TRIBAL COMMUNITIES OF THE JEYPORE TRACT OF ORISSA
India

Equator Initiative Case Studies
Local sustainable development solutions for people, nature, and resilient communities
Local and indigenous communities across the world are advancing innovative sustainable development solutions that work for people and for nature. Few publications or case studies tell the full story of how such initiatives evolve, the breadth of their impacts, or how they change over time. Fewer still have undertaken to tell these stories with community practitioners themselves guiding the narrative.

To mark its 10-year anniversary, the Equator Initiative aims to fill this gap. The following case study is one in a growing series that details the work of Equator Prize winners – vetted and peer-reviewed best practices in community-based environmental conservation and sustainable livelihoods. These cases are intended to inspire the policy dialogue needed to take local success to scale, to improve the global knowledge base on local environment and development solutions, and to serve as models for replication. Case studies are best viewed and understood with reference to 'The Power of Local Action: Lessons from 10 Years of the Equator Prize', a compendium of lessons learned and policy guidance that draws from the case material.

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PROJECT SUMMARY

The M.S. Swaminathan Research Foundation (MSSRF) was concerned about the rapid depletion of rice diversity in the Jeypore tract of the Indian state of Orissa, once the home of the largest number of rice varieties in India. In 1998, the foundation undertook to improve the condition of poor farmers while revitalizing vanishing rice varieties, combining modern and traditional approaches for the conservation, enhancement, and sustainable use of local rice biodiversity.

While coordination of initial research, pilot studies, and funding was handled by MSSRF, the institute has increasingly handed control over to local actors among the tribal communities of the Jeypore Tract through the development of community-based organisations. These local institutions have sustained and expanded the project’s benefits for the district’s communities and ecosystems through the introduction of a diverse range of sustainable livelihood activities.

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KEY FACTS

EQUATOR PRIZE WINNER: 2002

FOUNDED: 1998

LOCATION: Jeypore, Orissa, India

BENEFICIARIES: 1000 families from 16 villages

BIODIVERSITY: 83 rice landraces
The Jeypore tract in the Indian state of Orissa (now Odisha), is considered a center of origin and diversity of Asian cultivated rice (oryza sativa l.). Located in the district of Koraput, in southern Orissa, the Jeypore tract comprises a highland plateau of the Eastern Ghats consisting of a number of hills, with altitudes ranging between 150 and 1,500m above sea level. Fifty-two tribal communities live in Koraput, with the Khond, Bhatada, Paroja, Bhumia and Gadaba numbering among the largest of these. Tribal communities constitute half of the district’s population. Approximately 84 per cent of Koraput’s population live below the poverty line, making it one of the poorest regions in India.

The rural, tribal communities of this region have developed and conserved species of rice using traditional knowledge and innovative practices to meet evolving food security and environmental needs. Rice is cultivated across a range of agro-ecosystems, including uplands and lowlands, and irrigated and rain-fed landscapes. Land types are classified locally into five broad categories: donger - land on hilly slopes used for shifting cultivation; dhepa - unbunded and bunded upland landscapes; bhatta - irrigated and rain-fed medium lands; khala - lowlands; and jhola – deep lowlands or land located between hills as terraces.

Within each of these land categories, numerous varieties of rice are cultivated in three, distinct seasons: beali (autumn rice), sarrad (winter rice) and dalua (summer rice). Specific rice varieties are grown depending on local preferences for characteristics such as plant height, pigmentation of plant parts, grain shape and size, and the presence of awns. Different rice varieties are also cultivated for their culinary properties – cooked rice, popped rice, puffed rice and pressed rice; and their palatability – aromatic or non-aromatic. The range of genetic varieties and of cultural practices associated with rice have made the Jeypore tract a globally important reserve of genetic diversity and accumulated traditional knowledge of rice cultivation.

**Background and Context**

Addressing a decline in genetic diversity

The latter half of the twentieth century saw a rapid erosion of biological diversity in India. As a subset of biodiversity, agricultural biodiversity is under particular threat, with standardized crop varieties replacing native ‘landraces’ – local species varieties that have developed naturally through adaptation to their local environments. With the advent of India’s Green Revolution in the late 1960s, government agricultural extension agencies began introducing new rice varieties to improve production and productivity in tribal areas. In the process, local varieties were often replaced with high yielding varieties, eroding the rich genetic diversity of rice. Orissa was once the traditional home of the largest number of rice varieties of any state in India, with more than 1,750. However, by the 1990s, the number of local rice varieties had fallen to approximately 150.
To counter this trend, a movement to devise means and strategies of in situ conservation of agrobiodiversity and associated traditional knowledge has developed, to compliment ex situ storage and retrieval. Much agrobiodiversity is in the custody of tribal and rural communities scattered in remote, mountainous and often inaccessible regions, which are invariably poor and economically marginalized.

