

Community Biodiversity Management and Empowerment

Documentation of the Sites included in a Global Study

Compiled by:

Marja Helen Thijssen

Walter Simon de Boef

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Wageningen UR Centre for Development Innovation (CDI) works on processes of innovation and change in the areas of secure and healthy food, adaptive agriculture, sustainable markets and ecosystem governance. It is an interdisciplinary and internationally focused unit of Wageningen University & Research centre within the Social Sciences Group.

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Photos

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Executive summary

The FAO 2nd State of the World report on Plant Genetic Resources for Food and Agriculture (PGRFA) indicates that on-farm management is implemented primarily by non-governmental organizations (NGOs) with the objective to contribute to biodiversity conservation associated with the development of sustainable livelihoods. Progressively, more universities are becoming engaged in contributing to the evidence based development actions of those NGOs and farming communities.

Community Biodiversity Management (CBM) is a set of practices for the conservation and sustainable utilization of agrobiodiversity and/or PGRFA. Secondly, it is a participatory process towards building community institutions and the capacity required to achieve conservation and sustainable use of PGRFA. The main objective of the global CBM study is to compare different local practices and realities of community based management of biodiversity at selected sites in Brazil, Ethiopia, India and Nepal. In addition, the Global CBM Study attempts to measure the degree of empowerment that is achieved through the CBM methodology.

This document contains comprehensive descriptions of all the sites in which the Global CBM Study was conducted. For brevity, future publications sharing results, conclusions and experiences of the Global CBM Study will omit such detailed descriptions and instead will provide reference to this publication as a supplementary source for those data.

These site descriptions are summaries synthesised from information documented both by the locally active institutions and also during exchange visits between CBM researchers from the respective participating countries to alternate study sites abroad.

1 Introduction

1.1 Global Study on CBM and Empowerment

Community Biodiversity Management (CBM) is a methodology guiding practices to contribute to the conservation and sustainable utilization of biodiversity at the local level, with emphasis on agrobiodiversity and/or Plant Genetic Resources for Food and Agriculture (PGRFA). The CBM approach distinguishes itself from other conservation strategies by focussing on increasing communities' decision-making power and securing their access to and control over genetic resources for sustainable livelihood management (Sthapit *et al.*, 2008). Community Biodiversity Management is primarily a methodology with a set of practices contributing to the maintenance and continued use of agrobiodiversity. Secondly, it is a participatory process towards building community institutions and the capacity required to achieve conservation and sustainable use of PGRFA (Sthapit *et al.*, 2008; Subedi *et al.*, 2005).

Nepal, India, Ethiopia and Brazil are leading countries in the international debate on the conservation and sustainable use of PGRFA. They are all countries with an enormous wealth of genetic diversity and within each individual examples of CBM can be identified. Despite a diverse array of specific historical, political, cultural and even biological contexts, it is possible to identify common conditions in which the CBM methodology contributes effectively to the empowerment of farming communities, leading to *in situ* conservation and on-farm management of genetic resources in these different example locations.

The main objective of the global CBM study is to compare different local practices and realities of community based management of biodiversity and measuring the degree of empowerment that is achieved through the CBM methodology. Through this we aim to learn more about the effectiveness of the CBM methodology and practice in empowering farming communities. By enabling the investigators and those investigated to consciously participate in, and to take ownership of the entire research process, the fundamental principles CBM were followed.

1.2 Partner organizations

The FAO 2nd State of the World report on PGRFA (FAO, 2010) indicates that on-farm management is implemented primarily by non-governmental organizations (NGOs) with the objective to contribute to biodiversity conservation associated with the development of sustainable livelihoods. Progressively, more universities are becoming engaged in contributing to the evidence based development actions of those NGOs and farming communities.

The NGO LI-BIRD (Local Initiatives for Biodiversity Research and Development) in partnership with local farming communities in Nepal, elaborated CBM as an approach with different process steps, from creating community awareness on the value of agrobiodiversity to building the appropriate community institutions for sustainable management. For each step different participatory methods and practices, ranging from a diversity fair for creating awareness to a community fund for supporting management practices, were endorsed. In a natural and highly participatory process, CBM (as methodology) emerged through learning and innovation (Subedi *et al.*, 2005) following a process of studying the management of agrobiodiversity within those communities. This study was conducted in collaboration with the Nepal Agricultural Research Council and Bioersity International (formerly IPGRI). The CBM methodology is now mainstreamed in Nepal.

Likewise methodologies, not necessarily referred to as CBM, were simultaneously developed by the M.S. Swaminathan Research Foundation (MSSRF) in India (Arunachalam, 2000) and other organizations primarily in South and Southeast Asia (FAO, 2010; Jarvis *et al.*, 2011). In addition, we observe on-farm agrobiodiversity management initiatives similar to the CBM approach in Brazil and Ethiopia, in which farming communities join in practicing community management to ensure greater control over their resources and their livelihoods.

Accordingly, the Global study works with the following partners: LI-BIRD in Nepal, Bioversity International and MSSRF in India; Ethio-Organic Seed Action (EOSA) in Ethiopia; and the Federal University of Santa Catarina (UFSC), Centre for Agricultural Studies, and the Brazilian Enterprise for Agricultural Research (Embrapa) in Brazil.

1.3 Purpose of the document

This document contains comprehensive descriptions of all the sites in which the Global CBM Study was conducted. For brevity, future publications sharing results, conclusions and experiences of the Global CBM Study will omit such detailed descriptions and instead will provide reference to this publication as a supplementary source for those data.

1.4 Structure of the document

These site descriptions are summaries synthesised from information documented both by the locally active institutions and also during exchange visits between CBM researchers from the respective participating countries to alternate study sites abroad.

The following chapters correspond to each of the sites in the four participating countries, in alphabetical order by country. The structure of each chapter follows the same outline:

- Context;
- Institutional and project setting;
- Key project activities;
- Social and institutional organization;
- Plant genetic resources;
- CBM practices.

With regards to the final section in each chapter, CBM practices, the CBM approach has been generalized according to the process with the following components or steps (Sthapit *et al.*, 2008):

1. Enhancing community awareness;
2. Understanding local biodiversity, social networks and institutions;
3. Capacity building of community institutions;
4. Setting up of institutional working modalities;
5. Consolidating community roles in planning and implementation;
6. Establishing a CBM Fund;
7. Community monitoring and evaluating;
8. Social learning and scaling up for community collective action.

It became apparent after evaluation of the data, that CBM practices closely include the above components in their process and can be further generalized into three different clusters.

Those include:

1. Generating awareness and an understanding of local diversity;
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities;
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up.

Accordingly, the information provided on CBM practices at each site was enumerated according to those abovementioned three subheadings.

2 Site description for Guaraciaba, Brazil

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2.1 Context

The site is located in a semi-deciduous forest region which has been largely transformed into an agricultural landscape. Forest cover was initially removed by European timber industries, leading to significant losses of native species. Landraces of important food crops such as maize and beans were used in agricultural practices on the cleared fields. The advent of the green revolution replaced many of these local landraces with high yielding introduced varieties, accompanied by fertilizer and pesticide dependency. This dependency has subsequently driven up the costs of production and consequently, in the 1990s, food sovereignty was at stake.

