



# GENETIC RESOURCE, ENERGY, ECOLOGY AND NUTRITION (GREEN) FOUNDATION

India



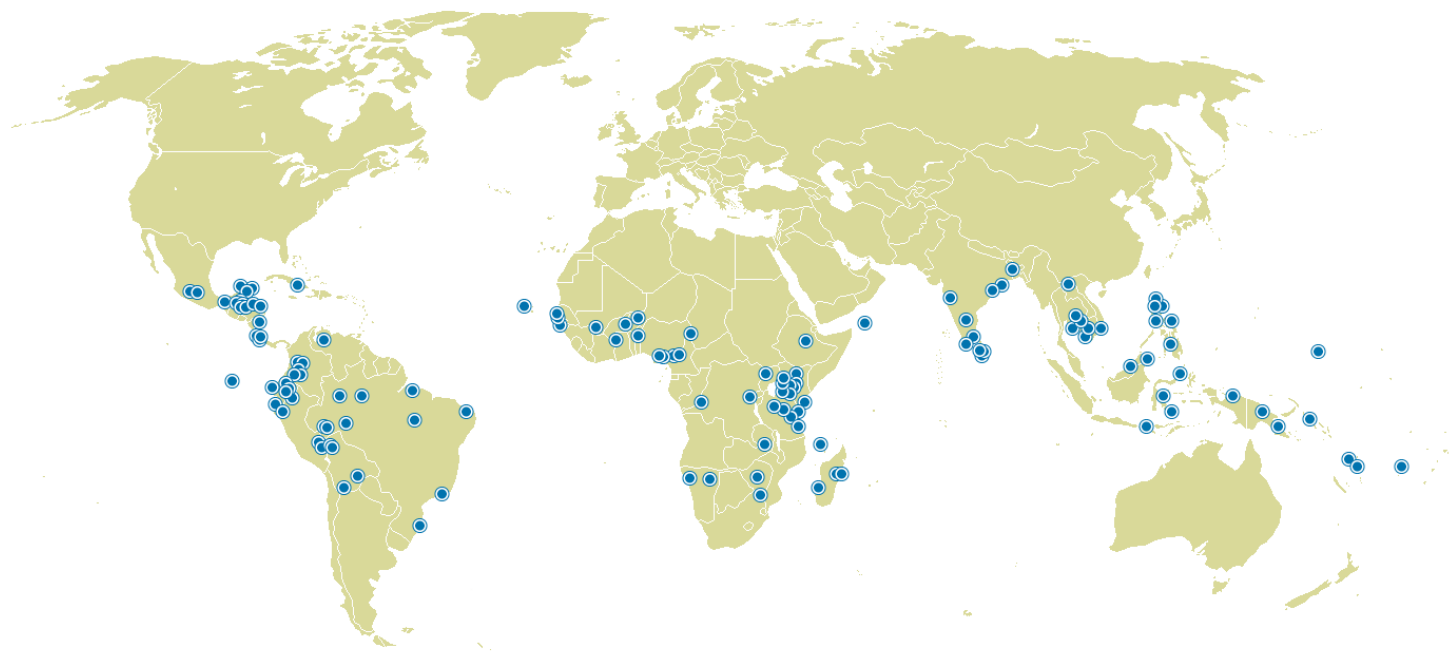
## Equator Initiative Case Studies

Local sustainable development solutions for people, nature, and resilient communities

# UNDP EQUATOR INITIATIVE CASE STUDY SERIES

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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## Acknowledgements

The Equator Initiative acknowledges with gratitude the GREEN Foundation, and in particular the guidance and inputs of Rama Satish. All photo credits courtesy of GREEN Foundation. Maps courtesy of CIA World Factbook and Wikipedia.

## Suggested Citation

United Nations Development Programme. 2012. *Genetic Resource, Energy, Ecology and Nutrition (GREEN) Foundation, India*. Equator Initiative Case Study Series. New York, NY.

