm conservation of genetic resources is successfully carried out across the world by decentralized Community Seed Banks (CSBs).

Community seed banks are mostly owned and managed by peoples organizations or farmers groups. It is decentralized and free from the control of seed corporations. The local groups get the long term and short term benefits. Community seed banks are at least partly supported by NGOs

as they can provide or augment technical and logistic support. In addition to this they can also help source funds to sustain the enterprise.

The collections in the community seed banks should be dominated by indigenous traditional varieties and wild relatives. If and where possible, farmer bred lines should also form part of this collection. Sufficient facilities must be available for seeds to be stored and seeds must be available to any interested member on agreed terms. Active sharing and exchange policy between other groups should also be worked out. It is very important to obtain the cooperation and involvement of the immediate community. Members of the CSB should be well trained in the principles and methodology of genetic conservation, in basic characterization and documentation work based on criteria relevant to farmers needs. Simple on farm research should be encouraged to help evaluate the performance of promising cultivars. This helps to build the technical capacity of those in charge of the seed bank and also increase their interest and motivation. Seed collected should be properly documented before they are made available to users. If possible, it should also serve as training centres for participatory plant breeding.



COMPARISON OF A FORMAL AND A COMMUNITY SEED BANK

Gene Bank	Community Seed Bank (CSB)
It is the conventional seed bank.	It is the farmers' seed bank.
This is the formal system for seed conservation	This is the informal system which is an integrated one.
Seeds are stored under cold conditions.	Seeds are conserved under natural conditions as part of cropping patterns.
There is no room for co-evolution in this system	There is ample scope for co-evolution and it is continuous.
Expensive high technology methods are used for maintenance of gene banks.	Technologies used are simple and farmer friendly and it is maintained with limited resources.
The main emphasis is on genes that may be useful in breeding.	The emphasis is more on community seed supply which is an important component of sustainable agriculture.
The focus is on exploiting for higher yields.	The focus is mainly on integration of many individual cultivars.
Market needs are given priority while breeding.	Subsistence, food security and food priority is given more importance.
It is a capital incentive and highly centralized in approach.	It is need based and decentralized. It is maintained at a low cost.
The main beneficiaries are breeders, biotechnologists and researchers.	The main beneficiaries are farmers, peoples' organization, farmers' organization, farmers' association and the community.
A very large number of varieties can be collected in one or a few locations, safety can be ensured for seed survival and viability by using high cost technologies such as storage in liquid nitrogen temperatures, very detailed studies and characterization can be carried out for a documentation of the varieties to protect indigenous varieties and prevent biopiracy, interaction possible with plant breeders etc.	The number of varieties protected at each location is likely to be limited, risk of loss of varieties due to vagaries of weather or other natural disasters, limited amount of documentation and characterization possible, poor interface with plant breeders or the formal research system.
High cost, usually the interface with farmers is rather poor or restricted.	Excellent interface with the farmers, documentation of characteristics that may be considered important for the farming community (such as nutritional or therapeutic properties, fodder value, use in rituals, taste etc.).

COMPONENTS OF A COMMUNITY BASED CONSERVATION PROGRAMME

The priorities of communities are important in all CSB programmes. The various stages of a CSB programme are

- Survey and planning
- Collection and documentation
- Seed evaluation
- Multiplication and utilization
- Seed testing, planting out for multiplication (this includes testing for seed viability, germination techniques, seed dormancy and keeping accessions pure).
- Seed treatment, processing and storage

In a farmer run CSB some of these steps overlap.

Survey and Planning

Collection needs to be carefully planned and one needs to make sure that collection is done at the right places and also during appropriate seasons. One needs to have a proper knowledge of the distribution of the crop diversity in the region. The cropping pattern, the crop calendar and any agricultural changes that have occurred over the years need to be understood. The cultural relationship that the community has with the crops needs to be respected and the NGO has to be sensitive towards that. A survey of the whole region should be done which would give a fairly good picture of varieties that are grown there and those which are in the process of becoming extinct. Diversity will be relatively low in places where High Yielding Varieties (HYVs) and hybrids have spread. Remote villages should be targeted since the possibility of getting traditional varieties there are very high. Priority should be given to those areas which are facing rapid ecological degradation because of development and deforestation. Backyards and kitchen gardens should be given special focus since farmers would be growing threatened and rare species for their personal use there.

Collection and Documentation

Where to Collect?

Seeds should be collected from farmers and regions where indigenous cultivation practices are still in vogue. Areas where monocultures have not spread should be targeted since more genetic diversity is usually found there.

Criteria for Collection

This mainly depends on the farmers needs for seeds of different crops. Specific needs like high yield, disease and pest resistance, medicinal and fodder value, flavour, palatability, drought and flood resistance should be kept in mind. As a rule one should collect varieties which are distinctly different. Also, one should collect from places where there is a marked difference in the elevation and where a natural hindrance is found. One should also make effort to collect from every eco region within the field and also where local people are ethnically and culturally different.

When to Collect?

The ideal time to collect is soon after harvest. Excellent opportunities would be available on market days for seed collection. Small quantities of seeds are traditionally sold by farmers in weekly markets. While collecting from the field the best time for seed collection is when the dew has evaporated from the plants.

How to Collect?

It is important to use the farmers networks for seed collection since they know who in the region grows traditional varieties. Seed collection can be done in the field when crops are mature. Alternately it can also be done after harvest from farmers houses.

How much to Collect?

One should collect as much as a farmer can spare. Enough seeds should be collected so that they can

be stored in two different locations. More seeds should be collected from cross pollinated crops and medicinal plants. With respect to trees that require grafting, at least 2 – 3 cuttings should be collected from each randomly selected tree.

Collection Equipment and Documentation

Simple containers to collect and store seeds should form part of the kit. Information about plant varieties can be obtained through meetings and focus group discussions. Moisture proof labels should be put on seed bags, jars or boxes preferably on both sides. A separate label or data sheet in a file should be maintained. The label should have common and vernacular names, locality and date of collection, collector's name and collection number and donors name and address. Farmers from whom the varieties are collected should also be interviewed wherever possible and various characteristics of the variety should be documented. A detailed questionnaire can also be prepared at the beginning of the exercise to get specific details about varieties which can provide a check list.