The communities of Guaraciaba are said to be well advanced in the CBM process. They have reached a high level of awareness on CBM practices and understand their local diversity, displaying concern for genetic losses and the revival of the use of agrobiodiversity.

2.2 Institutional and project setting

The lead investigating institution of the Global CBM study at this site is the Federal University of Santa Catarina (UFSC). The Environmental recuperation and support to the small-scale farmer project – Micro-watershed 2 (in short the MB2 project), funded by the World Bank and the state government of Santa Catarina, Brazil, and implemented in partnership by Epagri and the State Secretariat of Agriculture, is the initiative under study. The second phase of the project commenced in 2003 and was completed in 2009 (the third phase is currently still under negotiation) having set out to achieve the following objectives:

- managing and conserving soil and water over 250,000 hectares affecting 50,000 families;
- implementing the management structure in three river basins covering a total area of 8.4 thousand square kilometres;
- implementing in two corridors covering an area of 4.2 thousand square kilometres;
- establishing systems for collecting animal waste from 16,500 properties;
- establishing riparian forest along 2,000 km; and
- implementing the Environmental Education Programme in 1,000 rural schools, reaching 92,850 people, including farmers, teachers and scholars.

2.3 Key project activities

These include:

- organizing farmer groups into micro-watershed development associations;
- supporting small scale farmer activities;
- providing support to the housing of small scale farmers;
- strengthening the production system of small scale farmers; and
- supporting small scale farmer households through value addition activities.

2.4 Social and institutional organization

The communities participate actively in most CBM practices, thereby consolidating community roles for implementation, monitoring and evaluation. In addition, the communities receive good support from external agencies, universities and municipal government. Technical support on CBM activities such as PVS of maize and rice, and the provision of diversity kits is facilitated by Santa Catarina State Enterprise for Agricultural Development and Extension, within the context of the MB2 project.

The Micro-Watershed Development Associations were established under the MB2 project, which hired facilitators with good agrobiodiversity track records to assist in the process of social learning and advancing community level agrobiodiversity management. Institutional working modalities required for implementing CBM have been developed through the MB2 project at micro-watershed and community levels.

2.5 Plant genetic resources

Prior to the advent of the green revolution in southern Brazil, most of the farming activities were initiated by the colonialists, including maize, beans and other local food crop cultivation of many local landraces. In the late 70's every family cultivated landraces. Later, farmers turned to higher yielding varieties and the use of fertilizers and pesticides resulting in the local extinction of landraces of all major food crops.

Contemporary CBM practices have seen the establishment of PVS for both maize and rice with widespread community involvement. Sixteen varieties (6 local) of maize and 19 rice varieties (including 14 landraces from Guaraciaba) have been involved in selection. Diversity kits that were distributed to families have also increased the cultivation of potatoes and beans for household consumption. Approximately 16 species and 52 varieties were multiplied to cater for 300 families.

2.6 CBM practices

1. Generating awareness and an understanding of local diversity:
 - increased the concern over genetic resources losses during the green revolution;
 - recording traditional knowledge in a package of practices for farmers distributed as flyers;
 - planned diversity fair for rice, beans and popcorn in 2011.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - establishment of the Micro-Watershed Development Associations;
 - hiring of facilitators with good agrobiodiversity track records to assist in capacity development;
 - capacity development from UFSC to families engaged in participatory plant breeding.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - high levels of participation in CBM practices;
 - support from external agencies, universities and municipal government;
 - PVS;
 - PPB;
 - technical backstopping;
 - diversity kits;
 - seed production;
 - processing of vegetables and fruits for sale at the local market.

3 Site description for Imbituba, Brazil

Sofia Zank & Natalia Hanazaki

Federal University of Santa Catarina (UFSC), Florianópolis, SC

3.1 Context

Imbituba is a port with a unique shoreline formed by shifting sand dunes known as *Areais da Ribanceira*. The native vegetation has a high abundance of *Butia (Butia capitata)* which is extracted by locals for the preparation of cachaça and ice cream.

Before urbanisation, inhabitants were fishermen and farmers. In the 1970s farmers in the *Areais* had their lands expropriated to prepare the area for industrial developments. Developments have not yet materialized and farmers have continued using the lands for agriculture. This very unstable environment is traditionally used for slash and burn systems and the extraction of natural resources such as *Butia* and medicinal plants.

3.2 Institutional and project setting

The federal University of Santa Catarina (UFSC) is leading the Global CBM study at Imbituba site. The Traditional varieties of manioc and community based management: local knowledge and origin of new varieties project has been active in the site since 2009. The project objectives are to:

- analyse the local management and the linkage with the origin of new varieties of manioc;
- study the formation of seed banks in the soil that influences the generation of new varieties;
- analyse the farmers' perceptions on the generation of new varieties;
- analyse the local practices that have enhanced the dynamic process related to manioc management and the landscape management;
- identify the farmers' rationale that determines the extent and distribution of local manioc diversity; and
- contribute to strengthening the exchange networks of varieties at the local and regional scale.

The project is funded by CNPq and CAPES of Brazil, in partnership with ACORDI in Imbituba.

Another project entitled, Ethnobotany at *Areais da Ribanceira* of Imbituba: knowledge about use and local management of plants has been ongoing in the site since 2009 with the objectives of:

- studying the knowledge, use and management of native medicinal plants and the economic and cultural importance of these species;
- analysing the potential opportunities and threats to the natural resources of the region, according to the use and management of medicinal plants;
- analysing the local knowledge and management practices of *Butia capitata*, an abundant resource in the area;
- strengthening the local organization of farmers through ethnobotanical studies, emphasizing the value of the local knowledge about plant resources; and
- contributing to local management planning, for social and environmental sustainability.

This project is funded and implemented by the same partnership for the former project.

3.3 Key project activities

Main activities for the former project are to:

- include a participatory diagnostics approach to the ethnobotany of manioc and the landscape used for cultivation;
- take a community-driven and research oriented approach;
- establish ecological and agricultural plots for experimenting inside the communities; and
- strengthen a manioc varieties exchange network in a regional context.

The latter project includes the following activities:

- evaluating the use and management of native medicinal plants and *Butia capitata*;
- evaluating the environmental availability of the plant resources used;
- constructing guidelines for use, management and conservation of the plant resources in a participatory manner; and
- sharing and socialising the results with the local stakeholders and with both governmental and non-governmental agencies acting within the municipality.

3.4 Social and institutional organization

Today, farmers from five neighbourhoods surrounding *Areais* use the land for agriculture. The community in this context is an assembly of farmers that have continued a traditional farming livelihood. Farmers range between 37 and 85 years of age, most retired from regular wage paid employment, relying on retirement benefits for cash income. Fishing and agriculture provide additional household income. The average landholding varies between 0.5 and 4 hectares. In order to obtain land rights, this community is in the process of transforming *Areais* into a conservation unit or settlement of agrarian reform. Since the farmers do not yet own the land, they are not permitted to receive extension services from EPAGRI.