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India

## PROJECT SUMMARY

With the aim of preserving seed diversity and genetic heritage, encouraging the adoption of organic farming practices, and improving rural livelihoods, GREEN Foundation works through around 40 farmers' groups – termed Krishi Self-Help Groups – covering 30 villages across the northern districts of Karnataka, comprising a target population of almost 5,000 farmers, with a particular focus on women and indigenous peoples. All groups are members of a farmers' federation, Janadhanya. Beginning in 1994 with just a handful of farmers, the association now comprises 650 members.

GREEN staff oversee agricultural trainings through outreach services and conservation awareness raising activities, while much of the work of the foundation takes place in-situ, in community-managed seed banks and through on-farm seed cultivation. The foundation currently cultivates 328 varieties of indigenous seed, which have been revived, reintroduced, multiplied and stored in gene banks.

## TABLE OF CONTENTS

Background and Context 4

Key Activities and Innovations 6

Biodiversity Impacts 8

Socioeconomic Impacts 10

Sustainability 11

## KEY FACTS

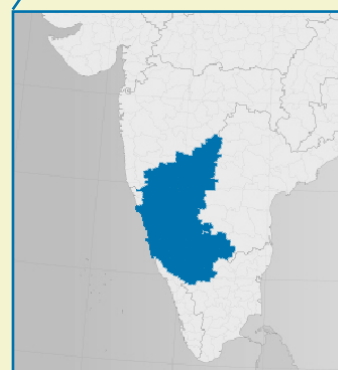
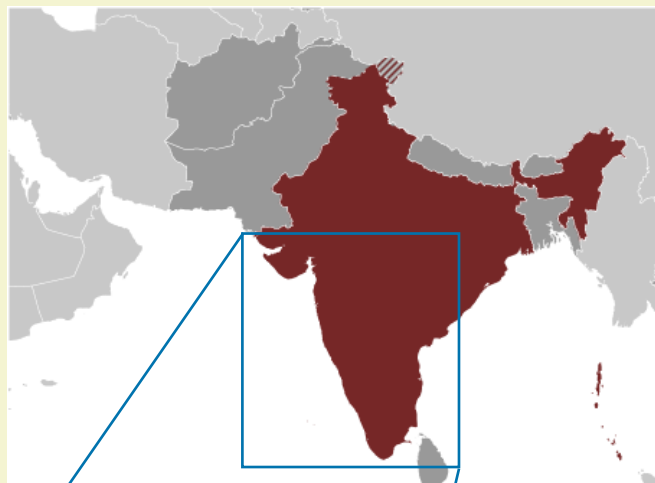
EQUATOR PRIZE WINNER: 2004

FOUNDED: 1994

LOCATION: northern rural districts of Karnataka, South India

BENEFICIARIES: nearly 5,000 farmers

BIODIVERSITY: seed and gene banks





# Background and Context



Genetic Resource, Energy, Ecology and Nutrition (GREEN) Foundation is a community-based organization that works with disadvantaged groups of smallholder and marginalized farmers in the semi-arid regions of Karnataka, South India, with a particular focus on women farmers.

The organization aims to conserve agrobiodiversity and raise the income levels of farming households through the promotion of sustainable agriculture. The initiative began in 1994 as the modest efforts of five female farmers who shared a commitment to seed exchange and preserving genetic diversity. With its central headquarters in Bangalore, capital of Karnataka, the foundation has since grown to benefit almost 5,000 farmers across the state's northern rural districts through a range of sustainable agriculture activities, including seed diversity, food security, and agricultural diversification.

Project activities have been enthusiastically embraced by rural communities in Kanakapura Taluk, Ramanagara District, while the foundation is currently expanding its project area to include three agro-climatic zones in Karnataka: the "northern dry zone", comprising Kakamari, in Belgaum District; the "northern transition zone" of Gundenatti, Belgaum District; and the "hilly zone" of Kadkod, Uttara Kannada District.

Working through networks within the farming community, the foundation has been successful in reviving the genetic resource base essential for the survival of smallholder farmers. Activities bring together the socioeconomic, ecological, cultural and gender-specific aspects of conserving biodiversity.

The organization embraces a multi-stakeholder partnership model that brings together farmers, scientists and consumers in developing biodiversity conservation and sustainable agricultural practices and consumption patterns that are based on traditional knowledge and which are validated and improved through scientific research.