Type of Information to be Maintained

Seed Container Information (labels)

1. One outside the seed container
2. One inside the seed container

Label Information

1. Local name(s)
2. Scientific name
3. Farmer's/donor's name and address
4. Collector's name and address
5. Collection location (local description)
6. Date of collection
7. Date of storage
8. Location of further documentation

File Card Information

(Two copies to be filed separately in case of loss)

1. Copy of label information
2. Detailed description of sample location

3. Storage locations and status
4. Germination test and grow out records
5. Unusual seed/plant characteristics.

Seed Evaluation

The seed varieties should be characterized and evaluated based on the farmers requirements. The following criteria should be kept in mind.

- Palatability and cooking time
- Agronomical criteria which includes the ability to compete with weeds, duration of the crop, pest and disease resistance etc.
- Morphological criteria like height of the plant, tillering potential, grain and fodder yield
- Storage quality of seeds
- Opportunities that are available for processing
- Special cultural values like use in ceremonies etc.
- Adaptability to the environment.

Seed Multiplication and Utilization

In situ multiplication of these seeds is the next essential step to increase the number of seeds available for conservation and utilisation. Seed varieties must be increased in farmers fields using acceptable agronomic practices. During regeneration and multiplication of these varieties the site and soil type used should resemble that of the original site. Optimum sowing date, exact seed rate and appropriate spacing should be chosen and right cultural practices must be followed. Harvesting should be carried out at the right time of maturity and special care should be taken to avoid contamination of seeds during threshing and drying.

Details of seed production techniques for various crops, storage mechanisms, seed treatment techniques and seed certification procedures can be found in the other publications brought out by the seed node which are available on the RRA website (<http://www.rainfedindia.org/>). They have also been listed in the references section of this book.

ORGANIC FARMING AND INDIGENOUS SEED CONSERVATION EXPERIENCES FROM TAMIL NADU, INDIA

Centre for Indian Knowledge Systems is an organization devoted to exploring the contemporary relevance and applications of traditional Indian knowledge systems. Headquartered in Chennai, South India, CIKS works with 20,000 farming families spread over five districts in the state of Tamil Nadu. The Centre's focus areas are biodiversity conservation, organic agriculture and *Vrkshayurveda* (The ancient Indian plant science).

Background

There are many reasons why indigenous varieties are still conserved in spite of all odds. High yielding varieties are not suited to all farming conditions and there are situations where indigenous varieties are better suited. For example, in the alkaline soils of Tamil Nadu, an indigenous variety of paddy called *Kalarpalai* alone can be cultivated. Varieties like *Vadan Samba* are highly drought resistant. Most indigenous varieties are resistant to pests and they are less vulnerable and more hardy. Indigenous varieties require less farm inputs (such as chemical fertilisers and pesticides) and they yield straw which is valuable to farmers as cattle feed as well as roofing material. Many varieties fulfill specific nutritional and other dietary needs. Besides this, indigenous varieties provide the basic genetic material for developing any other variety in future.

Farmers Seed Banks for Indigenous Paddy Conservation

Though indigenous rice varieties are still preserved by a few farmers they are getting depleted at an alarming rate. It is becoming increasingly clear that to maintain biodiversity in farmers' fields an alternative system of seed supply has to be created. Although farmers greatly feel the need to regrow some of the traditional varieties they have lost, one has to be able to provide them with sufficient quantities of local seed varieties in order to fulfill this need. The community has to be convinced or has to feel the need to bring back

lost biodiversity and any effort should be aimed at the community level. Several groups across the country are trying to preserve these varieties through on farm conservation. CIKS has been involved in setting up farmer's seed banks in villages in different parts of Tamil Nadu. This section presents the Centre's experiences.

The Setting up of a Seed Bank in the Valayampattu Village, Chengam Taluk, Tiruvannamalai District

In the year 1993 - 94, CIKS was working with farmers in the Valayampattu village on the use of plant products for pest control. It was involved in participatory experimentation in farmers' fields. The programme was quite successful and farmers realised the benefits of using plant products as alternatives to pesticides. During the farmers meetings, several farmers felt that it would be beneficial for them if they had access to some of the indigenous varieties which they had been cultivating before the Green Revolution era. It was around the year 1995 that CIKS came into contact with Navdanya. Navdanya is an all India effort by several voluntary organisations across the country to conserve indigenous varieties on farm. This movement is spearheaded by the well-known environmentalist Dr. Vandana Shiva. With the help and support of Navdanya, CIKS launched its on farm conservation activity in the year 1995 in Valayampattu.

On farm Conservation Activity Expands

The Centre's initial efforts in on farm conservation was in collaboration with NGOs in different parts of Tamil Nadu. In Valayampattu village, it actively collaborated with the 'Save the Eastern Ghats' Movement for setting up the community seed bank. After a year CIKS expanded this programme to Tiruporur in Kanchipuram district with the help of the *Grammiya Munnatra Sangam* (GMS), to Nedumbaram village at Tiruttani with the assistance of the Centre for Development of Disadvantaged Peoples (CDDP), to the

Mosavadi village, Vandavasi, with the help of the VISA Peace Centre and to the Manampathy village, Uthiramerur with the help of the Women's Welfare Development Association (WWDA). In the year 1998, it started its work in the Kattankalathur block of Kanchipuram district (the then Chengalpattu district) in a major way with the support of the Council for Advancement of People's Action and Rural Technology (CAPART). Subsequently, this work has expanded to the districts of Kanchipuram, Tiruvannamalai and Nagapattinam. CIKS has also been supported in this effort by different funding agencies like the IDRC, UNDP and Ford Foundation.

Survey and Collection of Indigenous Varieties

The Centre's initial effort was to get access to the indigenous varieties. In every area of its work detailed survey was taken up by CIKS field workers to find out the indigenous varieties of paddy already available in that area. It found that at least in some villages some farmers had the tradition of conserving these varieties for self consumption. CIKS collected / purchased the seeds from these seed savers. Besides this gazetteers, district reports, travellers accounts, gave information as to what were the traditional varieties that were grown in these areas before the hybrids came in. An attempt was made to get these varieties back to the farmers from other parts of the taluka / district or other parts of Tamil Nadu if these varieties were still available.