The farming community established the Rural Community Association of Imbituba (ACORDI), following an educated and strong leader Marlene Borges, to principally address the ongoing land rights issues. Today 25 families are members. Land issues are an important component of the CBM process because land is the primary resource necessary for CBM to operate at a collective level in the maintenance of biological resources. ACORDI direct CBM components and practices.

At the time of the exchange visit, the land was under judicial review and the farmers were prohibited from accessing and utilizing the area. This situation has led to tremendous social learning, scaling-up of awareness and social organization (which are all advanced components of the CBM process), reinforcing the role of the practices in the community. The annual cassava fair has contributed to the CBM process by enhancing awareness and capacity-building. Since 2009, the partnership with the Federal University of Santa Catarina (UFSC) has been important for understanding local biodiversity and helping the community to monitor and evaluate CBM processes. The Department of Ecology is doing ethno-botanical research and the Department of Geography is working with participatory resource mapping. Such activities contribute to policy and legal frameworks related to CBM.

Since 2003, ACORDI organizes the annual cassava fair. The aim of the fair is not to promote diversity. The main aim of the fair is to create awareness among the community members on the uses of cassava, and associated farming lifestyles. The fair is an important means of generating income for the association. Community activities and structures are financed with the proceeds of the fair. The fair programme includes seminars, with invited lecturers, on subjects chosen by ACORDI's members. During the fair, regional cassava food products are sold.

The community cassava-processing centre was built in 2009 with proceeds from the cassava fair and external financial support raised by ACORDI. Farmers cover the costs of processing their cassava in the unit with 30% of their produce. The processing centre share is then divided between farmers working in the processing unit; ACORDI, for maintenance of the processing unit; and farmers, who retain the largest amount of the produce.

The cassava fair has become a forum for activist groups with similar agendas. UFSC also plays an important role as an intermediary for attracting regional, national and potentially international attention to Imbituba.

3.5 Plant genetic resources

Important plant genetic resources are local cassava varieties and the natural population of *Butia* palm. Farmers cultivate approximately 37 cassava varieties. Community members, as well as outsiders, collect *Butia* from the wild in *Areais*.

3.6 CBM practices

1. Generating awareness and an understanding of local diversity:
 - UFSC characterizing the vegetation landscape, traditional knowledge and plant genetic resources;
 - annual cassava fair;
 - participatory resource mapping;
 - ethno-botanical research.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - providing a forum for activist groups with similar agendas;
 - formation and high degree of social organization within the *Areais* community association ACORDI;
 - UFSC provides an evidence base for environmental activist groups and other supporting organizations;
 - UFSC plays an intermediary role for greater exposure to the local prevailing issues;
 - action learning for policy and legal framework development;
 - seminars and lectures on subjects chosen by ACORDI.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - conservation and management of *Butia*;
 - mobilization of community funds for CBM activities and structures;
 - establishment of the community cassava processing unit;
 - recovery of funds from the processing plant for sustainable development;
 - income generation;
 - participatory monitoring and evaluation of the CBM process.

4 Site description for Irati, Brazil

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4.1 Context

The Global CBM Study is working with faxinal communities. These traditional communities were, until recently, found throughout the Araucaria forests of the Paraná state, in the South of Brazil. The faxinal system is associated with slash and burn agriculture and extensive use of common forest lands to raise animals through a communal fencing activity. The farmers also have their own lands within a common forest patch. Land ownership is complicated because of local unwritten laws and the lack of clarity regarding land use. Informal agreements among the communities are established in order to control the access to natural resources. Some of these agreements are recognized by formal municipal laws, which help to ensure compliance. Faxinal management has contributed to the use and conservation of several species. The community extracts yerba-maté (*Ilex sp.*) and harvests timber/firewood. The main income generating activities are cultivation of tobacco and animal husbandry.

4.2 Institutional and project setting

UFSC's activities in Faxinal dos Marcondes are still in their initial stages. In July 2009, the UFSC team made the first contact with local organizations, including the Puxirão Network coordinator, Hamilton José da Silva, and other members. The various organizations involved in CBM at Irati include: UFSC; the Federal University of the Central West Parana; two NGOs (Institute for Popular Education (IEEP), and the Centre for Environmental Studies, Evaluation and Research (CEMPA)); and the federal government institute responsible for biodiversity conservation, the Chico Mendes Institute for Biodiversity Conservation (ICMbio).

CAPES, Brazil, is funding the Plant and landscape domestication in southern Brazil in the community biodiversity management context project. In partnership with Articulação Puxirão dos Povos Faxinalenses (Collective Articulation of the Faxinal People), data collection for the project commenced in mid-2009 and should have concluded by the end of 2010. The project objectives were to:

- document the genetic resources in the managed landscapes used by local populations;
- document and systemize practices and knowledge associated to the genetic resources in the managed landscapes;
- systemize the traditional management practiced by local communities of the landscapes;
- evaluate the occurred changes in the management of the landscapes and the associated use of its biological resources;
- evaluate the contribution of the landscapes to forest conservation;
- explore indicators for domestication of the landscapes and for used biological resources;
- analyse how the local organization of faxinal people can contribute to conservation of PGR; and
- contribute to the building of conservation strategies *in situ* related to the establishment of conservation areas of sustainable use (Sustainable Development Reserve).

4.3 Key project activities

Main activities of the project mentioned above include:

- participatory approaches to diagnosis, focussing on the ethnobotany of the use and management of non-timber species in the landscapes; and
- community-driven and participatory approaches to research in the permanent plots in the historical landscapes.

4.4 Social and institutional organization

The community is predominantly of Ukrainian, Polish and “Caboclo” origin. Caboclos are an ethnic group of mixed native and European/African descent. The community is well aware of environmental issues and have placed severe restrictions on the exploitation of exotic plants. This aspect of community resource management is perhaps unique to this site. There are lots of opportunities to refine the collective structures for using such forest resources, for the benefit of the poor families. The exodus of young people from these faxinal communities to nearby cities and selling off of their ancestral property to people who no longer recognize the traditional land rights have resulted in violent land conflicts. This conflict has brought the faxinal communities together and spurred them to form a movement to get back their traditional land records.

Since 2000, some faxinal communities have been organizing themselves, in a process that is supported by NGOs and Universities, to fight for their traditional land rights. In 2005, the communities founded the Puxirão Network of the Faxinal Peoples (Articulação Puxirão dos Povos Faxinalenses). Today there are 227 faxinal communities, 33 of which participate in the Puxirão Network. The Puxirão Network organizes a meeting of faxinal communities every two years.

During discussions with the communities, the Indian model of Joint Forest Planning and Management (JFPM) and the establishment of Village Forest Committees to micro plan and manage the resources was explained by the Indian CBM representatives to the communities, and suggested as a possible option to strengthen community faxinal management. More research and awareness-raising activities could support the establishment of conservation units and the legalization of the faxinais (Sustainable Development Reserve) by the Ministry of Environment.