Concerned about the rapid depletion of rice diversity in one of its centers of origin, the M.S. Swaminathan Research Foundation (MSSRF), with a pro-poor, pro-nature, pro-women mandate, began endeavors to revitalize vanishing rice varieties, while simultaneously improving the conditions of poor farmers. In 1995, with a grant from the Ramon Magsaysay Foundation, MSSRF initiated a project to collect and document landraces from throughout the Jeypore tract in an effort to protect the intellectual property rights of the district’s tribal and rural farm families. In 1998, MSSRF, supported by the Swiss Agency for Development and Cooperation, commenced a project to enhance the conservation and sustainable and equitable use of biodiversity in seven tribal villages of Koraput district. The main goal of the project was to promote sustainable management of agrobiodiversity and to develop procedures to recognize and reward the contributions of tribal and rural families, in particular women, to the conservation and enhancement of genetic diversity.

The project had the following objectives:

i. Revitalization of the on-farm conservation traditions of rural and tribal farmers
ii. Development of innovative approaches to effectively link biodiversity conservation and enhancement with improvements to the livelihoods of the rural and tribal poor
iii. Development of participatory plant breeding and conservation systems
iv. Integration of principles of gender and social equity into biodiversity conservation sustainable use, through policy research.
v. Linking primary conservation actors with markets, to create an economic stake in conservation
vi. Offering networking and capacity building opportunities to tribal farm families through scientific training and exposure visits
vii. Enhancement of capacities related to biodiversity management at various levels (farmers, local communities, non-governmental organizations, government agencies and policy makers)

The key players in the project have been tribal and rural farming families, locally elected officials, government agencies and civil society organizations. Through self-help groups and community-based institutions, farming families have taken leadership in the management, conservation and sustainable use of genetic diversity of rice landraces. Wherever feasible, members of locally elected gram panchayats (village-level self-governments) take decisions on legal matters. Three dominant communities, the Paroja, Bhumia and Gadab, have participated in the in situ farm conservation practices that now extend to sixteen villages, and are supported by fifteen project staff. While the overall vision has not changed dramatically since 1998, new learning has been incorporated, most notably the use of participatory tools.

“Empowerment of primary conservers at the community level should be given top priority for in situ and on-farm conservation of agrobiodiversity.”

Bibhu Prasad Mohanty, Chairman, Tribal Communities of the Jeypore Tract of Orissa
Activities of the Jeypore tract project follow a ‘Four C’ strategy, focusing on conservation, cultivation, consumption and commerce, all with the aim of fostering conservation and sustainable use of rice genetic resources.

**The ‘Four C’ approach**

**Conservation:** Participatory plant breeding and on-farm, participatory conservation systems are used to link tribal farmers to ex situ gene, seed and grain banks. Documentation of farmer practices and cataloguing of genetic resources are undertaken at field locations, such as the Biju Patnaik Medicinal Plants Garden and Research Centre, and are subsequently shared with a Community Gene Bank in Chennai.

**Cultivation:** Farmers have been trained in improved agronomic practices. The spread of modified cultivation practices and genetic varieties has been facilitated by farmer-to-farmer seed exchanges, workshops on participatory hybridization, and the creation of field-level gene, seed and grain banks.

**Consumption:** The project has established mini hullers to reduce the labor intensity of rice grain processing, promoted kitchen gardens to increase household food security and nutrition, and has worked towards the revitalization of other traditional food crop varieties, including various species of millet, pulses and oil seeds.

**Commerce:** The project has attempted to introduce new varieties of rice and improve farmers’ access to new and emerging markets.

Prior to the project’s initiation, lack of access to modern agricultural technologies and practices hampered the ability of small-scale farming households to meet their food security needs. Yields of traditional rice varieties were typically low, and over-reliance on rice as a food staple was high. Rice cultivation was sufficient to meet food security needs for an average of eight to nine months per year. Simple agronomic practices have been introduced to increase the productivity of native rice varieties including seed selection and treatment before sowing; line transplanting to aid in harvesting and weeding; low seed rates to optimize spacing between seeds; transplanting of seedlings; and development of seed nurseries. Organic farming has also been encouraged through the application of farmyard manure and bio-pesticides. Consequently, tribal farming families have experienced higher rice yields, making it possible to meet household food requirements while also producing considerable surplus grain for sale on the market.

