Field Study

Gene Campaign's work for Self Reliance in Food and Livelihood Security in Jharkhand

Gene Campaign's Jharkhand project on food and livelihood security is making good progress. The GC team attempts to work in an inclusive way, its staff is diverse, incorporating ethnic and religious minorities, backward communities and is gender sensitive. Our literature is prepared in the local regional languages and tribal dialects, enabling us to reach a range of people. Collaborations with research institutions are established and field research is often being conducted jointly.

Gene Campaign appears to be emerging as a reference point for agro biodiversity conservation and establishing Gene and Seed Banks.

Conservation of rice in this region, important for being the primary Center of Origin of Rice is becoming successful with both ex situ and in situ conservation being well established now.

Contents

Conservation and Use of Agro biodiversity

The activities included increasing the collection of traditional varieties and ; their multiplication and in situ conservation in Gene-Seed Banks with a community based system for using and administering the material; characterization of the varieties and germplasm evaluation to identify useful genes. 'Ultra Desiccation' is being developed as a technique for improved long-term storage at ambient temperature.

Underutilized and edible wild bio-resources are being revived and promoted in the food chain for improved food and nutrition

The collection: Samples of traditional varieties of diverse crop plants have been collected from 478 villages of 49 districts covering 9 states of the country. A total of 1990 samples of traditional varieties of rice, millets, legumes and vegetables have been collected, characterized and processed for storage in the Gene-Seed Banks. These consist of 1820 varieties of rice, 8 varieties of millets, 90 of legumes and 72 varieties of vegetables. Most of the legume varieties were collected from Bihar, legume cultivation is not popular in Jharkhand. Over 400 people have been trained in the collection,

characterization and documentation of agro biodiversity.

Area of sample collection:

S. No.	States	Districts	Blocks	Villages
1.	Jharkhand	16	124	314
2.	Bihar	13	76	118
3.	Assam	03	06	09
4.	West Bengal	05	03	08
5.	Uttar Pradesh	02	02	04
6.	Madhya Pradesh	02	01	02
7.	Orissa	04	03	18
8.	Chhattisgarh	03	02	04
9.	Manipur	01	01	01
	Total	49	218	478

Number of traditional varieties collected:

State wise Collection	Rice	Millets	Vegetables	Legumes
Jharkhand	1048	08	22	10
Bihar	370	--	50	80
Chhattisgarh	180	--	--	--
Orissa	120	--	--	--
Assam	36	--	--	--
Manipur	07	--	--	--
Uttar Pradesh	30	--	--	--
Madhya Pradesh	10	--	--	--
West Bengal	19	--	--	--
Total	1820	08	72	90
Total Collection	1990			

Curating the collection: The rice collections were curated by examining the nomenclature, morphology and source of samples. Rice varieties bearing the same or similar names are sometimes collected from different regions. These are usually morphologically distinct. For instance we have six varieties called Kalamdani but they are also physically distinct. During curating the collection, such variants are identified and retained. When samples are collected that are clearly mixtures of different varieties, the single lines are being separated and maintained individually and the mixture is also maintained. The composition of mixtures that farmers use has risk management significance and constitutes a varietal composite.


Drought rice

Identifying useful genes:

The Birsa Agricultural University (BAU) is testing 170 varieties from the GC Banks for tolerance to water stress.

Rice samples from the Gene Bank are being also being evaluated by the Division of Genetics, Indian Agricultural Research Institute, (IARI) Delhi, for resistance to Bacterial Leaf Blight, a rice disease.

Starting with 17 traditional varieties that farmers characterized as disease resistant, five varieties have been identified as

resistant to bacterial leaf blight.

MoU for using farmers' material for Research

Materials have been shared with research stations for germplasm evaluation following the conditions of the Convention on Biological Diversity. An MoU has been signed by Gene Campaign on behalf of the local communities, after taking the consent of the representatives of communities. According to the MoU, no patents can be taken on any material developed from the research and evaluation and the germplasm will continue to be the property of the local communities.

