# Organic Farming and Indigenous Seed Conservation Experiences from Tamil Nadu, India

***Centre for Indian Knowledge Systems***

*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 in 125 villages 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).*

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## Background

India is the home of one of the greatest diversity of both wild and cultivated crops. However in recent years, there has been a marked decline in the variety and diversity of cultivated crops such as rice and cereals. With the advent of the Green Revolution, the emphasis has been to a large extent on the increase of yield; consequently a small number of paddy varieties selected for their capacity to give high yields in response to the application of high doses of fertilizer are being promoted. As a result, today the genetic base has narrowed down considerably.

Industrialized agriculture favours genetic uniformity. Typically, vast areas are planted with a single, high yielding variety - a practice known as monoculture - using expensive inputs such as irrigation, fertilizer and pesticides to maximize production. In the process, not only traditional crop varieties, but long - established farming ecosystems are

obliterated. Genetic uniformity invites disaster because it makes a crop vulnerable to attack - a pest or disease that affects one plant quickly spreads throughout the crop.

During the 1970s, the Grassy-Stunt Virus devastated rice fields from India to Indonesia, endangering the world's single most important food crop. After a four-year search which screened over 17,000 cultivated and wild samples of rice, only one population of the species *Oryza nivara*, growing wild near Gonda in Uttar Pradesh, was found to have a single gene for resisting Grassy-Stunt Virus Strain 1. Today, resistant rice hybrids containing the wild Indian gene are grown across 1,10,000 sq. km. of Asian rice fields.

**Diversity of Rice Crop in India**

According to Dr. Richharia, the well known rice scientist 4,00,000 varieties of rice existed in India during the vedic period. He estimated that, even today 2,00,000 varieties of rice exist in India - a truly phenomenal number. This means that even if a person were to eat a new rice variety every day of the year he would live for over five hundred years without reusing a variety. Every variety has a specific purpose and utility. Dr. Richaria has collected and identified 20,000 types of rice in the Chattisgarh area of Madhya Pradesh alone.

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Farmers in every part of country have deep knowledge of their own rice varieties, of their environmental and nutritional requirements and their properties and peculiarities. This has enabled them to harvest a crop even under the most severe stress situations. Farmers also possess high yielding varieties of their own which are not recognised in agricultural extension programmes.

The alarming rate of ecological and biodiversity destruction has now been recognised and the need for conservation is acknowledged at the level of farmers and the state. There are a number of reasons for enlarging the diversity of cultivated crops such as rice and in this effort various indigenous varieties used by farmers have a key role to play.

**Characteristics of Indigenous Rice Varieties**

*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.*

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 article presents the Centre's experiences.

**The Setting Up of a Seed Bank in the Valayampattu Village, Chengam Taluka, 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 Valayamapattu 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 Munnetra 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 more than 125 villages spreading over the districts of Kanchipuram, Tiruvallur, Tiruvannamalai and Nagapattinam. CIKS has also been supported in this effort by different funding agencies like the IDRA, 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. CIKS has other plans to strengthen the marketing network.

***In Situ* Conservation Centres**

During the course of its work for the last 10 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


*In situ conservation centres have been established in the experimental farm of CIKS and selected farmers fields.*

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.

**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 this programme produces 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.

**Organic Farmers *Sangams***

After nearly 10 years into this programme CIKS has come up with certain models for the maintenance and sustainability of the effort. Currently, it has nearly 3000 farmers spread in nearly 125 villages who conserve these varieties organically. There are more than 800 households which maintain integrated organic home gardens. In every village, CIKS is in the process of forming organic farmers *sangams* or groups. So far it has established 37 organic farmers *sangams*. These *sangams* have members who come together for a common cause of organic farming and indigenous seed conservation. The *sangam* members pay a monthly subscription which is maintained in a bank account. Elected office bearers take care of and give directions to the working of the *sangams*. The *sangams* maintain the village community seed bank. Storage structures for the seed bank are initially provided through the programmes with a beneficiary contribution and later it is maintained by the *sangam*. The borrowing and returning is controlled by the *sangam*. *Sangams* may also be provided with certain agricultural implements like sprayers, tarpaulin sheets for drying grains and so on which is hired out for a nominal rate. Some *sangams* also run biopesticide units as an income generating activity. The basic know how and the infrastructure is provided by the Centre.

## Conclusion

Starting from a handful of five indigenous rice varieties CIKS biodiverse organic farming programme has enlarged into a major effort. Currently, the Centre has more than 130 rice varieties being conserved organically and more than 50 varieties of vegetables providing nutritional security to households. It hopes to expand this effort to the entire state and probably to the entire country.