Community-based grain, seed and gene banks were created for storing and lending excess grains during food shortages. Shortened to ‘Village Seed Banks’ by participating communities, these banks also facilitate storage and exchanging of high-quality seeds of local landraces for sowing, and ensure the long-term conservation of genetic varieties.

**Participatory methods**

Participatory approaches to plant breeding and conservation have been applied to enhance existing on-farm varieties of rice. Self-help groups have been formed to carry out vermicomposting (composting using worms) which has contributed to enhanced agricultural yields. Kitchen gardens, household fruit-tree planting and forest food gardens have all been promoted to enhance food security and nutrition, and to give families additional sources of income.

MSSRF scientists and farmers worked together through a participatory process to catalog native rice landraces based on genetic characteristics. A number of quantitative traits were observed based on random samples of plants, including plant height, number of tillers, number of panicles, average panicle length, number of filled grains per panicle, grain fill index and harvest index.
Farmers were trained in the identification of various morphological characters related to yield performance, and also received training in selecting panicles with well-filled grains as seed material. After three seasons of practical training by MSSRF scientists, farmers were able to autonomously conduct seed selection and varietal purification using methods such as threshing, hand winnowing, removing undersized seeds, removing off-color seeds, and sun-drying. Data on the quantitative traits of landraces were statistically analyzed and the top performing varieties for each agro-ecosystem were selected.

The process of selecting and purifying native varieties helped farmers to add value to seeds for sale, with purified seeds achieving higher prices on the market than unpurified varieties, as illustrated in Table 1.

Table 1: The relative price of purified and unpurified rice varieties

<table>
<thead>
<tr>
<th>Agro-ecosystem type</th>
<th>Landraces</th>
<th>Purified (INR)</th>
<th>Unpurified (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upland</td>
<td>Paradhan, Matidhan, Pandakagura, Basumati, Donder</td>
<td>7-8</td>
<td>5</td>
</tr>
<tr>
<td>Medium land</td>
<td>Sapuri, Bodikaburi, Gathia, Muktabali</td>
<td>12-15</td>
<td>10</td>
</tr>
<tr>
<td>Lowland</td>
<td>Umuriachudl, Sunaseri, Velikan, Pathangada</td>
<td>12-15</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Kalajeera</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: M. S. Swaminathan Research Foundation, 2010-2011 Annual Report

All of the improved agronomic practices introduced under the initiative practices have a high rate of uptake among farmers participating directly in the initiative’s work, and methods may also be replicated by non-participating neighboring farmers. Figure 1 illustrates the adoption rates of various components of improved agronomic practices by both participating farmers and non-participating farmers.

Target beneficiaries of the project are tribal, rural and economically-marginalized farming families, most of whom farm less than two hectares of land. In 1998, a total of 100 farming families from eight villages comprised the three community development blocks of Koraput district participating in the project. This number has since increased to nearly 1000 families from sixteen villages belonging to five different tribal communities. Knowledge has been rapidly disseminated to other regions and farming communities through farmer-to-farmer exchanges. Similarly, the initiative has developed a ‘Train the Trainers’ program that equips model farmers to disseminate more complex scientific knowledge. Village knowledge centers use information and communications technology to promote the project as well as for outreach and knowledge dissemination.

Fig. 1: The percentage of participating and non-participating farmers applying improved agronomic practices

![Graph showing percentage of participants and non-participants applying improved agronomic practices](source: M. S. Swaminathan Research Foundation, 2010-2011 Annual Report)
The project has innovatively applied technology, traditional knowledge, and management techniques. In terms of innovative technology, the selection of seeds from mother panicles of local rice varieties for seed purification has led to uniformity and stability of yields as well as to crop improvement.

Among the most noteworthy technological innovations has been the establishment and introduction of gene, seed and grain banks, which have provided grain for consumption, seeds for cultivation and genes for conservation. Participatory approaches to local rice variety hybridization, water management in fields, and the practice of seed soaking have also contributed significant technical advancements. The project has applied traditional knowledge to seed storage, drying and preservation, rooting these practices in local capacity and culture. The project’s management innovations include the building of community institutions around the gene, seed and grain banks, for self-help groups and as the basis for knowledge-sharing networks.

**Improving livelihoods**

To supplement the increased incomes from improved agronomic practices, MSSRF encouraged the development of a number of alternative livelihood options among Jeypore’s tribal communities. Between 2004 and 2009, a range of livelihood projects enabled families to diversify their sources of household income. These activities (summarized in Table 2) focused on six villages - Chendia-Jhiligaon, Dhola-Jhiligaon, Kaudiaguda, Kusumguda, Paknaguda and Uduluguda, targeting the poorest tribal households. The most successful activities promoted included large-scale vegetable cultivation, vermicomposting, backyard poultry farming, fish farming, and the initiative’s ‘five-plant’ campaign.