4.5 Plant genetic resources

Key plant genetic resources of the region are *Araucaria spp* and *Ilex spp*. Major issues include the loss of traditional lifestyles and external pressure from the agribusiness community, which affects local biodiversity and land ownership.

The community has 200 ha of communal land, where economic plants like *Araucaria spp*, *Ilex spp* and other rare flora grow. The reserve is a repository of various kinds of fruits for human as well as animal consumption. Yerba-maté leaves, firewood, and the nuts and timber of *Araucaria angustifolia* are collectively managed.

4.6 CBM practices

Identifying CBM practices at “Faxinal de Marcondes” was not easy. Since CBM is embedded in the traditional structures of common property management, specific CBM components could not be identified based on discussions with community leaders, community members and stakeholders. The only collective action the community is involved in is the conservation of community land for collective use by faxinais.

Value addition to yerba-maté by the community as micro-enterprises is another option to be explored. Value addition to *Araucaria spp* nuts for bread, flour, baby food, health food and ice cream is also an option.

5 Site description for Porteirinha, Brazil

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Embrapa Semi-Arido, Petrolina, Pernambuco

5.1 Context

Porteirinha site is located in the semi-arid northern part of Minas Gerais state. The human development index for this area scores it amongst the poorest in the state. The main sources of livelihood are agriculture and animal husbandry. Household landholdings vary from small to large with the majority being approximately 3 ha in area and less than 10 % being above 25 ha. Predominant crops include maize, sorghum, beans, pumpkin, cassava and pigeon pea. Some cash crops such as *Jatropha curcas* and *Opuntia sp.* have been introduced for biodiesel and animal feed production, respectively.

5.2 Institutional and project setting

The working title for the ongoing CBM related project at Porteirinha site is REPARTIR (Participatory research in the conservation, value addition and sustainable use of genetic resources of Cucurbitaceae). In addition, the VABio project (Value addition in agrobiodiversity as means to empower rural communities in the semi-arid region of Brazil) commenced in 2010. In both projects, the lead organization is Embrapa Semi-Árido.

Having built upon earlier projects like the Brazil-Italy Biodiversity Programme (PBBI), which commenced in 2004, activities related to on-farm/*in situ* conservation and management of plant genetic resources, meeting the aspirations of the CBD, have been continued. The objectives of the REPARTIR are the following:

- in partnership with communities, develop programmes for participatory research, characterization, evaluation, selection, breeding, production and introduction of traditional varieties of cucurbits (Cucurbitaceae is the family of squashes and melons, including gourds);
- to quantify the local genetic diversity to assist in the management, conservation and continued use of traditional varieties of cucurbits using participatory methods, traditional methods and tools of molecular biology;
- characterize the traditional varieties of pumpkin for their content of beta-carotene, anti-oxidant activity and total carotenes for the production of functional food preparation and nutrition labelling;
- with the participation of communities, develop alternatives to promote production, processing and marketing of agro-ecologically suitable sponge plants as a source of alternative income and generating new market opportunities; and
- contributing to the training of small producers, technicians and students in rescuing, managing, participatory breeding and producing traditional varieties.

The VABio project also aims to promote participatory approaches to CBM, varietal selection and breeding, value addition, sustainable utilization of local genetic resources, evaluation of CBM activities and empowerment.

The donor for these projects is the Brazilian Embrapa Macro Programme for small scale farming. Partners are predominantly organizations within Embrapa but for the VABio project, various community oriented, research, extension and education service institutes are involved, including Empresa Baiana de Desenvolvimento Agrícola S.A. (EBDA) and Universidade do Estado da Bahia (UNEB).

5.3 Key project activities

The key activities are all participatory in nature and include:

- diagnosis of conservation *in situ*;
- conservation of traditional varieties of cucurbits;
- characterisation of varieties;
- selection and breeding of traditional varieties; and
- agro-ecologically appropriate sponge gourd production.

Planned activities of the VABio project were, in addition to what REPARTIR practice, to develop models for CBM, include PVS, PPB and value addition of lufa sponge, pumpkin, manioc and goat feed in local activities and lastly, to evaluate empowerment within the community.

5.4 Social and institutional organization

In 1991, the Association of Smallholder Farmers of Tamboril was established. Today, the association has 80 members who meet at least once a month. The community grow cassava at a mainly individual household level, but in 2000, the Association established an area of communal land for cassava production. The association has also been granted a community centre for cassava-flour processing by the local government.

Under the PBBI, the first project meeting was held in 2006 between the local labour union and the community which foremost aimed to increase community awareness on the potential for sponge gourd as a source of income. A survey was conducted to identify the variety and frequency of sponge gourd occurring spontaneously in the community. In 2006, a diversity block was carried out as a group activity, facilitated by Embrapa. The community participated in varietal selection with technical inputs from Embrapa scientists.

In 2006, Embrapa secured additional funds from the National Council for Scientific Research for implementing participatory research for conservation, value-addition and sustainable utilization of Cucurbitaceae genetic resources. The funds were also utilized for capacity building on sponge gourd production and value addition. In 2007 and 2008, Embrapa, together with the community, evaluated the success of sponge gourd production in the area. It was discovered that production was not limiting success but that poor marketing was discouraging community members' involvement. In reflection, the CBM process has been predominantly driven by Embrapa to fulfil its mandate of realising conservation activities in a participatory manner. The community's interest in working with sponge gourd; however, is diminishing because of the association's members lacking the necessary capacities to develop market linkages.

5.5 Plant genetic resources

Since 2007, the community have been cultivating sponge gourd in an area considered communal, and occasionally in backyards. Pumpkins are always grown for food as well as for livestock feed. Other crops grown on communal land include beans, pigeon pea and cassava. Maize and sorghum are also important food crops.

5.6 CBM practices

1. Generating awareness and an understanding of local diversity:
 - awareness raising meeting on sponge gourd;
 - surveying local diversity and abundance of sponge gourd.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - formation of Association of Smallholder Farmers of Tamboril;
 - capacity building course on sponge gourd production and value addition;
 - monthly association meetings.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - diversity block;
 - participatory research;
 - PVS;
 - technical backstopping;
 - extension and input services from Embrapa;
 - donation of the community processing centre by local government;
 - association setting aside communal land.

6 Site description for Tavares, Brazil

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6.1 Context

Tavares is a municipality consisting of 5000 inhabitants, 2000 of which are extra urban. Of the 2000 rural inhabitants, 80% of households possess, on average, 20 ha of land. Ten per cent of the population have greater than 200 hectares landholding. Farmers with such large lands typically grow rice, rear livestock and manage pine forests. Forty three per cent of the rice farmers are commercial in their production, the remainder produce for subsistence. Small scale farmers are engaged more so in the cultivation of vegetables, beans, maize and cassava. Out of 700 farmers, 500 grow onion commercially.

Up until 100 years ago, rice farmers cultivated landraces but have subsequently adopted for high yielding introduced varieties. Almost all the local varieties have been eroded over the years. Every year, four to five male farmers die from depression-related causes and cancers or heart-problems. It is speculated that illness may be caused by high doses of chemical fertilizers and pesticides.