Ultra-Dltra-dcal yield loss.d tolerantwith students and civil societyrity , Uttranchal esiccation:

A new technology called ultra-desiccation is being tested to prolong the storage at ambient temperature. This will greatly facilitate long term storage. This is a pilot project to test whether the new technology of ultra desiccation works in the field.

Sixty varieties of traditional seeds are being ultra desiccated and will be tested for germination viability over a five year period

Once the technology has been validated over five years or more with small samples, important samples in the collection can be subjected to ultra desiccation and the technology established for wide use.

Community Gene-Seed Banks:

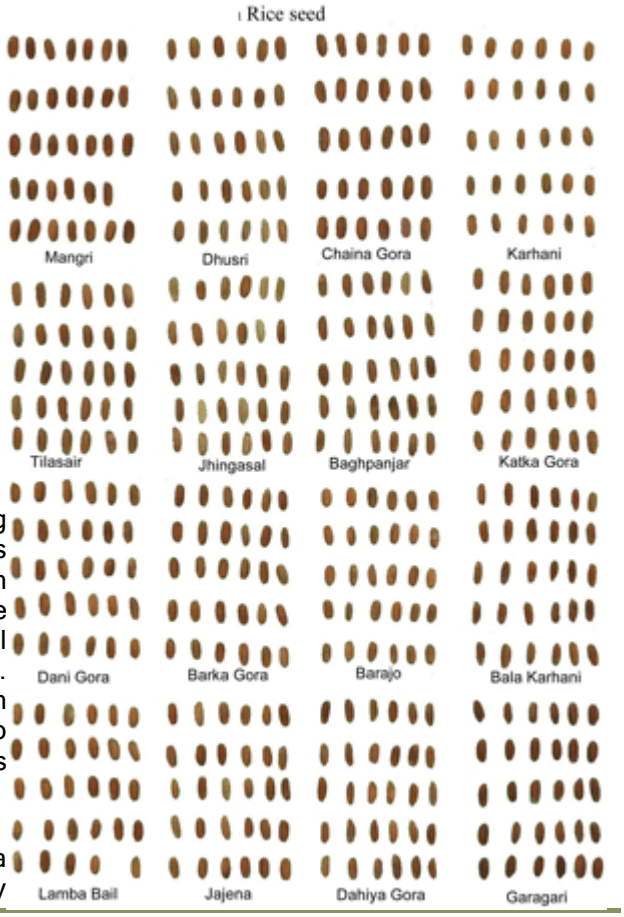
Eight Gene-Seed Banks have been set up in Kacchabari, Kulli, Nayatoli, Ichak, Pannakhunti, Adampur, and Kerua and Birsa Agriculture University,in Ranchi, Hazaribagh and Nalanda districts of Jharkhand and Bihar.

In situ conservation

In 2005 over 1350 farmers have taken 600 traditional rice varieties from the Gene-Seed Banks, in 2006, 1730 farmers have taken 815 traditional rice varieties to cultivate in their fields.

In-situ conservation & Seed Multiplication:

An increasing number of farmers are showing interest in cultivating traditional rice at least in part of their land. In 2005 over 1350 farmers have taken 600 traditional rice varieties from the Gene-Seed Banks, In 2006, 1730 farmers have taken 815 traditional rice varieties to cultivate in their fields. These farmers also host seed multiplication renewal plots for Gene Campaign to refresh and renew the seed in the Banks. This kind of field level conservation is greatly desired by conservation policy makers but is difficult to achieve. Gene Campaign has begun to achieve a breakthrough after three years of intensive fieldwork. This is a good indicator for in-situ conservation.



Seed samples were multiplied to provide viable and healthy seeds to a large number of farmers. The multiplication work was carried out by

farmers as well as by Gene Campaign. GC multiplied 415 varieties in the demonstration plot of Birsa Agricultural University with three purposes, first to increase the seed quantity, second to conduct morpho-agronomic characterization of the varieties and third to organize field training programs for master trainers and other, as well as awareness programs with students and civil society.