<table>
<thead>
<tr>
<th>Livelihood activity</th>
<th>Number participating</th>
<th>Year</th>
<th>Status</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group vermicompost production</td>
<td>16 households in three villages</td>
<td>2006-07</td>
<td>Very successful, replicated in other villages</td>
<td>Farmers use compost in their own fields and sell surplus for cash income</td>
</tr>
<tr>
<td>Individual vermicompost production</td>
<td>35 households in three villages</td>
<td>2004-05</td>
<td>Very successful</td>
<td>Organic cultivation has enhanced production and raised income</td>
</tr>
<tr>
<td>Oyster mushroom cultivation</td>
<td>75 members</td>
<td>2007</td>
<td>Cultivated by groups and individuals in three villages</td>
<td>Created employment and raised incomes</td>
</tr>
<tr>
<td>Straw mushroom cultivation</td>
<td>51 households in three villages</td>
<td>2007</td>
<td>Replicated in neighboring villages</td>
<td>Supplementary income source</td>
</tr>
<tr>
<td>Off-season vegetable cultivation</td>
<td>61 households</td>
<td>2004-05</td>
<td>Hampered by water scarcity during summer months</td>
<td>Cultivation of cash crops has increased incomes of farm families</td>
</tr>
<tr>
<td>Group vegetable cultivation</td>
<td>66 households in three villages</td>
<td>2004-05</td>
<td>Group cultivation a success; individual cultivation given emphasis after two years</td>
<td>Created employment and raised incomes</td>
</tr>
<tr>
<td>Individual vegetable cultivation</td>
<td>91 households in three villages</td>
<td>2007</td>
<td>Built on success of group cultivation; technical guidance given to farmers</td>
<td>Enhanced productivity of upland areas, increased incomes</td>
</tr>
<tr>
<td>Inter-cropping of arbi (taro) and yam</td>
<td>24 households in Nuaguda village</td>
<td>2004-05</td>
<td>Used for seed multiplication</td>
<td>Farmers have also used for household consumption</td>
</tr>
<tr>
<td>Fish-farming</td>
<td>24 households in Nuaguda</td>
<td>2007</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>Tamarind value addition</td>
<td>35 households in Nuaguda and Gunthaguda villages</td>
<td>2007</td>
<td>Undertaken with Community Gene Bank (MSSRF Chennai)</td>
<td>Tamarinds processed and kept in cold storage for sale during peak season at higher price</td>
</tr>
<tr>
<td>Mini rice huller</td>
<td>34 households in Nuaguda</td>
<td>2007</td>
<td>Maintained by self-help group members</td>
<td>Has helped households to save time and increase income</td>
</tr>
<tr>
<td>Leaf plate stitching</td>
<td>8 households in Boliguda village</td>
<td>2007</td>
<td>Groups provided with sewing machines</td>
<td>Increased incomes and used to repair clothes</td>
</tr>
<tr>
<td>Groundnut cultivation</td>
<td>54 households in Boliguda village</td>
<td>2006</td>
<td>Under large scale production and has been replicated</td>
<td>The largest source of income after paddy rice</td>
</tr>
<tr>
<td>Green-gram (mungbean) cultivation</td>
<td>13 households in Nuaguda</td>
<td>2006</td>
<td>Has been successful</td>
<td>Incomes increased</td>
</tr>
<tr>
<td>Shallow wells for irrigation</td>
<td>46 households in Nuaguda and Gunthaguda villages</td>
<td>2008-09</td>
<td>Has benefitted vegetable cultivation</td>
<td>Income generated by vegetable cultivation</td>
</tr>
</tbody>
</table>

*Source: M. S. Swaminathan Research Foundation, 2010-2011 Annual Report*
Impacts

Biodiversity Impacts

The area under landrace cultivation, the number of different local varieties used, and the number of farm families participating in the project have all increased significantly across the target region since the project was initiated. The number of rice landraces under cultivation has increased from 72 to 83, and this rate of scaling-up has continued, with 402 acres under landrace cultivation in 2009, and 978 farming families involved in the conservation and enhancement of genetic diversity of rice species. Village Seed Banks are now operating in 17 villages, conserving a total of 24 rice landraces, in contrast to six varieties in 2002.