6.2 Institutional and project setting

Tavares site is also a beneficiary of the REPARTIR project (see Chapter 5 for detail).

The Diversity Guardians Network is a project that commenced in 2009 working in the site location. This project is also led and financed by Embrapa in partnership with the universities Federal de Pelotas, Federal de Santa Maria and Caxias do Sul. Emater rural extension, Bionatur Agroecological Seeds and UNAIC farmers' union are also partners.

Objectives of the Diversity Guardians Network include:

- review and analysis of the existing biodiversity in maize, beans, cucurbits and other vegetables, and plants of multiple purposes;
- forming a state-wide network of farmers' seed guardians and the institutions;
- conducting training of farmers and technicians in techniques of varietal selection and seed production;
- monitoring community seed banks for the dissemination of technological information;
- supporting the organization and/or organizing fairs of local agrobiodiversity; and
- selecting new varieties for enhanced agrobiodiversity.

6.3 Key project activities

The main activities of the Diversity Guardians Network are establishment a guardians network and mapping biodiversity; collecting and storing landraces' seed; morphologically characterising landraces; characterising the chemical and nutritional properties of grains; breeding landraces in a participatory way; and establishing community seed banks and exchange of technology.

6.4 Social and institutional organization

Approximately 80% of the farmers in Tavares site have below secondary level schooling and illiteracy within the older population is high. Literacy is higher among females. In 2007, with the funding of Petrobras, the Federal University of Pelotas began working with the community on environmental education. Focussed mainly on the conservation of local varieties of crops such as maize, bean, pumpkin, cassava, sweet potato and several cucurbits, the project aimed to enhance local diversity and increase food security whilst maintain cultural tradition. Since 2007, Embrapa and Emater have been organizing annual seed fairs for raising awareness among the community. Community members are becoming increasingly interested in seed exchange. Subsequent to the first of these diversity fairs, predominantly women in the community have taken the initiative to host weekly food fairs. As a result, a market has been established. Emater has facilitated the support of local government to these women in supplying fresh produce to local schools, the cost of which being subsidised.

There are 10 farmers' associations active in Tavares site, but most of which are related to machinery. Emater has identified three farmers as diversity guardians, one woman and two men (between 60 and 80 years of age). These guardians work at individual level and are not related to the other community members. Emater collects seed from the guardians and records information related to both the seed and the guardians. Seeds are then reproduced, labelled (recognising the guardian) and distributed to other farmers. The guardians receive no financial benefits from this work and neither does Emater have a policy for protecting the traditional knowledge and seeds of these guardians. Embrapa has just started the process of acknowledging the important role of the guardians by organising an international seminar on local varieties in which the CBM exchange team participated. Collection of local materials has been contributed to the Embrapa genebank. Emater plans to set up a separate association for the families who are working with local varieties.

6.5 Plant genetic resources

Targeted conservation of varieties of maize, bean, pumpkin, cassava, sweet potato and several cucurbits has been initiated. Farmers also grow other vegetables and grains, onion and rice being the most marketed.

6.6 CBM practices

1. Generating awareness and an understanding of local diversity:
 - annual seed fair;
 - weekly food fair and market;
 - environmental education.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - identification of diversity guardians;
 - initiation of an acknowledgement process for important guardians;
 - plans to establish a separate association for local variety custodians;
 - lectures on seed production, use and conservation of cucurbits;
 - value addition courses on activities such as pumpkin and fruit jam production, craft making from sponge gourds and pepper canning.

3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - seed exchange;
 - financial support to female farmers for supplying fresh food to local schools;
 - linkage to extension services;
 - linkage to local government for inputs;
 - collection of local varieties in the Embrapa genebank.

7 Site description for Chefe Donsa, Ethiopia

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7.1 Context

The CBM site of Chefe Donsa is located in the central highlands of Oromia. Small-scale subsistence agriculture is the common livelihood, characterised by traditional practices of mixed crop-livestock farming. Agriculture is also the major generator of revenue in the area. Livestock, wheat and legumes provide the main cash earnings. Animal husbandry is a prominent feature at this site. Farmers utilize livestock for plough power to minimize labour costs and to conserve resources in general. A few farmers engage in the meat industry and other cattle business. Other commercial activities that farmer at this site are oriented towards include grain trade and rural shops. The nearest grain market (and the largest) is Addis Ababa.

The consequences of genetic erosion in agricultural crops, including tetraploid wheat varieties, are significant. Likewise to the other study sites in Ethiopia, reintroduction of traditional wheat and sorghum varieties and re-establishment of traditional cropping patterns are the main agenda.

7.2 Institutional and project setting

The organization responsible for the inclusion of the Chefe Donsa site in the global CBM study is Ethio-Organic Seed Action (EOSA). They are the lead organization coordinating the study in Ethiopia. In partnership with other Ethiopian public organizations (district offices of Agriculture and Rural Development (ARD) and Cooperative Promotion (CP); zone offices of ARD and NGO Coordination offices; and Debre Zeit Agricultural Research Centre), EOSA is supporting the Integrated Agrobiodiversity Management and Seed Security Programme by:

- providing technical, material and financial resources;
- coordinating all on- and off-farm agrobiodiversity development activities;
- building capacities of local farmers and strengthening local farmers' institutions; and
- creating links to local, regional and international forums.

The first phase of the programme initiated in 2002 with the support of the Global Environmental Facility (GEF), and after phasing-out, EOSA has been maintaining programme activities with the support of USC-Canada. Since 2006, with the full support of the CBDC Africa programme¹ funded by DF of Norway, SwedBio of Sweden and Hivos/Oxfam of the Netherlands, the programme set out to achieve the following objectives:

- promoting community based management and enhancement of agrobiodiversity;
- strengthening local seed supply systems to ensure security at the community level;
- promoting market and non-market incentives for socio-economic gains to the farming communities; and
- minimizing the conflicts between modern agricultural technologies promotion and traditional practices whilst sustainably managing natural resources and crop diversity.

¹ CBDC is a regional programme involving Ethiopia, Burkina Faso, Lesotho, Malawi, Mali, Sierra Leone, Zambia and Zimbabwe.

7.3 Key project activities

The main activities of the Integrated Agrobiodiversity Management and Seed Security Programme are as follows:

- realising the conservation and sustainable use of agrobiodiversity *in-situ*, involving major activities such as: on-farm management; community seed banking; participatory varietal selection; seed production and capacity building;
- Improving value addition through the creation of market access, installing seed processing units and introducing additional facilities for seed processing; and
- rehabilitating the agro-ecology of the area by promoting crop rotation and appropriate management of gullies.

7.4 Social and institutional organization

Similarly to the activities at Ejere site, major efforts have been made to reintroduce lost genetic diversity at Chefe Donsa site and restore traditional cropping patterns, balancing the distribution of cereals and legumes in farmers' fields. To sustain this, farmers have organized themselves into seed producer cooperatives, acting as both producer and marketing groups and also conservators of genetic resources. Accordingly, these seed producer cooperatives own and manage a community seed bank complex, to which EOSA provides technical support.