## *Vision and project catalysts; combating food insecurity*

The group's vision is well-preserved ecosystems, high genetic diversity, and sustainable rural livelihoods that protect India's natural resource base for future generations. More specific objectives include conserving local seed diversity, promoting an increased reliance on biodiversity-based ecoagriculture, and using these as foundations for endogenous growth and development of rural communities; creating a gender-sensitive environment which enhances leadership development skills for local women; contributing to the livelihoods of local people through value-added strategies that market cultivated and wild biodiversity; connecting the elements of soil, water, air, sunlight and seed to ensure an abundance of nutritious food and other basic needs of communities; and continuing to nurture community participation and assist in building robust people's institutions.

Among the project catalysts were poverty, malnutrition, a lack of food security, increased use of chemical fertilizers, and environmental decline. While the Green Revolution has helped meet food needs in India over the past four decades, it has promoted agricultural techniques with lasting environmental implications, including the contamination of groundwater, release of greenhouse gases, loss of crop genetic diversity, and the eutrophication of water bodies and coastal marine ecosystems. It has also increased the dependence of marginalized farmers on external inputs, leaving them more vulnerable to the vagaries of nature and thus threatening food security at the subsistence level. Similarly, massive biodiversity loss and ecosystem degradation have deepened poverty and insecurity. Breaking this vicious cycle requires local ingenuity and strong entrepreneurship to create new forms of income based on a conservation ethic rather than on over-harvesting.

With regard to food and nutritional security, malnutrition caused by deficiencies in specific vitamins and minerals afflicts some 40 percent of the world's population, especially women and children.



The majority of people suffering from micronutrient malnutrition live in South Asia, ironically a region with an incredible diversity of fruits and vegetables that are excellent source of micronutrients. The trend for more and more people to be nourished by fewer and

fewer plant and animal food sources, however, has reached the point today where there is greater dependence on a handful of species. GREEN Foundation addresses this shortfall by conserving agricultural genetic diversity through its smallholder farmers' groups.



*“Observing climate change has become inevitable for the smallholder and marginalized farmers who live in areas reliant on rainfall. Our farmers have developed multiple strategies to cope with the changing climate.”*

*Rama Satish, GREEN Foundation*



# Key Activities and Innovations



With a focus on the conservation of local seed diversity, conservation of agrobiodiversity through ecoagriculture, and promotion of sustainable livelihoods through value-added processing and marketing, the GREEN Foundation has 17 full-time staff.

## *Rural beneficiary population*

The target beneficiaries of the project are largely farmers who have little or no land, and in particular socially and economically marginalized women. GREEN Foundation project activities are currently being carried out in around 60 villages in Kanakapura Taluk, including 4,000 farming households, with a total target population of almost 5,000 farmers across the northern districts of Karnataka, including 41 farming families in the village of Gundenatti, 28 families in Sirsi, and 40 families in Bija pur. In Gundenatti alone, over 40 percent of project beneficiaries are women and over ninety percent are indigenous peoples. All of the target project beneficiaries are located in rural areas.

## *Janadhanya: a federation of farmers' self-help groups*

The organization's main strategy for reaching its target beneficiary population is through scaling up farmers' groups, coordinated under a farmers' federation that integrates and coordinates the activities of the groups. Capacity building activities of the GREEN Foundation were initially targeted at improving the livelihoods of farmers through eco-agriculture practices at the individual farm level. Since its formation, the group has expanded to a more community-based and oriented approach, acknowledging that CBOs have capacity to share knowledge with one another and that larger scale change necessitates a more systemic approach. There are currently 40 farmers' groups – termed Krishi Self-Help Groups – covering 30 villages in the project area. All groups are members of a farmers' federation called Janadhanya (from the word 'Jana', meaning 'people') Registered under the Societies Registration Act of 1960, Janadhanya was established in 2006 with a handful of members keen to take the

movement forward while consolidating community involvement. An average of five to seven villages comprise individual clusters; representatives of these clusters, who are either nominated or voted in, make up the Board of Directors of Janadhanya. Currently, the board comprises of 13 members, 5 of whom are women. In order to involve all sections of the communities in which it works, GREEN has also facilitated the formation of Village Development Committees (VDCs). These VDCs, unique in their aim of removing all barriers of caste, religion and gender, meet once a month in order to discuss issues related to organic farming.