These activities inherently enhance biodiversity by conserving varieties of rice that would otherwise fall out of use. The farmers of the Jeypore tract are conserving unique landraces of rice that have adapted, largely by natural processes, to the specific climatic, environmental and cultural conditions of the region, thus enhancing the region's agrobiodiversity, and thus its general biodiversity.

Playing a leading role in the conservation of agrobiodiversity is the Biju Patnaik Medicinal Plants Garden and Research Centre. This medicinal plants garden is home to 347 ethno-medicinal plants commonly used by nine tribal communities in Orissa. In conjunction with other gardens, including a women's medicinal plants garden, the Eastern Ghats Rare, Endangered and Threatened (RET) Plant Garden, and artificial, sacred groves, this center has coordinated the preservation of a diverse range of native species and catalogued research into their ethno-botanical properties.

All three agro-ecosystems in which the project operates – upland, irrigated and rain-fed landscapes; medium land; and lowland – have benefitted from organic farming methods. Different species of traditional food crops like millets, pulses and oilseeds have also been revitalized, improving household food security and income generation, and increasing resilience to crop failures.

Socioeconomic Impacts

The target beneficiaries of the initiative are farming families in Koraput's tribal and rural communities, generally farming less than two hectares of land each. MSSRF has worked to increase the livelihood options of these families, raise their household incomes, and improve household food security. Since 1998, the project has extended to reach sixteen villages in three community development blocks in the district, reaching a total of 4,500 individuals by 2009. As illustrated by Table 3, poverty levels in these villages are high, with 76 per cent of their overall population living below the poverty line.

The social and economic benefits of cultivating native rice varieties are numerous. In addition to the cultural value placed on inherited varieties, other benefits of traditional varieties over high-yielding varieties may include superior taste and nutritional value, resistance to pests and diseases, resistance to droughts and floods, compatibility with local farming conditions, and economic practicality as they require fewer inputs such as chemicals and fertilizers. Generally, farmers of traditional varieties benefit from the crops' natural adaptation to specific local conditions, which allows them to be farmed more sustainably using fewer chemical inputs. There is also a great cultural benefit to communities in the use of their accumulated traditional knowledge of local varieties' properties and uses.

Increasing food security

As a result of the methods introduced by the initiative, rice is now available year-round, bridging household food deficits, where previously, it only met families' food needs for eight to nine months of the year. Harvested rice complements the farming of tubers, bamboo shoots, mushrooms and other forest products for food security. The promotion of off-season vegetable cultivation has also supported greater resilience to climatic changes and bolstered food security.
Training in line transplantation has improved the productivity of family farms by up to 25 per cent. Previously, transplantation of seedlings took place at 45 days old, with seedling then planted haphazardly. MSSRF training has encouraged the transplantation of seedlings at 21-25 days, allowing 20 cm between rows and 10 cm between plants on leveled plots, and planting north to south to allow plants to capture more sunlight. These conditions optimize agricultural productivity and increase yields. Similarly, MSSRF researchers determined that the widespread practice of planting more than 80 kg of seeds per acre was adversely impacting productivity, as plants competed for scarce nutrients. Consequently, farmers have been encouraged to use a seed rate of 12 kg per acre, scientifically determined to maximize output. As line planting has made it easier for farmers to weed rice crops, farmers have increased their numbers of productive working days.

The impact of MSSRF’s participatory work in Koraput villages has been remarkable. Average yields under improved agronomic practices have increased dramatically in all landscapes and for all landraces cultivated. The extent of yield improvement has varied between 30 and 70 per cent, all of which has been achieved without any chemical inputs and with only slight increases in the total cost of cultivation. Variation in the extent of improvement was observed across farmers, which could be attributed to variations between landholdings and variation in the adoption of modified agronomic practices.

Initial results in 1999 were especially impressive, helping to convince farmers of the benefits of adopting modified agronomic practices. In market terms, individual farmers realized yield improvements of up to 298 per cent in lowlands, 209 per cent in medium lands, and 162 per cent in uplands. In a survey of participating and non-participating farmers, improvements in benefit to cost ratio compared with traditional farming practices were seen in lowland and medium land farms, with the results for lowland farmers especially impressive; for an average cost of INR 6,023 per hectare, yields produced INR 14,144, for a benefit to cost ratio of 2.35.

The range of benefits brought about by the initiative has vastly improved households’ economic situations. Participating households have been able to sell excess grain and vegetables, reducing incidence of farmers mortgaging their lands, selling possessions or having to pawn belongings at high interest rates. Farmers have also been able to invest in bullocks to plough their land, further improving productivity. Revenues have been invested into school fees to improve educational opportunities, community infrastructure projects, home renovations and other improvements in quality of life.