Multiplication and in situ conservation of rice varieties:

Districts	Ranchi	Hazaribagh	Nalanda	Nawada
No. of varieties	560	210	30	15
Total varieties	815			

Legal recognition for Farmer Varieties:

Important samples from the collection have been characterized according to the detailed format approved by FAO and IRRI. This is an extremely time consuming and complex process which is used by plant breeders to register a new variety. Gene Campaign has given training to the village youths to characterize the varieties by this method. This method was used to characterize those special varieties, which have a chance of being registered as Farmer Varieties by the National Plant Variety Authority.

About 300 varieties are considered to have the potential to be characterized according to the new format. So far 200 varieties have been characterized according to the detailed protocol, at two stages. One, as a standing crop when morphology, flowering, crop duration was characterized and two, post harvest, when seed color, awning, 1000 seed weight, grain color, length, breadth, aroma and quality were characterized.

Important relevant information regarding the rice varieties was documented from farmers' long term experiences. This work was done during the collection of seed samples. The information provided by the farmers related to land type and soil, requirement of water, crop duration, drought or flood tolerance, pests or disease resistant, yield, aroma and medicinal properties.

Successful in situ conservation:

Traditional varieties cultivated by farmers from community Gene-Seed Banks:

Year	No. of farmers	No. of varieties
2005 – 06	1350	600
2006 – 07	1730	815

Over 1730 farmers are cultivating 815 traditional rice varieties taken from the Gene-Seed Bank.

Bringing underutilized food sources into the food basket

A total of 86 edible plants that are eaten as saag (leafy greens), have been identified by village communities in the region These have been collected and documented by GC. We are trying to create seed sources for such leafy greens. The problem is that since many have very small seeds the scatter easily, making collection of seeds as planting material is proving to be difficult.


Suvarmocha


Gandhari Bara


Tikhur


Beng sag

Thirty-one tubers have been collected which the community uses as famine foods. Many of these have medicinal properties. With more and more people opting for cereals even in time of food shortage, many of the tuber sources are getting lost. GC has begun distributing these tubers in villages for multiplication and to revive their use instead of going to the moneylender for loans to buy rice for periods of food shortage.

Gene Campaign in collaboration with Food and Nutrition Board, Govt. of India, has conducted training programs on value addition, processing and preservation of leafy greens, vegetables, fruits as well as pulses to prepare foods for women and adolescent girls.

The difficulties we face in in situ conservation are from the government, which pays no attention to conservation of rice agro biodiversity even as it promotes hybrid and high yielding rice. This lapse is particularly grave since Jharkhand is one of the regions of maximum rice diversity and is considered a Centre of Origin for rice. In this backdrop there is an even greater need to continue and intensify the work on Gene and Seed Banks in areas like Jharkhand, Chattisgarh and Orissa.

Establishing Bioorganic Agriculture

Ten villages have been developed as models for organic cultivation, six from Ranchi district and four from Hazaribagh district. There are a total 1733 households in these villages. These will serve as models for replication and dissemination of bioorganic practices.


Farmer's using vermicompost for Colocasia
Vill - Nayatoli (Oramanjhi, Ranchi)

Bio-fertilizers were produced using vermicompost, Blue Green Algae Rhizobium cultures ,green manure and compost.

Vermicompost is the most easily adaptable and popular. It was used successfully in trials of paddy, ginger and vegetables. 602 farmers have adopted vermicomposting and 369 units have been set up. 26 farmers are trying out Blue Green Algae cultures. Farmers report enhancement in their crop yield and quality with the use of bioorganic nutrients.


Farmer's using vermicompost in tomato field
Vill - Bhandra (Bero, Ranchi)

Plant based pesticides made from extracts of Azadirachta indica ,Pongamia pinnata , Nicotiana tabacum, Vitex negundo , Calotropis procera and Allium sativum were found to be effective against common pests in field trials of vegetables and paddy.

277 farmers have adopted plant-based pesticides. A cost –benefit exercise done with a wide variety of farmers revealed that they were able to make considerable savings after moving away from chemical pesticides and fertilizers.

The total cost of paddy cultivating using agrochemicals works out to Rs. 3300/acre,

The cost of cultivation by bioorganic methods the works out to Rs.