Today, Janadhanya comprises nearly 650 members, 285 of whom are women. Currently, the association is active in the Kanakpura area with regular trainings and exposure visits run by GREEN Foundation to build the capacity of its member groups. The federation intends to expand the number of Krishi Self-Help Groups to 100, covering over 60 villages.

## *Strategies for behavioral change*

The organization has been highly successful in reaching and expanding its target population, growing an integrated movement of organic farming and seed conservation. To facilitate the spread and conservation of seed diversity through its farmers' self-help groups, the foundation has established 34 community seed banks across the state, which has in turn resulted in the revival of indigenous knowledge as well as socially, environmentally and economically adapted agricultural practices. The production and distribution of traditional crop varieties by smallholder farmers through community-based seed banks is innovative as a decentralized system, whereby farmers need not depend on far-removed seed supply chains involving seed companies or government seed agencies. Community seed banks are able to adapt and respond directly and quickly to community needs and demands.

Uptake of new organic farming practices has been achieved through



extensive communication and educational outreach coordinated by the GREEN Foundation. This process has been slow and steady, as it took some time for farmers to abandon the use of chemical fertilizers and transition to organic farming, which typically involves more labor to integrate organic input use on farms. To overcome local apprehension around organic farming, the foundation has held seed fairs, used street theatre and public documentation of traditional seed varieties, and conducted training and awareness-raising programs.

GREEN Foundation is not just about the revival of traditional practices, but about the combination of indigenous knowledge and sustainable natural resource management practices with modern scientific principles. Through integrated farming systems, farmers have been empowered to become self-reliant in seed production and in the use of organic manure to avoid the hazards of fertilizers, pesticides and other chemicals in their farming systems.



*“There is a blind focus on developing urban areas and a gross neglect of basic infrastructure that is desperately needed in the rural areas: politicians should stop using the poor as a vote bank.”*

*Rama Satish, GREEN Foundation*



# Impacts



## BIODIVERSITY IMPACTS

The main biodiversity conservation activities of the organization include agrobiodiversity conservation, organic farming, seed mapping and multiplication, soil and water conservation, education and outreach efforts, and conducting training sessions with rural farmers' organisations.

### *Agrobiodiversity conservation*

The foundation has a particular focus on agrobiodiversity conservation. The main objective of the activity is to help farmers realize the value of plant resources on their farms and to reduce their dependence on external inputs (seeds, manures, pesticides and energy) as much as possible by using the resources available to them. Documentation, preservation, purification and storage of local crops, vegetables, fruits, multi-purpose tree species and medicinal herbs are carried out through *in situ* and *ex situ* conservation efforts. Community participation and leadership are key principles in these activities.

Conservation of indigenous seed varieties has been at the core of the foundation's work since it first began in 1994. In its early years, GREEN staff personally travelled long distances in their search for rare seed varieties, bringing new varieties back to the research farm in Thalli for multiplication and further investigation. These early trials form the basis of the foundation's conservation efforts today, and have yielded impressive conservation results. Prior to GREEN Foundation interventions, the majority of farmers were growing hybrid seed varieties. Today, the foundation cultivates 328 varieties of indigenous seed, which have been revived, reintroduced, multiplied and stored in gene banks. The more popular varieties are grown in larger quantities with farmers and through the community seed centers, which serve as a conduit for seed exchange and distribution. Many indigenous crop and vegetable varieties have been re-introduced in farming areas where they had all but disappeared. Increasing num-

bers of farmers are now reverting to the cultivation of these varieties and the low-input sustainable agriculture they require.