Seed Collection through Biodiversity Contests, Bija Yatra and Participation in Fairs and Festivals

Efforts were also made to collect indigenous seeds by involving youth particularly the students by announcing contests (Essay & Oratorical Competitions) in this subject. By means of this CIKS was able to not only collect information about the varieties but also to create awareness about the importance of conserving these varieties in farmers' fields amongst village students who are the future farmers of our country. A Bija Yatra was undertaken by several voluntary organisations to document information regarding the indigenous varieties available with the farmers and also information on indigenous

varieties. CIKS was also part of this bija yatra and it collected information and seeds during this yatra.

CIKS also participated regularly in agriculture fairs and festivals, where it displayed its varieties and also exchanged varieties with farmers. Information regarding the Centre's efforts was distributed in the form of pamphlets which brought the Centre in touch with more farmers who were interested in conserving these varieties and also with farmers who were conserving these varieties.

Collection of Seeds from Rice Research Stations

CIKS has also made some attempts to get access to some indigenous varieties from the rice research stations of Tamil Nadu such as Tirurkuppam, Ambasamudram and Aaduthurai.

Inventory of Conservators of Indigenous Varieties

In every area of CIKS' work detailed surveys were made and an inventory of farmers in different villages who cultivate these varieties were made. This inventory contains information like the reasons for preservation of these varieties, special characteristics of these varieties, mode of cultivation etc.

Farmers Seed Banks for Seed Exchange Distribution and Utilisation

In every area of the Centre's work a network of farmers has been organised for exchange of seeds and exchange of information. Several meetings with the farmers were held in different villages regarding the importance of the indigenous varieties. Farmers put aside part of their land towards conservation of indigenous grain varieties. They are provided with the initial supply of seeds which has been procured by CIKS from that area and surrounding areas from farmers who already grow it. These farmers who are part of the programme are given the technical know how of manuring their field organically, treating pests by natural control methods, use of vermicompost etc. The farmers are provided seeds with the understanding that at the end of the season they return twice the quantity of

seeds that they have taken from the seed bank. Farmers are also provided with bio inputs like biofertilisers (*Azospirillum*, *Acetobacter* etc) and neem seed cake.

Detailed documentation of every farmer is being maintained by CIKS. It has detailed information about the crop at every stage, the type and quantity of inputs used, pest control techniques used, characteristics of crop, yield obtained and other details.

Arogyam - A Marketing Support Programme for Conservation of Indigenous Varieties

During the course of CIKS work on conservation of indigenous varieties, one of the important constraints that the farmers met with was that of finding a market for their varieties. It was very depressing to note that they did not get a reasonable return in the regular market. To overcome this, CIKS evolved a programme of linking up the consumers with the farmers. Arogyam is a programme which has registered members. These members ensure the purchase of organically grown indigenous varieties. This programme is done on the initiative of the Centre and it provides a good market for the farmers cultivating indigenous varieties organically. This pilot programme on marketing has shown that it would be possible to make available organic products to the consumer at rates on par with the existing inorganic products and also provide the farmer a reasonable return. This was one of the earlier programmes for marketing which has subsequently expanded to formation of producer companies for marketing.

***In situ* Conservation Centres**

During the course of its work for the last 20 years on indigenous seed conservation, CIKS has collected more than 130 varieties of paddy suitable for cultivation in Tamil Nadu. There is a network of farmers who cultivate this and conserve this year after year. The farmers choose to cultivate one or two varieties depending on the soil type, irrigation facility and agroclimatic region to which they belong. However, all these varieties have to be conserved year after year. They also need to be conserved in more than one region so that they are not destroyed due to the vagaries

of climate. Besides this the Centre experiments with any new variety that it get and cultivates it at least for a few seasons before passing it on to the farmers. Sometimes the Centre also gets access to rare varieties and the amount it gets may be a handful (say a few grains). These have to be cultivated with great care and propagated. In addition to all these, CIKS needs places where these varieties are cultivated year after year and farmers can come and take a look at the standing crop and decide for themselves what they would cultivate. For all these purposes *in situ* conservation centres have been established in the experimental farm of CIKS and selected farmers fields. In these *in situ* conservation centres more than 50 varieties are grown at a time. Detailed documentation of these varieties are done by the CIKS staff and farmers. Details of the kind of documentation done for two varieties is found in Appendix - I.

VAIDYA KUMBALAM

- An Indigenous Variety of Ash Gourd

ASH GOURD is a common vegetable used for cooking, making sweets and in the preparation of certain Ayurvedic and Siddha medicines. Ash gourd is called *Petha* in Hindi, *Budagumbala* in Kannada, *Kumbalanga* in Malayalam, *Poosini kai* in Tamil and *Boodida gummadi* in Telugu. For about 15 years scientists at the Centre for Indian Knowledge Systems (CIKS) in Chennai have been conserving and promoting the propagation of several traditional vegetable varieties such as *Vaidya kumbalam*. Ash gourd (*Benincasa hispida*) is a vegetable that is widely cultivated and used. During a visit to the CIKS farm Vaidya Muralidharan who was then the principal of Sri Jayendra Saraswathi Ayurveda College at Nasrathpet at the outskirts of Chennai city saw that we were conserving many varieties of gourd. He told us that there is a specific variety of ash gourd called as *Vaidya Kumbalam* or *Nei Kumbalam* in Kerala which was highly valued for its medicinal properties. It was the variety of choice to prepare the ayurvedic medicine *Kooshmanda rasayanam* of which ash gourd is the principal ingredient. There is a similar preparation made by the Siddha physicians called as *Poosani lehiyam*.

Integrated Home Gardens

During the Centre's work with indigenous paddy cultivation it realised that the very concept of home gardens was fast vanishing. When it did a survey to find out the reasons, CIKS realised that the introduction of high yielding varieties and subsequent loss of local varieties was one of the main reasons for the disappearing home gardens. Women farmers could not afford the high price of hybrid seeds for home gardens and even if they did buy the seeds paying a high cost, the germination capacity of these seeds was very low. They could not use it for the next season. CIKS made an intervention in this area also and succeeded to bring back at least 50 indigenous vegetable varieties which are cultivated in the home gardens of these women. These women cultivate the vegetables organically and the Centre provides training for the same. It has also trained women to produce good quality seeds. Every family involved in this programme produce at least Rs. 300/- worth vegetables. This adds to the nutritional security of the family. In addition to cultivating vegetables in these gardens women are also encouraged to cultivate herbs which can be used in curing common ailments. They are provided training in organic cultivation of herbs and also the know how of preparing some of the medicines for self help. This is a 100% women based programme.