1700/acre, a saving of Rs. 1600 per acre.

Adoption of bio organic farming practices:

Particulars	2005-07
Farmers trained	1248
Master trainers trained	83
No. of vermicompost units	369
Farmers using vermicompost	602
Farmers using BGA	26
Farmers using plant based pesticides	277
No. of organic farmers	584

Effective Plant based Biopesticides:

Plant	Plant part used	Effective against
Tobacco Nicotiana tabacum	Leaf	Aphids, White flies, leafhopper, thrips.
Neem Azadirachta indica	Leaf, Seed	Mildew Rusts, Thrips, Leaf minor and many other insects.
Sindwar Vitex negundo	Leaf, Stem	Diverse pests
Akwand Calotropis procera	Leaf	Diverse pests
Karanj Pongamia pinnata	Leaf, Seed	Diverse pests
Garlic Allium sativum	Bulb	Boring pests

Plant based pesticides face very stiff competition from chemical pesticides. The Agriculture Department of the state aggressively promotes chemical pesticides, as does Birsa University. This makes the adoption of organic pesticides difficult. Bioorganic pesticides acts in a preventive manner and need attention. They must be applied before the pest attack.

Reviving Indigenous Healing Practices

Over two hundred types of medicinal plants are being raised in a nursery to provide planting material for herbal gardens.

Medicinal plants are being planted in public spaces, school, college and university campuses to sensitize and educate people about medicinal flora and indigenous healing

Awareness programs were organized to encourage rural and urban communities to grow medicinal plants in their homesteads. Gene Campaign has distributed over 350 medicinal and nutritionally valuable plants at family level in various villages of Ranchi and Hazaribagh and to educational institutions, college campuses and campuses of government buildings.

Training rural communities to prepare herbal formulations for simple ailments, under the guidance of Vaidyas.

The training program on preparation of herbal formulations was started under the guidance of local *vaidyas* in the villages of Ranchi district.

Training programs on preparing herbal medicines were conducted in 30 villages involving 168 men and 200 women. About 50 people have been identified with the potential to be trained in preparing herbal medicines. More than 40 herbal medicines were prepared, of which about 30 are popular.

Rights awareness programme
Vill - Kulli(Bero, Ranchi)

Rights awareness programme
Vill - Bhandra(Bero, Ranchi)

Preparing Information Materials

A number of information and educational materials and training manuals pertaining to the project activities relating to food, nutrition, indigenous healing and conservation, the importance and need for green agriculture, new and emerging national and international policies with a bearing on bioresources and local communities, etc. have been produced in local languages. Special attention has been paid to creating information materials in Nagpuri and Urdu as well so that the dominant adivasi community and the large Muslim community is fully involved and integrated in the project activities.

Promoting Rights Awareness and Legal Literacy

This program to create awareness about the legal rights that communities have been granted over bioresources, seeds and indigenous knowledge is getting stronger everyday. Even though marginalized communities are apprehensive about exercising rights because of years of subjugation, it is precisely they who stand to benefit most from the new legal rights. Irrespective of the speed of progress in absorbing the concept of rights, rights awareness is a very important program and one that Gene Campaign takes very seriously. The Rights Awareness program uses diverse communication strategies and a range of audio-visual materials.
The national legislation related to bioresources and farmers and communities rights have been paraphrased into simple text, and translated into Hindi and the local Nagpuri dialect. The legislation discussed was the Protection of Plant varieties and Farmer's Rights Act, The Biodiversity Act, The Patent Act and the Geographical Indications Act. The main messages relevant to community rights are extracted and used in different ways. This text has also served as the basis for songs, slogans wall writings and banner messages as well as the scripts of Street Plays.

Gene Campaign's finds the best approach is to make the legal matter and its presentation attractive and light. Songs composed in the Nagpuri language, which is a prevalent tribal dialect, convey the legal messages. The songs with musical instruments help to draw attention to the key messages. A Street Play has also been developed that familiarises the laws to the village communities in an easily understandable manner.