Conservation efforts can be broken down into *in situ* and *ex situ* conservation. The former involves on-farm conservation, where individual farmers conserve seeds for cultivation in their household plots. This form of genetic diversity conservation allows for an evolutionary process of crop adaptation, and gives farmers more control over their genetic resource base. This has been encouraged by demonstrations of rare varieties, and by the instituting of kitchen and community gardens. Individual seed savers are also empowered to grow and conserve seeds on their farms, becoming resource persons within their community, as they provide seeds to those who may need them as well as to seed banks. Farmers are also active participants in seed multiplication – the seeds they produce are procured through Janadhanya for further distribution.

*Ex situ* conservation is carried out through two principal avenues: through the foundation's 34 community seed banks, which provide communities with free and easy access to seeds on the basis that a farmer must return twice the number of seeds he or she borrowed; and GREEN Foundation's central gene bank, in Dodda Maralawadi, Kanakapura Taluk, where over 100 rare varieties are stored. Seeds cultivated each year in rare variety demonstrations are stored here for future use.

### *Organic farming, soil conservation*

The foundation has a complementary focus on organic farming and maintaining soil health. The addition of chemical fertilizers, weedicides and pesticides to the soil damages local ecosystems and decreases soil fertility. Microorganisms and creatures such as earthworms are important for maintaining soil health; the use of chemicals disrupts this ecosystem balance. Many chemicals (including fungicides, insecticides, growth promoters and chemical nutrients) are used on crops, which then negatively affect insects, birds



and other organisms. The use of organic fertilizers such as Beejamrutha, Jeevamrutha, and Panchagavya has been widely adopted in the central project area, with its further replication being encouraged through activities such as hands-on training, demonstrations, and Farmers Field Schools (FFS).

**Fig. 1: Organic fertilizers promoted by GREEN**

<i>Beejamrutha:</i>	cow dung, lime water, coil, water, cow urine
<i>Jeevamrutha:</i>	soil, water, cow dung, cow urine, pulse flour, jaggery (unrefined cane sugar)
<i>Panchagavya:</i>	ghee, cow urine, cow dung, milk, coconut, banana, curd, jaggery

Organic farming practices promoted by GREEN include agroforestry, farm ponds, the use of silt as a fertilizer, construction of trenches and bunds, and vermicomposting.

*i. Agroforestry*

Incorporating trees in farming is an age-old practice in India that has recently declined in usage. GREEN Foundation has encouraged its application through raising saplings in communal nurseries for planting around farm plots in trenches. As a result, nearly 10,000 saplings were raised by women farmers in the villages of Aralagadaku and Veeraiahnadoddi alone.

*ii. Farm ponds*

GREEN has given trainings to farmers in digging farm ponds in the lowest lying areas of their land holdings, guiding them on where to locate their ponds, how to excavate them, and how to create a network of drainage channels that lead to the pond. These ponds then

catch and store rain water; outlets built into the pond help discharge excess water into surrounding areas to aid with irrigation, helping to reduce farmers' dependence on groundwater or rain.

*iii. Silt application*

The foundation has similarly reinvigorated the use of silt as an organic fertilizer, which had previously been in decline. In traditional Indian agricultural practices, silt was allowed to gather in village tanks and lakes, and was then reapplied to farmers' fields in order to improve soil fertility. There are a reported 36,000 tanks in 26,000 villages of Karnataka state, that serve this dual purpose as water storage systems for communities and trapping silt sediment rich in nutrients. GREEN researchers have helped to gauge appropriate application methods, which may differ from farm to farm, and have provided training in its usage.