Trainings, Outreach Programmes and Production of Educational Material

The Centre provides constant training to the network of farmers in organic cultivation of indigenous varieties. They are also trained to prepare plant based biopesticides on their own. Farmers are also trained in various composting techniques. This helps them to become self sufficient as far as farm inputs are concerned

and also saves them a lot of money. Outreach programmes are also conducted regularly to increase awareness in other sections of the village community. Essays and oratorical competitions are held in schools. CIKS also has produced a number of publications in the form of books, posters and films on organic agriculture and biodiversity conservation.

Value Addition as a Marketing Strategy

It was realised that to encourage farmers to undertake cultivation of indigenous varieties a good market also has to be created for them. CIKS has trained women groups to make several value added products like rice vadagam, appalam, noodles, hand pounded *aval* (flattened rice) from specific indigenous varieties. There is currently a good market for these products and the women farmers get a decent return by way of sales. The recently established producer companies of CIKS will take forward the marketing of these products in future.

Administration of Community Seed Banks

The community seed banks are maintained by the Sustainable Agriculture Self Help Groups (SASHGs) that have been formed in the villages. These SHGs have members who come together for a common cause of organic farming and indigenous seed conservation. These SASHGs not only maintain the village community seed bank but also other common services to the community like an agricultural machinery facilitation centre, biopesticide units, vermicompost units etc. CIKS provides handholding at the initial stages and later these are managed by the Panchayat Agriculture Development Committee (PADC) which gets linked to the Cluster Agriculture Development Committee (CADC) and finally to the producer company.



INDIGENOUS RICE VARIETIES: CASE STUDIES

1. Indigenous Rice for Filariasis Control

Filariasis is a disease spread by mosquitoes. Even modern medicines do not have a complete cure for this disease. But, people believe that this disease could be cured by Siddha medicine. Murugadasan from the village Thiruppurambiam 5 kms from Kumbakonam says that filariasis can be cured by using the indigenous rice variety called *Karungkuruvai*.

According to him, the *Karungkuruvai* paddy is boiled with cactus milk (*thirugukallipal*), cow's milk and honey and made into a *lehyam* confection. This *lehyam* is stored in a mud pot. People who are afflicted with filariasis should have it for five days continuously and after an interval of three days, again for five days. During the intake of this medicine, ghee, milk, cereals and fried salt should be added to the diet. The method for preparing the *lehyam* using *karungkuruvai* also finds a reference in the ancient Tamil text *Pulippani Vagadam 500*. Ramu of the same village had already undergone this treatment 15 years back and has been cured.

Karungkuruvai

Karungkuruvai is an indigenous paddy variety. This can be cultivated during the *Kuruvai* (June 1 - August 31) and *Navarai* (December 15 - March 14) crop seasons. The crop grows well on clayey, coarse and sandy clay soils. Normally, the crop grows to a height of 95.56 cm. The age of the crop is 120 – 125 days. Normally, 55 grains can be obtained from an ear head.

This paddy variety was originally cultivated near Kollidam but currently they do not have this variety. CIKS from its collection has given seeds of *Karungkuruvai* to a farmer Gunasekaran of this area for cultivation in 20 cents of land.

Source : *Murugadasan, 2/34-D, South St., Thirupurambiam-612303.*

Compilation : *Subhashini Sridhar, Ashokkumar, CIKS, Sirkazhi.*

2. *Kappakar* for Food Security

Kappakar paddy variety is usually cultivated in clayey soil as a dry sown crop during the Samba (July – January) season. The duration of this crop is 5 months. More than 30 farmers have been conserving seeds of this variety in Thiruvanaikovil village of Thirukazhukundram block for more than three generations. When we interviewed the farmers as to why they conserved this variety, they reported the following –

“Every year we cultivate *Kappakar* variety as a dry sown crop in about 50 acres. This variety can tolerate drought. It can also withstand floods. The incidence of pest attack is quite low. Altogether, the cost of cultivation is very low. Hence we cultivate this variety every year.

During the *Samba* season (August – January) of this year (2002), our villagers had sown *Kappakar* as a dry crop in about 50 acres of land. Some farmers had sown a high yielding variety called *White Ponni* as a dry sown crop. Since there was no rain for 2 months subsequent to sowing, the crops withered. As soon as it rained, the *Kappakar* crop recovered and turned green. On the other hand, the *Ponni* crop did not recover. The average yield is about 16 – 18 bags per acre.

The rice of this variety is ideal for making idli and dosa. It also tastes good if the cooked rice is left overnight and then consumed. The hay of this paddy variety is also a good fodder for the cows.

Source : *S. Varadharajan, Sankar, Krishnan, Manickam, Thiruvanaikovil, Ozhalur (P.O.), Thirukazhukundram block, Kancheepuram district.*

Note : We had personally visited the fields of these farmers. It was quite surprising to note that *Kappakar* paddy variety remained green even in extreme drought conditions.

3. *Samba Mosanam* Paddy Variety – Ideal for Waterlogged Fields

Ranganathan who is a farmer belonging to Mangalam village of Tirukazhukundram block of Kancheepuram district has 2 acres of land adjoining a lake. Out of these two acres, half an acre of land remains submerged in water during the monsoon season. This resulted in crop loss when high yielding paddy varieties were cultivated. So, Ranganathan cultivated *Samba Mosanam* variety of paddy during July – November season by direct sowing.

Since there was heavy rain that year, the water level in the lake was higher than usual. There was about 4 ½ feet of water stagnation in about half an acre of his land. The stalks of *Samba Mosanam* paddy variety remained unaffected and withstood the waterlogged conditions. However, the stalks of high yielding paddy varieties like *Ponni* cultivated by the neighbouring farmers were bent and remained submerged in water. This caused germination of the grains resulting in crop loss.

In waterlogged conditions, wherever *Samba Mosanam* was cultivated, there was no loss in yield. This has motivated the neighbouring farmers to cultivate this variety during the next season.



Special Features of this Variety

1. This variety is also called *Puzhudikal*, *Eri nel* and *Maduvu muzhungi* in Tamil. It is suitable for cultivation in the vicinity of lakes. It is said that people travelled by boats and harvested the *Samba Mosanam* in the lakes.
2. This variety is good for preparing *aval* (flattened rice), idly and dosa.