Of the rice varieties native to Jeypore, Kalajeera, a lowland scented variety, has one of the highest commercial values due to its aromatic quality and cultural importance. Kalinga Kalajeera Rice Growers Cooperative Society was formed for the large-scale cultivation of this variety, with support from the National Agricultural Cooperative Federation. The increased yields and prices achieved for this variety since 2000, illustrated in Table 4, demonstrate the success of efforts to enhance its cultivation. In 2010-2011, the Kalinga Kalajeera Rice Growers Cooperative Society also promoted the adoption of the popular landraces Machhakanta and Haladichudi, which are processed into dosa powder mix, puffed rice bodi, chuda pressed rice mixture, and murukku. These value-added products are sold at the local weekly market, exhibitions, and in retail shops by self-help groups, bringing in extra income for group members. In 2010, the combined area under cultivation of these three varieties was 261 acres.

Developing new sources of household income

During the winter and summer seasons, MSSRF assisted 116 farm families in bringing 105 acres of land under cultivation with 18 different vegetables, including watermelon, tomato, pumpkin and carrot. These families shared a total profit of INR 713,857 from cultivation, with an average household profit of INR 6,154 (approximately USD 120).

Fish farming was carried out in the rainy season using individual farm ponds and community ponds, involving a total of 96 households. The community purchased around 27,000 fingerlings from the hatchery of the Orissa Fisheries Department. These were raised in village ponds with technical guidance and regular monitoring by MSSRF.
A total of 2,390 kg of fish was harvested for a profit of INR 191,160, giving an average profit of INR 1,991 per household (approximately USD 39).

Vermicomposting was taken up by 86 farm families, who constructed compost pits with tin roofs to reduce the maintenance costs associated with traditional thatching. A total of 259 quintals of ‘vermiwash’ was produced. With each household using one quintal in vegetable cultivation, a surplus of 173 quintals was sold at INR 400 each.

Backyard poultry farming and the “five-plant” campaign aimed to improve household nutritional security in 469 households. Each household was supplied with four 21-day old chicks, with 50 per cent of the cost being contributed by the households. These chicks were purchased from the Central Poultry Development Organization at the rate of INR 25 per chick. The poultry are fast-growing, reaching one kg in weight within three months.

Finally, the ‘five-plant’ campaign has encouraged households to plant a package of crops – drumstick (moringa oleifera), banana, papaya, green chili and yam – in backyard gardens. During the project term, 8,800 seedlings of these plants were raised in community nurseries in each of the six villages. Due to local climatic and soil conditions, however, the average survival rate of these crops was only 40 per cent, with yam being the only crop that was grown successfully across all households. This package of crops is being adjusted for future projects.

**Health benefits of native plants**

Through its work in conservation of native medicinal plant species, the Biju Patnaik Medicinal Plants Garden and Research Centre conducted a campaign on herbal prevention of malaria during 2010-2011. A herbal remedy using four native plants with medicinal properties – nictanthes arbor-tristis, andrographis panniculata, azadirachata indica and tinospora cordifolia – was distributed to 800 tribal community members in Kundura. Awareness raising on herbal remedies for malaria was also conducted in February 2011 with 316 students from nine schools. The Biju Patnaik Centre hosted demonstrations on 21 commercially cultivated species prioritized by India’s National Medicinal Plant Board, including the large-scale cultivation of long pepper (piper longum) and lemon grass (cymbopogon flexuosus). The center has also established a model on home herbal gardens to create awareness on the use of medicinal plants for primary healthcare. The center has acted as a ‘community campus’ for raising awareness on the ethno-botanical uses of native plant species. During 2011, 34 schools in Koraput and Nabarangpur districts established student herbal gardens with technical guidance from MSSRF, and the Biju Patnaik Centre supplying 4,420 medicinal plant seedlings belonging to 26 species.

**POLICY IMPACTS**

Since 1990, MSSRF has played a lead role in the organization of a series of international- and national-level workshops and consultations on plant genetic resources, their sustainable use and the equitable sharing of their benefits, using the activities of the Jeypore tract farmers as a basis. The Keystone Dialogues (1988-1991) led to the recognition of farmers’ rights within the Food and Agriculture Organization of the United Nations (UN FAO) framework and also contributed significantly to the Convention on Biological Diversity (CBD). MSSRF participated in national consultations for the creation of a *sui generis* system for India, which eventually led to the Protection of Plant Varieties and Farmers’ Rights Act in 2001 and the Biological Diversity Act in 2002, while the Chennai Platform of Action was developed as a conscious effort to mainstream biodiversity into the Millennium Development Goals.