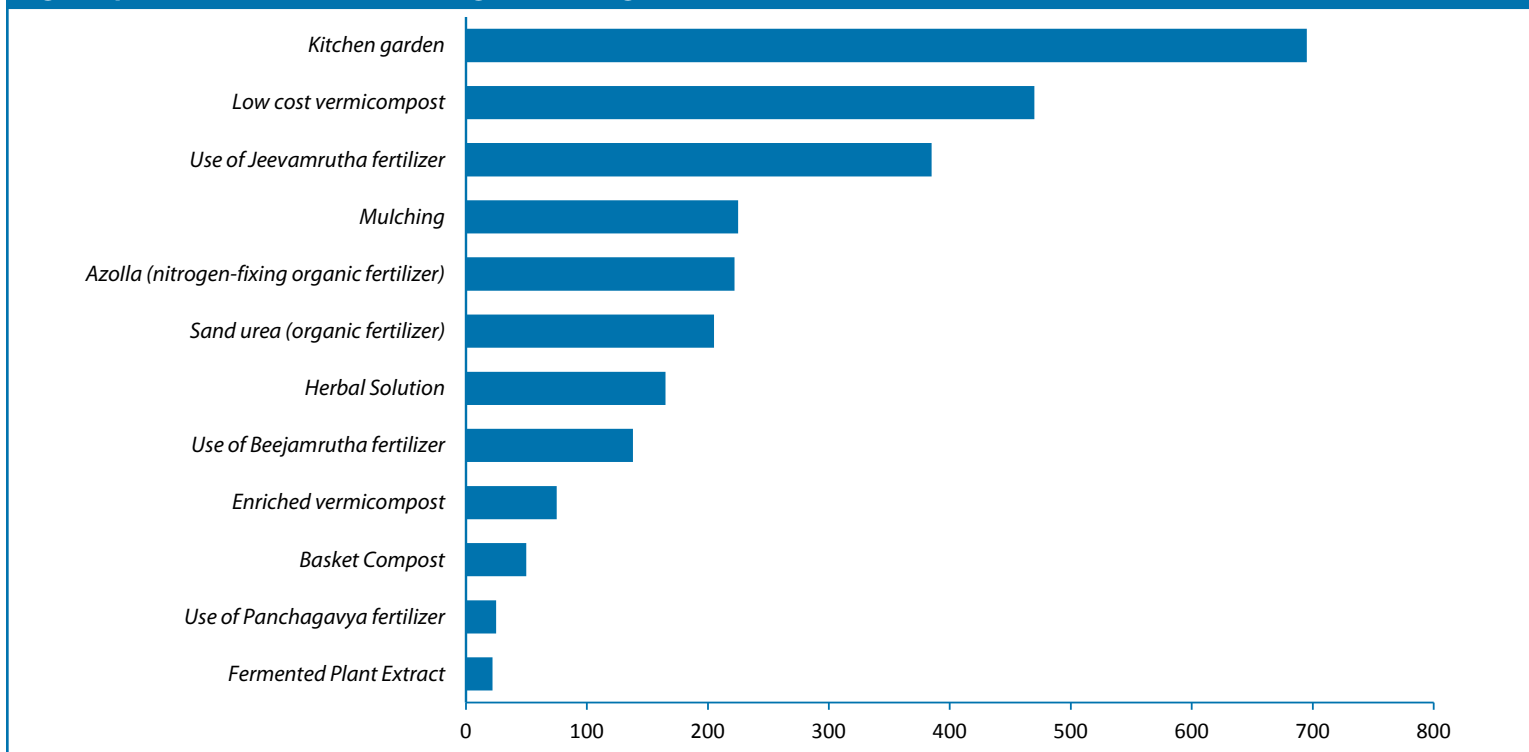
*iv. Trench and bund construction*

The combination of bunds (soil embankments) and trenches constructed on the periphery of farmland help to reduce soil erosion and retain water during periods of scarce rainfall. This practice can also improve ground water levels by increasing filtration, while soil and agricultural waste collected in trenches is used to enrich soil fertility by mixing it back into the land.

*v. Vermicompost*

Vermicomposting – the use of worms in compost to break down biomass – has been enthusiastically adopted by farmers. Rich in all essential plant nutrients, vermicompost is both cost effective and, in many cases, also supplements family income, as many farmers are able to sell the excess vermicompost in their farms at a good price.

**Fig. 2: Uptake of GREEN Foundation organic farming activities (numbers of farmers)**



Source: GREEN Foundation, 2010

Land that was previously eroded and degraded is now being rejuvenated through these sustainable land management activities. In 2010 alone, GREEN Foundation organic farming methods were being applied across more than 100 acres of land.