What is in a Name?

Indigenous varieties of seeds have names that are rich in information and have their own message about various kinds of properties of the varieties. A few illustrations are given below citing the names of indigenous paddy varieties in Tamil. Some varieties give an indication of the colour such as – *Sigappu kuruvikar* (red coloured) or *Karunkuruvai* (black coloured). In some cases the crop season in which the variety is usually cultivated is indicated such as – *Samba mosanam* (Samba season), *Karthigai samba* (cultivated in the month of *Karthigai*), *Chithirai kar* (the month of Chaitra/April). The crop duration is sometimes indicated by terms such as – *Arubatham kodai* (a 60 day variety). Special properties are indicated by names such as *Madu muzhungi* (literally means that it can grow in a water body – this is a flood resistant variety). The appearance may be indicated by names such as *Kulla kar* (a short stature kar variety), *Thanga samba* (a samba season variety that has a golden hue etc.).



GENETIC DIVERSITY AND DISEASE CONTROL IN RICE

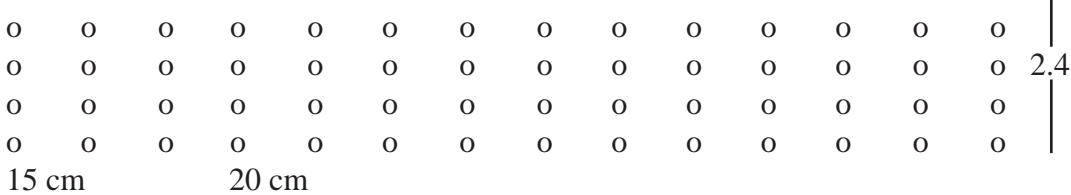
Recently, there has been a remarkable demonstration of the role of genetic diversity in disease control of rice. In a major experimental effort that was carried out beginning from the year 1998 (the work is still in progress) experiments in China have shown that by intercropping resistant modern rice varieties with susceptible traditional rice varieties, the incidence of Rice blast can be decreased significantly - in fact, to the point that no floral spray of fungicide was used after the first year. The same experiment also showed that there is an 89% increase in the yield of rice. We are summing up below the salient features of this experiment reported in the Science journal - NATURE.

The experiments were carried out in the Yunnan province of China during the years 1998 - 1999. It was an collaborative effort involving the plant protection department and Agricultural Universities in the Yunnan province at China, International Rice Research Institute at Philippines and Botanists in the Oregon State

University of USA. In the Yunnan province of China, farmers have been traditionally preserving Glutinous or “sticky” rice varieties which are used for confections and other speciality dishes. These have a higher market value than other rice types but they have lower yields. They are also highly susceptible to blast disease, caused by the fungus *Pyricularia oryzae*. Non-Glutinous hybrid varieties are less susceptible to rice blasts. Experiments were based on a farmer’s practice of dispersing single row of glutinous rice between groups of four rows of hybrid rice. The layout of rice is explained in the given below diagram.

In the first year of the experiment, mixed plots were set up involving two different traditional rice varieties which are susceptible, namely - Huangkeneo and Zinuo. Two hybrid rice varieties were used for intercropping namely Shanyou 63 and Shanyou 22. Four different mixtures were planted in 812 hectares of area in five townships in the Shiping county of Yunnan province. This provided excellent blast control when varieties

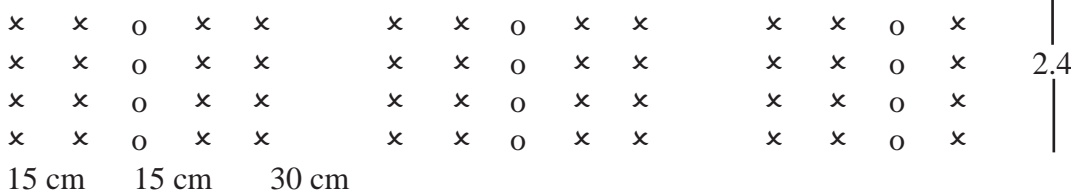
Glutinous monoculture



Hybrid monoculture



Mixture



were mixed. Hence, only one floral fungicide spray was applied. In the second year, the study was expanded to 3,342 hectares of rice fields. This time five townships in the adjacent county of Jianshui were also included. The results were quite spectacular. The diversification had a substantial impact of rice blast severity. In the first year of experiment, the panicle blast severity in the susceptible variety averaged 20% in the monocultures but was reduced to 1% when dispersed within mixed population. Panicle blast severities of hybrid varieties which averaged 1.21 % in monocultures was reduced to varying degrees in mixed plots. Results from 1999 were very similar to 1998 season. Disease susceptible rice varieties planted in mixtures with resistant varieties had 89% greater yield and blast was 94% less severe than when they were grown in monocultures. The experiment was so successful that fungicidal sprays were no longer applied by the end of the two year programme.

It is interesting to see that the experiments are currently being continued and in the third year - they are being expanded to 40,000 hectares! These experiments, we believe, have great significance in the Indian context. India also has a great varietal diversity of not only rice but also a vast number of other crops. Harvesting is by and large still carried out manually with a sickle and hence separate harvests of intercropped mixed varieties is feasible and possible. The results of the above experiments have drawn great attention and offer enormous possibilities in terms of the use of varietal and species diversity in sustainable agriculture.

Based on the paper - "Genetic Diversity and Disease Control in Rice" Youyong Zhu et.al NATURE Volume 406, 7th August 2000, pp. 718-722. January 2001



ON FARM CONSERVATION – EXAMPLES FROM THE FIELD

Communities across the World have conserved seeds for several centuries through on farm cultivation. Our farmers had their own time tested practices of collecting, storing, multiplying and also evaluating the many species that were conserved by them. With the modernization of agriculture the indigenous knowledge has been undermined and this in turn has led to the erosion of plant genetic resources.

The community based conservation is a major tool towards farmer empowerment. The seed supply and the quality are assured and the farmers can plant what they want at any time they deem is right. It significantly reduces the cost of production and there is better opportunity for seed improvement. Farmers tend to maintain more than one kind of seed and hence the genetic diversity will be sustained. Varied preferences of farmers leads to a wider collection which is adaptable to the farmers environment, management systems and mixed cropping. The seeds that are selected or varieties that have been produced would have traits that favour organic agriculture. Traditionally the role of women in seed management is very strong. This will also be enhanced.