Farmers involved in on-farm conservation, seed banking and seed production activities are composed of representatives from 14 kebeles of Gimbichu district. The farmer association that owns the community seed bank complex is made up of household representatives, which are for the most part men. Women farmers, in one form acting as a separate women's association, are involved in income generation, in participatory knowledge sharing events like PVS and food fairs or exhibitions. Young and old farmers are involved in the knowledge sharing practices for the conservation, enhancement, marketing and utilization of the diverse plant genetic resources. The labour exchange and wage labour systems are also common practices in the site.

The farmers are more inclined to conserve the local varieties as guardians of agrobiodiversity. The reason for focusing on these wheat types is that such valuable resources are totally neglected by the formal research, extension and seed supply programme. Regardless, the site appears to have better connections with extension services than the other two in Ethiopia. On-farm seed multiplication includes enhanced and basic materials obtained from the national agricultural research centres and the national seed enterprise. The enhancement of local materials is carried out in a participatory process where partners i.e. experts from research and teaching institutions, as well as agricultural development workers, team-up with farmers, the latter playing a dynamic role in the activity. Such integration promotes synergy between the formal and informal knowledge systems. Seeds of some varieties are distributed both formally and informally beyond the community. Seed marketing is one such means for distribution.

With the support of FAO, the seed producers' cooperatives own a seed cleaning facility to improve their marketing potential. The institutional linkage with EOSA is also, like it is in Ejere site, valuable for awareness raising and capacity development. EOSA organizes forums for networking and experiences and lessons sharing, arranges field days and diversity fairs for seeds and foods.

7.5 Plant genetic resources

The area is a source of diversity for durum wheat and sorghum. Currently, the main agricultural crops include wheat and legumes such as chick pea, lentil and grass pea.

7.6 CBM practices

1. Generating awareness and an understanding of local diversity:
 - seed fairs and food-tasting;
 - field days;
 - inventorying and documenting crop diversity, conducting baseline surveys, tracing back historical records through the national genebank and documenting elderly farmers knowledge on traditional patterns and practices;
 - promoting diversification for food, nutrition and livelihood security.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - formation of farmers' associations;
 - multi-stakeholder forums;
 - formal and informal training.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - participatory approaches to enhancing local diversity;
 - PVS;
 - reintroduction of wheat varieties through crop rotation practices;
 - seed production and marketing;
 - value addition programmes promotion for enhanced wheat varieties;
 - seed banking;
 - seed extension services;
 - technical backstopping;
 - donation of the seed cleaning machine by FAO;
 - scaling-up and strengthening the community seed bank complex.

8 Site description for Ejere, Ethiopia

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8.1 Context

The Ejere site is located within the central highlands of the Oromia region, characterized by a hilly landscape consistent with the Great East African Rift Valley. The area was considered to be a biodiversity hotspot due to the occurrence of tetraploid wheat, evident from the durum wheat collections of the community seed bank complex at Ejere.

Approximately 400 households make up the community. The inhabitants are predominantly engaged in mixed crop-livestock farming at a small scale. Most farmers engage in traditional practices of rain-fed subsistence agriculture but it appears that they are becoming more market-oriented, moving towards semi-commercial production systems. The community has access to markets in the nearby town, Mojo, and also the capital, Addis Ababa. The site represents a productive environment despite being semi-arid. Exchange labour practices, locally referred to as 'Debo', are common.

8.2 Institutional and project setting

Ejere site is another beneficiary of the Integrated Agrobiodiversity Management and Seed Security Programme. For further information please consult Chapter 7 under the same section heading.

8.3 Key project activities

The objectives and key activities of the Integrated Agrobiodiversity Management and Seed Security Programme are generic. Accordingly, the project objectives and activities at this location are identical to those of Chefe Donsa site.

8.4 Social and institutional organization

Major efforts have been made by the Institute for Biodiversity Conservation and EOSA, with the full participation of the community, to restore the representation of traditional crops in modern agricultural systems, focussing predominantly on the reintroduction of lost wheat diversity. To sustain these efforts, farmers have been organized as custodians of crop diversity and seed producer groups who autonomously manage a community seed bank complex. The community seed bank links on-farm management of genetic resources with formal biodiversity conservation ex-situ. The enhancement of local materials is a highly participatory process. Farmers distribute varieties formally and informally among members and beyond the immediate locality. A number of important cash crops are conserved and multiplied by members of the community seed bank. This community level farmer management scheme is also a mechanism for empowerment.

In Ejere site, 240 farmers are legally registered as members of a farmers' association called Ejere Area Farmers' Conservator and Seed Producer Cooperative. The association, which was organized under the umbrella of the community seed bank complex, is dominated by men. Female farmers; however, participate actively in PVS and food-tasting activities. Both young and old farmers are equally represented in the group. The elders participate in knowledge dissemination and traditional conservation, enhancement, marketing and utilization practices for a diversity of local plant genetic resources.

EOSA firmly believes that concerted and coordinated effort from key actors in different crop value-chains and in both the public and civil support services are crucial for achieving meaningful development in biodiversity conservation and use. EOSA organises various forums for bringing together different research institutions, food processing industries, government offices and NGOs engaged in agricultural and rural development programmes.

Conservation approaches, and CBM as a process in general, at the site, follows the principle of engaging all key actors in multi-stakeholder forums, as described above. The process is highly participatory with the community actively involved in designing the approaches taken. It was agreed upon by those involved, that the following steps have to be included in CBM at Ejere site: awareness raising; collecting, inventorying and documenting genetic diversity at the site; recording traditional knowledge and practices associated with local varieties; reintroducing indigenous wheat varieties restoring a more traditional cropping pattern; establishing and empowering farmers' organizations, linking to institutions such as the community seed bank; and scaling-up good practices within and outside the target community.

The institutional linkage to EOSA is also important from a capacity development perspective. EOSA, agricultural Development Agents (DAs) and various researchers assist with both formal and informal training provision, sometimes also in collaboration with national and international development organizations.

8.5 Plant genetic resources

Ethiopia is a centre for genetic diversity of durum wheat. However, in the recent past, in order to meet the increasing demand for food, the changing socio-economic environment and the prevailing federal policies for agricultural development at that point in time, the replacement of diversity-based cultivars by semi-dwarf wheat varieties was deemed important for increased food production and economic yields. This has threatened the genetic diversity of the region. Currently, community livelihoods are based predominantly on rearing livestock (cattle, sheep and donkeys) and cultivating wheat with some pulse crops. Legumes such as chick pea, lentil, fenugreek and grass pea are common.

8.6 CBM practices

The CBM activities facilitated by EOSA are of particular importance because the traditional crops and varieties are neglected by the formal research, extension and seed supply programme. Moreover, EOSA has been addressing the research and development agenda of farmers, since the formal system focuses on introduced germplasm that perform well under high input situations, but which are frequently vulnerable to biotic and abiotic stresses that have direct negative impacts on the livelihoods of the community.

Field days and seed and food fairs are organized by EOSA to share experiences and lessons learnt regarding the conservation and use of farmers' varieties.