### *Seed mapping and multiplication*

Seed mapping has been promoted by GREEN as a strategy for identifying particular varieties of indigenous seeds found within specified regions. Using a Participatory Rural Appraisal (PRA) approach, GREEN engages community members (and especially elders) to determine existing species in their locale. Indigenous knowledge of seed diversity is documented; over time, the technique also helps to give an indication of the extent of biodiversity loss. All available seed varieties in the community are collected and distributed among farmers for further multiplication and use, helping to underpin the richness of biodiversity in the region. Indigenous crop varieties that may have disappeared from the area are restored by sourcing them from other regions. Through techniques such as PRA, GREEN has been able to rediscover nearly 420 indigenous seed varieties in the region of Thalli since it began its work there in 1997.

### *Education and outreach efforts*

Environmental education and awareness-raising activities have been carried out in Karnataka through traditional and innovative means. In particular, raising awareness on the cultural importance of the region's historical seed genetic diversity has been accomplished through 'seed yatras' and 'seed fairs'. The former describes a traditional Indian medium of story-telling, adapted for the purpose of demonstrating the uses of native seed varieties. Decorated bullock carts travel from village to village informing and educating farmers on sustainable agricultural practices, employing music, dance and theater to raise awareness. Samples of indigenous seeds are also distributed for farmers to grow in their fields.

'Seed fairs', meanwhile, have been introduced to Karnataka by GREEN as a means of bringing smallholder agrarian practitioners together to discuss and share organic farming methods. Traditionally, village 'santhe' (weekly markets) provided a forum for farmers to network and share lessons learned; in place of this, GREEN facilitates on average two seed fairs each year, held around the end of the harvest season, to host these invaluable exchange sessions.

### *Training and exposure visits*

Over 450 training sessions on sustainable agriculture were held by GREEN Foundation in 2011 alone. These workshops included training farmers on biopesticides; organic fertilizers such as vermicomposting; a method for cultivating ragi (finger millet) known as *Guli*; a system of rice intensification (SRI) for dry land paddy cultivation; and on proper seed storage and crop improvement techniques. Training sessions are specific to different periods of the agricultural season, based on modules developed by GREEN over years of experiential learning.

These trainings are augmented by exposure visits, in which farmers

from different regions are supported to visit practical examples of successful integration of sustainable practices in farming communities. This has helped to spur adoption of practices such as community seed banks. GREEN facilitates approximately 6 to 8 exposure visits per year.

## SOCIOECONOMIC IMPACTS

Aside from the benefits for farming households resulting from decreased expenditures on farm inputs such as fertilizers and chemical manure, socioeconomic conditions have improved for participating farmers in a variety of ways. Livelihoods have been diversified through the introduction of alternative income-generating opportunities, while food and nutritional security have been enhanced by the production of organically-grown grains and vegetables and the adoption of kitchen gardens.

### *Participatory organic certification*

A critical factor in diversifying income streams for rural farmers in Karnataka has been the introduction of low-cost certification for organic producers. Demand for safe, healthy, and sustainably-produced food is gradually increasing in Indian and worldwide markets. Large-scale farmers and traders are increasingly working with certified organic food producers. Smallholder organic farmers are typically unable to realize the benefit of the high values of organic products, however. Third party certification systems are generally too expensive and complicated for small-scale application. The foundation has therefore employed a Participatory Guarantee System (PGS) to benefit small farmers without any cost. The system allows them to become eligible to sell organic produce under a PGS label. Eligibility criteria are assessed by a committee of farmers. As a member of the PGS Organic India Council, GREEN Foundation has facilitated the certification of 32 farmers since 2006, with over 70 farmers still in the process of being certified.

### *Integrated farming systems*

Another new initiative being implemented is the establishment of integrated farming systems. These model farms serve as focal points and demonstration sites to illustrate the benefits of sustainable farming techniques. The main objective is to build confidence and capacity among the farmers by demonstrating that with smallholdings of between one and two acres, they can diversify their livelihoods to include and incorporate agriculture, sericulture (silk farming – Ramanagara District is renowned for its production of silk), sheep and goat rearing, poultry, animal husbandry and agroforestry in a holistic manner. A pilot project is currently underway on twelve farms – six with irrigation facilities and six rain-fed – to funnel financial and technical support and develop them into model demonstration farms.