In India there are a large number of grass root efforts that have taken up on farm conservation of seeds. These conservation efforts mainly deal with farmers and local communities. A desk

study was undertaken in June 2012 by CIKS to document such efforts. The coverage of the groups illustrated is by no means exhaustive and must only be considered as representative of this effort. The desk study mainly relied upon information from secondary sources like publications and also the internet. The websites of specific organizations were also scanned. In some cases information was provided by the organization through mail. The benefits to the community through such efforts have been consolidated below.

- Production and sale of certified organic seeds to farmers
- Conservation of indigenous varieties
- Timely access to good quality seeds
- Crop improvement through varietal breeding
- Women trained in seed production
- Income from sale and redistribution of seeds

This effort is meant to promote sharing and exchange of information as well as materials wherever desirable and feasible. We hope that this will also lead to the formation of networks and coalitions in this very important area of work. The following pages of this section provides details of 19 organisations involved in on farm conservation.



S. No	Name of Organization	Location/contact details	Type of effort	Benefits to community	Kind of seeds stored / conserved	Where	Since when	Reference
1	Centre for Indian Knowledge Systems (CIKS)	Dr. K. Vijayalakshmi, No.30, Gandhi Mandapam Road, Kotturpuram, Chennai – 600085 Tamil Nadu	Seed bank, On-farm conservation activities, Seed exchange, Commercial seed production	Access to good quality seeds, Production & sale of certified organic seeds to farmers.	Rice and vegetable varieties	Nagapattinam, Chengalpet, Dindugul, Kancheepuram	1995	Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004)
2	GREEN FOUNDATION (GF)	Dr. Vanaja Ramprasad P.O. Box No. 7651, No 120, 1st Floor, 7th Cross, Bilekahalli Dollar Layout, Off Bannerghatta Road, Opp Mantri Elite, Bangalpre – 560076, Karnataka, India	Community seeds bank, <i>In situ</i> Gene Banks	Conservation of traditional varieties of crops. Farmers having timely access to quality seeds. Crop improvement through varietal breeding	Paddy, millets & minor millets, vegetables, pulses, oilseeds, tuber crops	Bijapur, Bagalkot, Bellary, Gadag, Dharwad, Belgaum, Koppal, Haveri, Bidar, Raichur, Hassan (Karnataka)	1994	1. Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004) 2. Seed to Food GF publication, (2008) 3. Seed Quest, GF Publication, (2004) 4. Banking on Seeds, GF Publication (2005) 5. On-Farm Conservation of Seed Diversity, GF Publication (1998)
3	Parisara Samrakshana Kendra (PSK)	Mr. Panduranga Hegde, Basavaraja Nilaya, Chowkimath, Sirsi – 581 401, Uttara Kannada, Karnataka	Live gene banks in farmer's fields, Seed Exchange within the community and between communities	Conservation of traditional varieties	Rice varieties	Sirsi (Karnataka)	1994	Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004)

4	Deccan Development Society (DDS)	Mr. P.V. Satheesh 101, Kishan Residency, 1-11-242/1, Street No. 5, Shyamal Buildings Area Begumpet, Hyderabad - 500 016 Andhra Pradesh, India. Telephone: +91-40-27764577, +91-40-27764744 Fax: +91-40-27764722 E-mail: ddshyderabad@gmail.com	Conservation of traditional varieties, Community Gene Bank, Alternate PDS,	Conservation, cultivation of traditional varieties, Seed exchange, timely availability of good quality seeds	Millets – jowar, bajra, ragi, groundnut	Medak district of Andhra Pradesh	1985	1. Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004) 2. Web page: http://www.ddsindia.com/www/default.asp
5	NAVDANYA	Dr. Vandana Shiva A 60, Hauz Khas, New Delhi – 110016 Tel: 011-26968077 / 26532124 / 64343067 Fax: 011-26856795 Email: navdanya@gmail.com	Seed savers, Community seed producers, Seed Banks, Conservation farm, Beej Vidyapeeth	Conservation of traditional and heirloom varieties. Seed exchange, a learning centre for seed conservation and sustainable agriculture.	Rice, wheat, pulses, millets, oil seeds, vegetables, medicinal plants	Uttarakhand, Orissa, partners in about 16 states of India	1990	Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004)
6.	KRISHI PRAYOG PARI-VAR (KPP)	Mr. Aruna Kumara, Krishi Nivasa, Kuruvalli, Thirathahalli – 577 432. Shimoga district Karnataka. Email: aruna_kpp@yahoo.com krishipariwara@sancharnet.in	Community Seed Banks	Conservation of traditional varieties.	Rice, vegetable seeds,	Thirathahalli taluk, Soraba taluk, Sagara taluk of Shimoga district, Karnataka	2001	Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004)

7	Integrated Development through Environmental Awakening (IDEA)	Mr.Gowtham Shankar, Flat no.4C, Maharaja Towers, R.K.Mission Road, Vishakapatnam – 530003, Andhra Pradesh Email: gowtham_shankar@hotmail.com	Community seed banks, Grain Banks, Seed multiplication of rare varieties, Participatory varietal selection	Conservation, locally adapted seeds available to farmers	Paddy, Red gram, Maize, millets and vegetables	Vishakapatnam, East Godavari, Khammam districts of Andhra Pradesh Koraput, Rayaguda, Kalahandi, Bolangir, Nuapada, Gajapathi districts of Odisha.	1985	Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004)
8	BEEJ BACHAO ANDOLAN (BBA)	Mr. Vijay Jardhari Beej Bachao Andolan Upli Nagni, Dstt. Tehri Garhwal 249175 Uttarakhand, India Tel: 01378214226 raghujardhari@gmail.com	<i>In-situ</i> Community Seed Bank Efforts	Conservation of native varieties by farmers for own use and for exchange	Grains, millets, pulses, legumes, oil seeds, medicinal plants, vegetables	Tehri-Garhwal Himalayas`	1985	Seeds of Plenty Seeds of Hope. CIKS Publication, (December 2004) 2. Seeds for Life, The story of Beej Bachao Andolan 3. Web page: http://beejbachaoandolan.org/