Formal and informal training on crop improvement activities, PVS, quality seed production, soil fertility and other technical expertise, community seed bank management and on-farm conservation of local varieties.

The community seed bank also actively promotes the use of important cash crops in rotation for not only financial gain but also for maintaining soil fertility status.

1. Generating awareness and an understanding of local diversity:
 - seed fairs and food-tasting;
 - field days;
 - promoting diversification for food, nutrition and livelihood security.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - formation of farmers' association;
 - multi-stakeholder forums;
 - formal and informal training.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - participatory approaches to enhancing local diversity;
 - PVS;
 - reintroduction of wheat varieties through crop rotation practices;
 - seed production and marketing;
 - seed banking;
 - technical backstopping;
 - seed extension services;
 - scaling-up of good practices within and beyond the target community.

9 Site description for Harbu, Ethiopia

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9.1 Context

The site is located in Amhara region in the northern part of Ethiopia. The agro-ecology of the area ranges from lowland to mid-altitude conditions. For the most part, the environment is classified as marginal or fragile, frequently encountering drought stresses. Fertility is variable and sorghum-based crop-livestock mixed farming is commonplace. Production is small-scale and subsistence-oriented and most technologies are traditional in nature.

The infamous drought of 1984 resulted in considerable socio-economic and agro-ecological disruptions. Consequently, much genetic diversity has been eroded through, among several drivers, a lack of planting materials. The Seeds of Survival (SoS) programme, initiated by the Unitarian Service Committee of Canada, attempted to restore traditional cropping patterns to support local farmers. Since then, the Integrated Agrobiodiversity Management and Seed Security Programme has made significant investments in the area.

9.2 Institutional and project setting

For further information on the Integrated Agrobiodiversity Management and Seed Security Programme please consult Chapter 7 under the same section heading.

9.3 Key project activities

The objectives and key activities of the Integrated Agrobiodiversity Management and Seed Security Programme are generic. Accordingly, the project objectives and activities at this location are identical to those of the two sites.

9.4 Social and institutional organization

The legally established Harbu Area Farmers' Conservator and Seed Producer Cooperative has approximately 200 male and 27 female members. Younger and older farmers are almost equally represented with the elder farmers playing an important role in disseminating time-tested knowledge on traditional practices for conservation, enhancement, marketing and utilization of a diversity of plant genetic resources.

The prime focus since the initiation of the SoS programme has been on reintroduction of local landraces of sorghum, and the restoration of traditional cropping patterns. Previous collections at the national genebank and target collections from households in pocket areas enable the on-going Integrated Agrobiodiversity Management and Seed Security Programme to enrich the diversity at the site. The farmers' cooperative owns an additional community seed bank complex in a well-ventilated upland area of Harbu for the prolonged storage of (mainly) sorghum seeds.

The livelihood of the entire community relies heavily on sorghum production. The farming community is interested in traditional sorghum varieties because of their unique adaptation potential to harsher environmental conditions; their ability to give optimum yield with no or minimal inputs; their support to household or community level seed security; their diverse socio-economic and cultural importance; their desirable nutritional values; and the multiple-uses of stalks for construction, fencing, firewood, and livestock feed. The vast importance of sorghum to the local inhabitants is not fully recognized by the formal research and extension services operating in the region. Nevertheless, the community actively participates in participatory selection of sorghum varieties under on-farm conditions. This forms the basis for *in situ* conservation and CBM practices in Harbu.

9.5 Plant genetic resources

The area is known nationally as the Country's Heart of Sorghum Diversity. More than 66 morphotypes of sorghum exist in the Harbu area. There is also considerable diversity of teff in the region. In addition, chick pea and various fruits and vegetables are grown. There have been attempts to introduce wheat but no successes can be reported.

9.6 CBM practices

1. Generating awareness and an understanding of local diversity:
 - inventorying and documenting crop diversity, conducting baseline surveys, tracing back historical records through the national genebank and documenting elderly farmers knowledge on traditional patterns and practices;
 - raising issues concerning PGR management and environmental degradation with particular focus on climate change;
 - seed fairs and food-tasting.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - legally registering the farmers' cooperative;
 - formal and informal training.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - PVS;
 - reintroduction of older collections from the national genebank and local household stores;
 - seed banking;
 - seed production and distribution;
 - technical backstopping;
 - promoting value addition for enhanced sorghum varieties;
 - value addition programmes promotion for enhanced wheat varieties;
 - scaling-up and strengthening the community seed bank complex.

10 Site description for Jeypore, India

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10.1 Context

Ancient farming communities inhabit the region with intense upholding of tradition in crop cultivation. These farmers are very poor, 80% of which live below a dollar-a-day, but they also hold rich biodiversity in the range of crops and medicinal plants propagated. This region, known in the literature as the Jeypore Tract, is a secondary centre of origin for rice (Ramiah & Ghose, 1951). This region is also notable for having low agricultural productivity potential, weak market access, poor infrastructure and correspondingly low levels of education. However, tribal communities, although stubborn in their approach, have played an important role in the domestication, conservation and improvement of many rice varieties.

10.2 Institutional and project setting

The lead organization for the Global CBM Study in India is MSSRF. There are several projects active in the study site; three of these have been elaborated upon below. Additional projects, not outlined, are funded by the TATA Trust India, World Food Programme, Department of Biotechnology of the Government of India, Global Environmental Facility, Mitsubishi Corporation Japan and the Food and Agriculture Organization of the UN.

The first project; entitled, Capitalisation of Prominent Landraces of Rice in Orissa through Value Chain Approach, was initiated in January 2009 and concludes in 2012. The main objectives are to:

- enable enhanced income generation from the large scale cultivation of potential and promising rice landraces;
- introduce appropriate technologies and management practices for enhanced productivity of those promising rice landraces;
- facilitate and ensure procurement and primary processing with continuous supply-chain management including appropriate market linkages;
- develop community based entrepreneurship or institutions for promotion, popularisation and commercialisation of rice through value addition and branding; and
- enable the resource poor communities to get reward and recognition for their intellectual property rights and traditional knowledge systems.

The donor is the National Agricultural Innovation Project of the Indian Council of Agricultural Research. Partners include: Central Rice Research Institute (CRRI); Orissa University of Agricultural Sciences (OUAT); and Orissa Rural Marketing Society (ORMAS).

The second project has been described according to its three individual phases of implementation.

Phase-I entitled, Conservation, Enhancement and Sustainable and Equitable Use of Biodiversity, operated from April 1998 to March 2001 with the objectives to:

- revitalize the *in-situ* on-farm conservation traditions of rural and tribal women;
- prepare community biodiversity registers and training in dealing with issues such as ‘prior informed consent’ and ‘material and information transfer agreements’;
- initiate participatory plant breeding and the breeding of location-specific varieties of economic plants;
- integrate the principles of gender and social equity and ethics in biodiversity conservation and sustainable utilization through policy research;
- link primary conservers with markets, thereby creating an economic stake in conservation; and
- facilitate networking and capacity building.