Diversified farm-based livelihood activities underpin much of the foundation's work with rural households, encouraging the adoption of organic farming through a combination of benefits from expenditure savings, improved wellbeing, and increased household incomes.



# Sustainability and Replication



## SUSTAINABILITY

The program has been in operation for more than seventeen years and has grown steadily during that time. Beginning with only five women farmers, the foundation's work has spread across the state to the extent that it can now legitimately be considered a movement for seed conservation and organic farming. The foundation continues to increase awareness on sustainable farming methods and to produce and store indigenous seed varieties for the benefit of local and marginalized farmers.

Central to the sustainability model has been the creation and empowerment of self-help groups and the farmers' federation. This approach has allowed the GREEN Foundation to sustain, enhance and expand environmental benefits within the communities and ecosystems where the project is located. Other keys to project sustainability have included active community participation and leadership, financial resources, and ongoing capacity building and training.

Project sustainability has been further ensured by a robust partnership model, which includes HIVOS (*Humanistisch Instituut voor Ontwikkelingssamenwerking*) the Unitarian Service Committee of Canada (USC CANADA), Local Initiatives for Biodiversity, Research and Development (LI-BIRD) based in Nepal, the Netherlands-based NGO Agriterra, and the UNDP/GEF Small Grants Programme.



*“Stop encroaching and destroying the limited resources that we have borrowed from future generations. Instead, be custodians of our natural diversity, and safeguard the natural wealth vested in our hands.”*

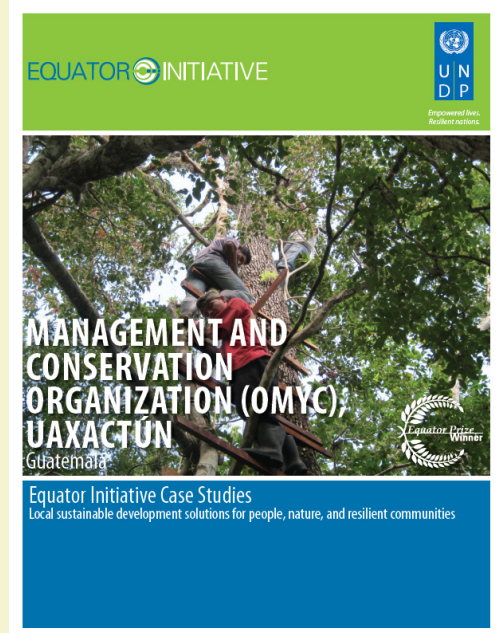
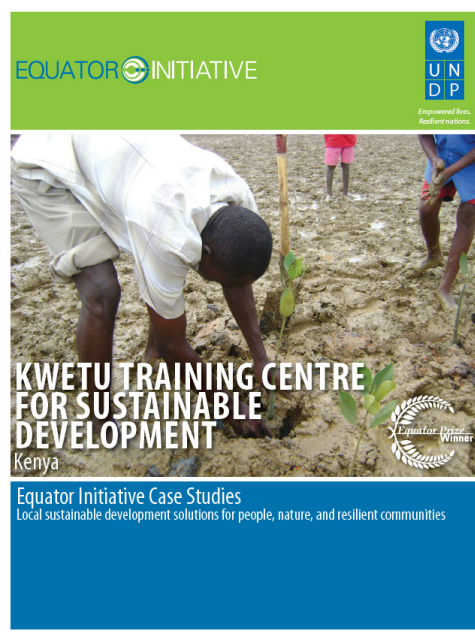
*Rama Satish, GREEN Foundation*



## FURTHER REFERENCE

- GREEN Foundation website <http://greenfoundation.in/>
- GREEN Foundation Photo Story (Vimeo) <http://vimeo.com/16748109>
- GREEN Foundation. 2010. *Day and night cannot dwell together. The human strand in the web of life: Community interventions as good practice in biodiversity conservation (Volume II)*. Community-based Biodiversity Management South Asia Programme, India. [http://www.greenconserve.com/sites/default/files/pdfs/book\\_02.pdf](http://www.greenconserve.com/sites/default/files/pdfs/book_02.pdf)

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