9	Mulkanoor Cooperative Rural Bank & Marketing Society	General Manager The Mulkanoor Coop Rural Bank and Marketing Society Ltd Mulkanoor Mandal: Bheemadivarapally District: Karimnagar Andhra Pradesh, India Ph: +91-8727-248222, 248241 Fax: +91-8727-248221 E-mail: info@mcrbms.org	Seed production, Seed suppliers	Production, and sales of good quality locally adapted seeds to the tune of Rs. 3-5 crore.	18 state varieties Paddy	Seed growers in 60 villages and Seed sales in Coastal AP, in Kurnool, Khammam, Mahbubnagar, parts of Karnataka etc. The seed is “truthfully labelled”.	1964	1. The Seed Sector in Andhra Pradesh – Report by Kavita Kuruganti 2. Web page: http://www.mcrbms.org/cooperative_spirit.asp
10	M.S.Swaminathan Research Foundation (MSSRF)	Dr.M.S.Swaminathan 3rd Cross Street, Institutional Area, Taramani, Chennai – 600113 Tel: 044 22541229 Email: chairman@mssrf.res.in	Gene Bank, Seed Bank, Grain bank, conservation of land races, seed multiplication and distribution	Farmers have access to locally adapted traditional seeds.	Rice, root crops(yams), fruits, vegetables, pepper, ginger, wild food plants, medicinal plants, small millets, green gram	Odisha (Jeypore), Kerala (Wayanad), Tamil Nadu (Kolli hills)	1998	Community Agro-biodiversity Conservation in Orissa. MSSRF Publication (2004) Web page: 1. http://www.mssrf.org/bd/bd-4c.html 2. http://www.cdi.wur.nl/NR/rdon-lyres/8A95C897-C42C-4A57-9DDB-5EECFF725066/157085/Jeypore.pdf

11	Centre for Interdisciplinary Studies , Vrihi	Dr. Debal Deb, Mr. Debashis Patra . Panchal Email: debaldeb@wildmail.com	Seed conservation, Seed Bank, Seed exchange, Propagation of farmer selected crop varieties. Farmers participating in production scale of folk varieties	Distribution of traditional varieties to farmers. Farmers have access to locally adapted seeds. Conservation of more than 700 folk varieties of rice	Rice	West Bengal, Bihar, Orissa, Jharkhand, Assam, Meghalaya, Tripura, Nagaland, Arunachal Pradesh, Chattisgarh, Maharashtra, Tamil Nadu	1997	1. Seeds of Tradition, Seeds of Future. Vrihi Publication - 2005 2. Web page: http://www.cintdis.org/vrihi http://independent-sciencenews.org/un-sustainable-farming/valuing-folk-crop-varieties/ October 6, 2009 http://www.good-newsindia.com/index.php/post12/story/debal/April2012
12	Gene Campaign	Dr. Suman Sahai Gene Campaign J-235/A, Lane W-15C, Sainik Farms New Delhi-110 062 India Tel: +91-11-29556248 Fax: +91-11-29555961 Email: mail@genecampaign.org	Community managed Zero-energy Seed Banks, Seed multiplication by out-growing accessions every alternate season, Ultra dessication of seeds	Conservation of traditional varieties, Availability of locally adapted seeds to changing environment conditions	Rice, millets, legumes, vegetables and oilseeds	Jharkhand and Uttaranchal	1993	Web page: http://www.genecampaign.org/Sub%20pages/zero-energy-genebanks.html (2008)

13	Annadana	Annadana Seed Bank Botanical Garden Auroville - 605101 TamilNadu, India Tel: 0413 2622667 seedbank@annadana- seed.org seedbank@annadana. com	Seed Bank, Conservation, production, multiplication, distribution and exchange of traditional varieties of vegetable seeds,	Availability of a wide range of organic vegetable seeds.	Traditional varieties of vegetables – cucurbits, legumes, solanaceous crops, crucifers, leafy vegetables	Auroville	1999	Web site: http:// www.annadana- seed.org/
14.	Centre for Rural Operations Programs Society (CROPS)	Mr.Janardhan 4-5-20/10, Sanjay Nagar, Jangaon, Warangal District, 506167, Andhra Pradesh Tel: 08716-3223621, 3221171 Email: cropsjangaon@ yahoo.com	Seed procurement, production, storage and re-distribution	Women trained in seed production, timely availability of quality seeds to farmers, income from sale /redistribution of seeds, conservation of local varieties.	Red gram, millets, Castor, paddy,green gram, ground nut, sesame	Warangal district, Andhra Pradesh	2001	1. The Seed Sector in Andhra Pradesh – Report by Kavita Kuruganti 2. Web site: http:// www.crops.co.in/ seedvillage.html
15.	Sahaja Samrudha	Mr.Krishna Prasad Nandana, No.7, 2nd cross 7th Main, Sulthanpalya, Bangalore – 560032, Karnataka, India Tel: 080 2365 5302 Email: sahajasamrudha@ gmail.com	Gene bank, Conservation of traditional varieties, sale of seeds under brand name -Akkadi	Availability of locally adapted good quality seeds, crop improvement measures with community involvement	Ragi, paddy, minor millets, vegetables, pulses	Chamrajnagar, Tumkur, Haveri, Koppal, Soraba, Sagar taluks of Karnataka.	2001	Web site: http://www. sahajasamrudha.org/ index.htm

16.	Thanal	Ms. Usha H-3, Jawahar Nagar, Kawdiar P.O., Thiruvananthapuram , Kerala- 695 003 Tel: 0471-2727150 Email: thanal @vsnl. com	Conservation of traditional varieties	Farmers having access to traditional locally adapted seeds.	Paddy, vegetables	Kerala	1986	Web site: http://www.thanal.co.in/index.php?option=com_content&view=article&id=123&Itemid=143
17.	Organization for Rural Reconstruction & Integrated Social Service Activities (ORRISSA)	40/570, Laxmi Vihar, P.O.Sainik School, Bhubaneshwar, Odisha – 751 005, India Tel: 0674 2582848 Email: info@orrissa. co.in	Conservation activities in farmers fields, seed exchange between farmers	Traditionally locally adapted varieties are readily available for farmers, Mixed cropping system of farming.	Paddy, millets, pulses, beans	Malkhangiri, Keonjhar, Mayurbhan, Koraput, Kandhamal districts of Odisha	1989	Web site: http://orrissa.co.in/seed_fairs
18.	Chetna Organic	Mr. Ashutosh Deshpande D No 12-13-677/66, Plot No 187, Sree Sail Durga Niwas, Adj Ashish Enclave, Street No 1, Tarnaka, Hyderabad - 500017 Tel : 040 2700 9944 Email: info@ chetnaorganic.org.in	Participatory evaluation of seed varieties, conservation of local varieties,	Conservation, timely availability of seeds	Pulses, cotton	Maharashtra, Odisha, Andhra Pradesh	2004	Web site: http://www.chetnaorganic.org.in/