### Table 4: Kalajeera production and price, 2000-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Villages</th>
<th>Families</th>
<th>Area (acres)</th>
<th>Production (quintals)</th>
<th>Grain Price (INR/quintal)</th>
<th>Seed Price (INR/quintal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>3</td>
<td>3</td>
<td>0.66</td>
<td>12.2</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>2006</td>
<td>27</td>
<td>126</td>
<td>100.7</td>
<td>1208.4</td>
<td>1000</td>
<td>1500</td>
</tr>
<tr>
<td>2008</td>
<td>44</td>
<td>159</td>
<td>121.9</td>
<td>1340.9</td>
<td>1500</td>
<td>1700</td>
</tr>
<tr>
<td>2009</td>
<td>29</td>
<td>121</td>
<td>98.5</td>
<td>1209.4</td>
<td>1700</td>
<td>2000</td>
</tr>
</tbody>
</table>

Source: M. S. Swaminathan Research Foundation, 2010-2011 Annual Report
The Plant Variety Protection and Farmers’ Rights Authority (PVPFRA) was established by the Indian government to implement the Protection of Plant Varieties and Farmers’ Rights Act. In order to establish an effective system for the protection of plant varieties, the rights of farmers and plant breeders, and to encourage the development of new varieties of plants, it was considered necessary to recognize and protect the rights of farmers involved in conserving, improving and making available plant genetic resources for the development of the new plant varieties. This authority has also played a role in protecting plant breeders’ rights to stimulate investment for research and development for the development of new plant varieties and to facilitate the growth of the seed industry, ensuring the availability of high quality seeds and planting material for India’s farmers.

MSSRF has continued to assist the PVPFRA and the National Biodiversity Authority by providing input into the development of guidelines for the effective implementation of various provisions of the acts. In particular, MSSRF has worked alongside the PVPFRA with farmers from the Jeypore tract in the registration of local crop varieties, the identification of agrobiodiversity hot spots, and the sharing of expertise in agrobiodiversity, intellectual property rights, genetic resource access and benefit sharing, and social mobilization. In 2011, MSSRF conducted street plays and training programs on farmers’ rights in 27 tribal villages of Boipariguda, Jeypore and Kundura in Koraput, reaching a total population of 5,000 tribal and rural farmers. To date, Jeypore farmers have formally registered six native varieties with the PVPFRA.

“In view of the emerging challenge global environmental change including climate, emphasis needs to be shifted towards addressing new dimensions of on-farm conservation of biodiversity for food security, poverty reduction and sustainable livelihoods.”

Bibhu Prasad Mohanty, Chairman, Tribal Communities of the Jeypore Tract of Orissa
SUSTAINABILITY

Since 2006, MSSRF has been carrying out its work on biodiversity in close cooperation with the tribal villages of Koraput. Processes and results of all projects are documented and converted into multimedia resources, and used as training material and as tools for education and learning. Attempts are made to facilitate replication of this body of learning through village knowledge centers and farmer groups that act as vehicles for sustainability.

In recognition of the initiative’s achievements, the State Government of Orissa provided land to the Foundation for the establishment of a Community Agrobiodiversity Centre at Koraput. This permanent facility will include laboratories and a training center that will contribute significantly to the long-term sustainability of the project’s work.

At the grassroots level, the efforts of MSSRF and the communities of the Jeypore tract have been institutionalized through the development of community-based organizations that are carrying out projects with increasing autonomy from the Foundation. These include the Panchabati Grama Unnayana Samiti (PGUS), Central Village Committees, the Kalinga Kalajeera Seed Growers Society (KKSGS), village seed banks, self-help groups, and the project’s central management committee. These local institutions have the ability to sustain, enhance and expand the project’s environmental benefits throughout the district’s communities and ecosystems.

The Panchabati Grama Unnayan Samiti is a community-based organization bringing together the sixteen target communities. The organization is funded by interest earned on the USD 35,000 Equator Prize, awarded to MSSRF in 2002. This interest totaled INR 300,000 (USD 5,855) in 2010-2011, and has been reinvested by communities in local resource development, including the renovation of village and farm ponds to conserve rainwater for agriculture, household use and fish farming. The organization won the Genome Saviour Award in 2009-10 and six representatives of the sixteen villages were honored with a check for INR 1,000,000 (USD 19,510) in a ceremony in New Delhi in recognition of their contribution to the conservation and promotion of local genetic resources in the field of biodiversity.