Farmer training programe on agrobiodiversity collection

Due to GC's presence in the area and its cordial relations with the local community, it has been possible to take up the somewhat difficult work of generating awareness about legal rights on abstract issues like Intellectual Property Rights and Bioresources. The progress is slow but it is visible.


Training Programme with SHG
Vill - Nayatoli (Ormanjhi, Ranchi)

Organising Women in Self Help Groups

A total of twenty SHGs work with GC on both seed banks and bioorganic agriculture. Gene Campaign has given training to the women groups on the processing of minor forest produce and locally available fruits and vegetables, organic farming, agrobiodiversity conservation, herbal formulations and health and nutrition. Some of the SHGs have taken loans from NABARD and Gramin Banks to start economic activities. Economic activities under consideration are vermicomposting, bee keeping, poultry, and cows, making detergents, and bamboo baskets, as well as snacks, pickles and organic vegetables.

Training & Capacity Building

Training and building capacity in the project area was conducted at different levels. The men and women in the project villages and surrounding areas were included in outreach and educational programs so that they were sensitized about the issues of agrobiodiversity conservation and its sustainable use for long term food and livelihood security. Simple

literature is distributed at meetings.

Village youth have been trained in all project activities. Some are trained as trainers who can do training and demonstrations in particular activities like setting up gene-seed bank, characterization of crop varieties, ultra-desiccation, and about the nutritional value of underutilized bio-resources.

Training and capacity building programs were conducted among village youth, school and college students, Mahila Samuhs and members of CSOs in the region, to develop self reliance in the project, expand the outreach beyond the project area and build sustainability beyond the life of the project. These people are being trained to become the carriers of the project work over time. The purpose of the training is to spread awareness, enable people to participate in policy discourse and make trainers competent and confident in the subject matter and to handle program activities and public education programs.

Information materials and training manuals were prepared to be used for awareness generation and in training workshops.

Subjects for training programs

- Importance of agro biodiversity for food security
- Centers of Origin and their location in India
- Indigenous healing practices and their relevance to rural health and veterinary care
- Food safety and impact of pesticide residues
- Why bioorganic agriculture and how
- Homestead health and nutrition gardens
- Processing for long term and medium term conservation of agrobiodiversity in Gene/Seed/ Grain Bank
- To develop a community based system for using and administering the material in the Gene/ Seed bank
- To characterize the agrobiodiversity and curate the collections
- Learn to evaluate the collection for agronomic properties, with the help of NBPGR and ICAR
- To organize organic/ green inputs and practice green/organic agriculture
- To collect, characterize and evaluate underutilized/ non commercial sources of edible bioresources for added food and nutrition
- Multiply these food sources and popularize them for free nutritional enhancement of poor diets.
- To prepare herbal formulations for simple ailments, under the guidance of Vaids and Hakims.
- Vermicomposting to create organic fertilizer and nutrients
- Preparing plant based pesticides
- To document information, keep accounts and maintain records of project activities

Farmer training programs

Education and Training Programs were conducted using (a) Door to door contact for creating awareness (b) Nukad-Nataks (c) Audio-Visual information materials (d) Practical Training (e) Visits to organic fields in Birsa Agriculture University (f) Field tests and demonstrations.

Teams consisting of experts from Birsa Agricultural University, Palandu ICAR station and Gene Campaign, have organized a number of training programs on bioorganic farming. The training programs were conducted in three phases, in phase one men and women farmers were made aware about the importance and economic value of the organic agriculture. In the second phase, theoretical details about the methods of preparation of biofertilizers and biopesticides, method of use, precautions and account keeping were provided. In the third phase, practical training to develop biofertilizers like vermicomposting, blue green algae based compost and other compost, as well as biopesticides from the locally available plants with pesticidal/insecticidal properties like Karanj, Tobacco, Sindwar, Neem, Calatropis, Tulsi, Lantana etc was imparted.

Over 1570 farmers have received training in organic agriculture practices and appear keen to shift to organic agriculture. Around 75 people have received training to become master trainers to give training in green agricultural practices.