19	Seva Mandir	Old Fatehpura Udaipur - 313004 Rajasthan India Phone: 0 294 2450960/ 2451041/ 2452001 Fax: +91 294 2450947 Email: info@ sevamandir.org	Seed Bank, Seed conservation work, Grain Bank Have collaborated with the National Bureau of Plant Genetic Resources (NBPGR) in a project on community seed banks – this has been described in a monograph in English and Hindi that can be downloaded from the NBPGR website – www.nbpgr.ernet.in/publications	Farmers have timely access to quality seeds, seed exchange	Wheat, Black gram, Bengal gram, Maize	Udaipur and Rajsamand Districts of Rajasthan	1980	Web site: http://www.sevamandir.org/what-we-do/programme-areas/natural-resource
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GOVERNMENT INSTITUTIONS AND LEGISLATIONS FOR PROTECTION OF INDIGENOUS VARIETIES

National Bureau of Plant Genetic Resources

The National Bureau of Plant Genetic Resources (NBPGR) evolved out of the Botany division of the Imperial Agricultural Research Institute (IARI) which has been in existence since 1905. The NBPGR in its present form was set up in 1976. It is the nodal institute at the National level for the acquisition and management of indigenous and exotic plant genetic resources for food and agriculture as well as research and human resource development for the sustainable growth of agriculture. It has its headquarters in New Delhi and maintains 14 regional stations in various parts of the country.

From time to time the Bureau conducts workshops and training programmes and brings out publications of interest. Accessions of genetic materials through field surveys in various parts of the country are reported periodically. The NBPGR interfaces mainly with agricultural scientists, universities and researchers and has very little interaction with farmers or community based organizations directly. However recently the NBPGR has come out with a publication on – “Community Seed Banks” documenting the experience of working with an NGO Seva Mandir based in Rajasthan. The publication is available both in English and Hindi and can be downloaded from the website of the Bureau (www.nbpgr.ernet.in).

Protection of Plant Varieties and Farmers Rights Authority

The Government of India enacted – “The Protection of Plant Varieties and Farmers Rights (PPV and FR) Act, 2001” about 10 years back.

The Indian Legislation is not only in conformity with the International Union for the Protection of new varieties of plants (UPOV) 1978 but also has provisions to protect the interest of breeding institutions and farmers. To implement the provisions of this Act the Department of Agriculture and Cooperation established the – “Protection of Plant Varieties and Farmers Rights Authority” in November 2005. The authority has 15 members of which 8 are ex-officio members representing Departments and Ministries, three from State Agricultural Universities and State Governments and one representative each from amongst farmers, tribal organizations, seed industry and women’s organizations associated with agricultural activities.

Functions of the Authority

The authority is responsible for registration of new plant varieties, as well as characterization and documentation of registered varieties. It is also responsible for the documentation, indexing and cataloguing farmers varieties. It maintains the National Register of Plant Varieties and National Gene Bank. It is also responsible for recognizing and rewarding farmers, farming communities and particularly tribal communities engaged in conservation improvement and preservation of plant genetic resources.

The website of the authority (www.plantauthority.gov.in) carries information regarding the activities, answers to several F.A.Qs (frequently asked questions) copies of bulletin and technical specifications relating to DUS (Distinctness, Uniformity and Stability) testing of various crops and forms for the application for registration of varieties.

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APPENDIX – I DOCUMENTATION OF INDIGENOUS RICE VARIETIES

Neelan Samba

Cultivation Aspects

Season : Samba
Cultivation method : Transplantation
Soil type : Clayey

Agronomical Features

Crop duration : 175 - 180 days
Nursery age : 45 - 50 days
Height of crop (cm.)
a) Average : 132.0
b) Maximum : 141.5
Lodging/Non-lodging : Lodging

Characteristics of the Earhead

Length of the earhead (cm)
a) Average : 24.9
b) Maximum : 27.5
Number of grains per earhead
a) Average : 185
b) Maximum : 191

Characteristics of the Grain

Colour of the grain : It is light green during the flowering stage, black in the milky stage and on maturity it is seen with a mixture of black and yellow colours.
Weight of 1000 grains : 24.899 grams
Colour of rice : Red
Rice quality : Coarse

Yield (per Acre)

Grains : 20 bags (1500 kg.)
Straw : 60 bundles (1800 kg.)

Special Features of the Variety

1. A highly suitable variety for areas which are prone to water logging. It is best suited for cultivation in the vicinity of lakes.
2. Resistant to brown plant hopper and earhead bug.
3. It increases the milk yield in lactating mothers and hence suitable for them.
4. Since the straw is very long it is used as a roofing material.

Samba Mosanam

Cultivation Aspects

Season : Samba
Cultivation method : Dry sown,
Transplantation
Soil type : Clayey soil

Agronomical Features

Crop duration : 160 - 165 days
Nursery age : 40 - 45 days
Height of crop (cm.)
a) Average : 134.2
b) Maximum : 150.2

Lodging/Non-lodging : Lodging

Characteristics of Earhead

Length of the earhead (cm)
a) Average : 25.7
b) Maximum : 26.3
Number of grains per earhead
a) Average : 162
b) Maximum : 213

Characteristics of Grains

Colour of the grain : It is light green during the flowering stage, black with long green stripes during the milky stage and turns a straw colour on maturity.
Weight of 1000 grains : 28.677 grams
Colour of rice : Red
Rice quality : Coarse

Yield (per Acre)

Grains : 24 bags (188 kg.)
Straw : 65 bundles (1950 kg.)

Special Features of the Variety

1. This variety is also called *Puzhudikal*, *Eri nel* and *Maduvu muzhungi*. It is suitable for growing in the vicinity of lakes. It is said that people travelled by boats and harvested the 'Samba mosanam' in the lakes.
2. The variety is good for preparing *aval* (flattened rice), idly and dosa.