Central Village Committees have been created in all of the project’s target villages, with executive body members elected by villagers for a one-year period. These committees are responsible for monitoring the work of projects in the villages, and providing suggestions for improvement, and play a key role in village resource management. All social, technical, and political conflicts are placed before the committee for resolution. Each committee manages a Village Development Fund into which community members pay individual contributions ranging between IDR 5-30 each month. The funds are designed to meet emergency needs and provide financial assistance to individuals or groups. All village funds are formalized and linked to banks for availing loans. In 2010-2011, IDR 56,098 was collected from 958 households.

The Kalinga Kalajeera Rice Growers Cooperative Society has taken on considerable responsibility in recent years, building on MSSRF’s work in promoting the cultivation of commercial Kalajeera, Machhakanta and Haladichudi rice varieties. The Society has conducted farmer-to-farmer extension programs to encourage cultivation of these crops, bringing substantial economic rewards to its members. A total of thirty self-help groups have also been established. These groups take regular deposits from members and are able to take out loans to invest in activities including goat rearing, agricultural activities, fish farming and mushroom cultivation.

Finally, village seed banks have been replicated in all target communities, focusing on conserving traditional landraces of rice, ragi, horse-gram and green-gram, with grains collected from community members. These local institutions are linked to the MSSRF Community Gene Bank in Chennai. The range of local institutions established has helped to devolve the management of these resources and promote community-led conservation and utilization of biodiversity.
of the project to the grassroots level, avoiding overall dependence on any one entity, while substantially building local capacity. These institutions underpin the work of MSSRF and have been key drivers of the initiative’s growth, expansion and sustainability.

REPLICATION

Since the initiative was begun, the area under landrace cultivation, the number of different local varieties in use, and the number of farm families participating in the project have all increased significantly across the target villages. In 1998, a total of 100 farming families from eight villages in Koraput district were involved in the initiative’s activities. This number has since increased to nearly 1,000 families from sixteen villages, encompassing members of five different tribal communities. The area under cultivation increased from 278.5 acres to 366 acres between 2000 and 2005; the number of landraces being cultivated increased from 72 to 83 in the same period, while the number of participating farm families rose from 250 to 390.

This rate of scaling-up has continued, and by 2009, the area under landraces had increased to 402 acres and involved 978 farm families. Village Seed Banks are now operating in seventeen villages, conserving a total of 24 rice landraces, up from six varieties in 2002.

Knowledge has been disseminated rapidly to other regions and farming communities through farmer-to-farmer exchanges, while a ‘Train the Trainers’ program has equipped model farmers in the dissemination of more complex scientific knowledge. The project is promoted through village knowledge centers, which use information and communications technology to promote the project as well as for outreach and knowledge dissemination. Training modules have been created for the extension of improved agronomic practices. Knowledge generated by the initiative is extensively disseminated to other stakeholders during formal meetings, presentations, websites and scientific and other publications. Farmer-to-farmer knowledge diffusion also occurs organically during visits to local markets, as well as through interaction during religious and social functions. NGOs in Kalahandi and Malkangiri districts have also played a role in replication, while the State Government of Orissa is in the process of funding local biodiversity projects based on the knowledge and experiences of MSSRF projects in Koraput.

PARTNERS

The project’s leading partners include the M. S. Swaminathan Research Foundation (MSSRF), the Swiss Agency for Development and Cooperation (SDC), United Nations Development Programme (UNDP) Equator Initiative and the Plant Variety Protection and Farmers Rights Authority.

Beyond these organizations, a wider range of stakeholders are often brought together by MSSRF for knowledge exchanges and policy development. For instance, a pilot study on conservation and the adaptive management of globally important agricultural heritage systems was carried out during 2010-2011 with support from UN FAO. This involved a one-day national consultation in Jeypore in November 2010. Regional consultations for this were conducted with participants from national institutions such as the Protection of Plant Varieties and Farmers’ Rights Authority, the Central Rice Research Institute, the National Bureau of Plant Genetic Resources; state institutions such as the Orissa University of Agriculture and Technology; and members of NGOs, community-based organizations, farmers, local government and Panchayat Raj Institution members of Koraput district.

“Communities should pool and utilize their local bio-resources and form local institutions for ensuring long term sustainability. Capacity building is another important component to sustain a project for a long term. Building a corpus fund is essential for improved management and continuity”

Bibhu Prasad Mohanty, Chairman, Tribal Communities of the Jeypore Tract of Orissa
FURTHER REFERENCE

- Tribal Communities of the Jeypore Tract of Orissa Photo Story (Vimeo) http://vimeo.com/15672408

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