*Source : Based on the information provided by Dr.K.Vijayalakshmi of the organisation.*

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# CHARACTERISTICS OF INDIGENOUS VARIETIES

**Thanga samba**

The earhead of this variety is very long. Since this variety of rice is extremely fine and long it is used for the preparation of special dishes like *pulav*. It is suitable for the South Indian meal.

**Neelan samba**

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

**Kurangu samba**

The earheads are very long. There are up to 267 grains in one earhead. It grows in areas prone to water logging as well as dry areas. Highly resistant to pests and diseases.

**Seeraga samba**

Since the rice of this variety resembles the shape of a spice *seeragam* it has got the name Seeraga Samba. The rice is extremely fine and aromatic, hence it is used for making *biriyani*. Though the yield is very low, since it is aromatic, it fetches the highest price amongst all indigenous paddy varieties of Tamil Nadu.

**Samba mosanam**

This variety is also called Puzudikal, Eri nel and Maduvu muzangi. 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. The variety is good for preparing *aval*. (flattened rice), *idly* and *dosa*.

**Kullakar**

This variety is highly suitable for preparing *idly* and *dosa*. It is also used in the preparation of porridge. Since it is a short duration variety it can be grown in all the three seasons. Highly resistant to pest and disease. The straw is preferred as roofing material.

**Thooyamallee**

The rice of this variety is highly suitable for the South Indian meal. It is also used for making special dishes like *biriyani*. During the flowering stage, the earheads look like flowers. In Tamil *thooyamallee* means pure jasmine. Since the rice of this variety is white in colour like the jasmine it is known by this name. Highly resistant to pests and diseases. Since this is a fine variety it fetches a good price.

**Kuzhiyadichan**

Kuzhiyadichan is highly suitable for making dishes such as *idly* and *dosa*. Suitable for saline soil and land which has good drainage facility. Highly drought resistant. Highly resistant to pests and diseases. It is also called Kulikulichan. It is ideal for lactating mothers, since it increases the milk flow.

**Kallimadaiyan**

The rice of this variety is highly suitable for making a South Indian snack called *murukku*. The Manapparai *murukku* became very popular since it was prepared with this variety of rice. It is also suitable for the South Indian meal. Highly resistant to pests and diseases.

**Pitchavari**

The rice of this variety is highly suitable for making a special dish called *pittu*. It is used for treatment of diarrhoea in cattle. It also increases appetite in cattle. Highly resistant to pests and diseases. It is suitable for cultivation in areas prone to water logging as well as drought prone areas.

# CIKS - 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, Mr. Ranganathan cultivated Samba Mosanam variety of paddy during the last July – November season by direct sowing.

Since there was heavy rain last 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.

## INDIGENOUS PADDY CULTIVATION - EXPERIENCES OF A FARMER, GOMATHINAYAGAM

Kitchili Samba is a traditional rice variety popular for its use in the South Indian meal and also for making a special dish biriyani. Gomathinayagam of Vivasaya Seva Sangam, Puliyangudi, Tirunelveli Dist. obtained seeds of this variety from CIKS and cultivated it during the Samba season of the year 2000. He raised the seedling for 1 acre using 40 kgs of seeds. The seedlings were transplanted on the 30th day. He used 40 loads of farmyard manure while preparing the main field. Before transplantation he irrigated the main field with dilute slurry. On the 25th day after transplantation he irrigated the field with cowdung solution. On the 30th day a litre of cow's urine diluted in 10 litres of water was sprayed. On the 40th day he sprayed *panchakavya* using a power sprayer. Only one weeding was done.

**Preparation of *Panchagavya***

For preparing *panchagavya* Gomathinayagam took 5 litres of slurry, 3 litres of cow's urine, 2 litres of cow's milk, 2 litres of curd prepared from cow's milk and 1 litre of ghee. All these were put in a wide mouthed vessel and left in a shady place. The solution was mixed by hand everyday in the morning and evening. The *panchagavya* is ready on the ninth day and can be used for the next 30 days. Since ghee does not dissolve easily he used a power sprayer. Three litres of *panchagavya* were diluted with 100 litres of water and sprayed. After spraying *panchagavya* on the 40th day after transplantation he irrigated the field. One hundred and thirty days after transplantation the crop was ready for harvest. He got an yield of 1400 kg.

According to Gomathinayagam, this variety was easy to cultivate and tasty to eat. It was extremely good for preparing pongal and pepper rice. Gomathy Nayagam mentions that the yield could be increased over a period of time by increasing the soil fertility gradually. He plans to distribute seeds of this variety to others in his area. He suggests that to preserve the soil quality and the environment it is better to cultivate such varieties organically.