Phase-II concluded in 2006, having started directly after Phase-I, with the objectives of:

- identifying innovative approaches that effectively link biodiversity conservation and enhancement with improvement of livelihoods of the rural poor;
- disseminating and facilitating the adoption of successful innovation approaches, which link biodiversity conservation and enhancement with improvement of livelihoods of the rural poor, into mainstream programmes in Natural Resources Management;
- enhancing the capacities of farmers, local communities, NGOs, Government agencies, policy makers related to biodiversity management at their various levels; and
- improving the legal and institutional framework for biodiversity management through policy advocacy undertaken by MSSRF both at the national and state level.

The objectives of **Phase-III**, which concluded in 2009, included:

- consolidating the outputs obtained from phases I and II;
- piloting the application of the PAN-MSSRF² concept in Orissa;
- establishing one village knowledge centre and one village resource centre in Jeypore;
- intensifying the interactions among various actors and institutions active in conservation initiatives and to contribute to local anchorage and increased sustainability of conservation initiatives; and
- analysing, documenting and disseminating the results obtained in the project, both within and outside India, thus paving the way for increased South-South cooperation.

The entire project is funded by the Swiss Agency for Development and Cooperation (SDC).

The final project, which was operational in the study site up until 2010, was funded by the International Fund for Agricultural Development (IFAD) in partnership with the University of Agricultural Sciences, Bangalore, and LI-BIRD, Nepal. The project was also implemented in a phased approach. Phase-I; entitled, Enhancing the Contribution of Nutritious but Neglected Crops to Food Security and to Incomes of the Rural Poor, Asia component – Nutritious Millets, was run from January 2002 to December 2004. Phase-II; Empowering the Rural Poor by Strengthening their Identity, Income Opportunities and Nutritional Security through the Improved Use and Marketing of Neglected and Underutilized Small Millets, concluded in December 2010.

² PAN-MSSRF is a systemic concept which aims to generate inter-disciplinary and inter-programme synergies through the integration of four components: Biodiversity Conservation Utilization and Enhancement, Food Security, Bio Village and Village Knowledge Centres with emphasis on gender equitable development through people based management.

Project objectives included the following:

- promotion of on-farm conservation of traditional varieties and enhancing income from their cultivation through technological interventions;
- interventions in crop production management with cost effective technologies for yield optimization. Introduction of community level mechanized grain milling to dispense with the drudgery of women in grain processing by traditional method;
- capability building among women and men in value addition of grain with different technological interventions to promote domestic consumption and to enhance market demand;
- networking production, value addition and urban markets eliminating middle-men; and
- use of self-help groups for men and women for achieving above project objectives.

10.3 Key project activities

Below is a summary of the main project activity areas. A comprehensive list of all practices which relate to CBM is provided in the section *CBM practices* at the end of the chapter.

- scaling-up quality seed production;
- making technological investments;
- improving entrepreneurship, processing and value-addition;
- increasing networking and marketing;
- forming community institutions and building capacity;
- initiating community seed banks and medicinal plant gardens;
- characterizing germplasm both on-farm and molecularly;
- internalizing participatory on-farm approaches in biodiversity and natural resource conservation and management.

10.4 Social and institutional organization

Despite this region being endowed with rich natural resources, many tribal groups continue to uphold the traditional practice of shifting cultivation, whilst continuing to live in abject poverty. Subsistence agriculture is the predominant livelihood in Jeypore site. Landholding varies from half a hectare to two per household. Some households are landless and so rely on wage labour for a source of income. Alternately they can share or rent land from others. The community has tenure over part of the land, dividing this among villagers for cultivation, and the rest is privately owned. Women have no right to land ownership. Villagers also rely on the surrounding forest for non-timber products, which can be harvested at a small fee payable to the Village Forest Committee.

MSSRF has been working in two tribal villages in the Jeypore area for over 5 years, having already withdrawn activities in the one village. These villages have considerably higher levels of literacy than those adjacent. Through participatory rural appraisal and frequent discussions with the farming communities of these villages, MSSRF has been able to assist in identifying and consequently prioritizing local landraces for cultivation. Consensus was reached between researchers and the community on the modification of traditional farming methods to improve the availability of quality seed. Farmers and scientists are working closely together on improving farming techniques, selecting preferential germplasm and promoting superior local rice varieties.

A community seed bank has been constructed in one of the villages in Jeypore site. Farmers rely on each other to store seed within their homes in the other village which has not formally constructed a store to bank seed. However, in both villages, a seed bank committee works towards the management of stored seed. In one example, to become a member of the village seed bank, thereby gaining access to its resources, households must contribute at least two kilograms of grain per year to the committee. Seed can also be accessed through purchase or on loan at a defined interest rate. All necessary information regarding to the various germplasm is documented in the seed bank book, which was originally kept up-to-date by MSSRF but is now the responsibility of the institution.

Despite the absence of institutionalized community organizations, the community does meet to discuss conservation strategies based on the results of diversity block and demo village trials. One institution, which MSSRF helped to establish, is the Kalinga Kalajeera Rice Growers Cooperative Society (KKRGCS), which focuses on value addition to indigenous aromatic rice varieties. The KKRGCs is also supported by the Orissa Rural Marketing and Development Society, which helps farmers in the cooperative with the formation of a marketing plan. Further support to the community has been received from MSSRF through the establishment of a small community processing unit which should free (particularly) female labour from the burden of rice dehusking.

10.5 Plant genetic resources

The main crops cultivated are rice, finger millet, little millet, maize, sorghum, Niger seed, pumpkin, black gram, green gram and some other vegetables. Villagers also harvest tubers, bamboo shoots and some other non-timber forestry products from the surrounding land.

The area is rich in rice diversity but much of this has been lost over some years. Many varieties have had to be re-introduced from other areas and, with the inclusion of some demo village variety trials, a total of 102 different rice varieties are at the communities' disposal. One indigenous aromatic rice is marketed vigorously under the brand 'Basna Rani', which literally translates as 'the queen of aroma'.

10.6 CBM practices

This list serves to enumerate all the different activities taking place in the Jeypore site which pertain to community-based conservation and sustainable utilization of agrobiodiversity.

1. Generating awareness and an understanding of local diversity:
 - through participatory rural appraisal and frequent discussions, a sense of concern regarding the loss of indigenous landraces of rice was generated among community members;
 - creating awareness within the community regarding the conservation of local varieties was achieved using street-plays, documentary screenings, and biodiversity and seed fairs.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - reaching agreement within the community to modify cultural methods of cultivation, embracing technology and modernized approaches, whilst retaining traditional knowledge;
 - providing training on improved farming methods;
 - encouraging the formation of community institutions and setting-up a village seed bank committee and various self-help groups;
 - coordinating the establishment of the KKRGCs and linking the society to the ORMDS for support in marketing activities.

3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - re-introducing local rice varieties through the set-up of diversity block trials and demo villages;
 - initiating community seed banks and documentation on germplasm;
 - promoting participatory approaches to CBM;
 - endorsing entrepreneurship such as the 'Basna Rani' marketing initiative.

11 Site description for Kolli Hills, India

Kumar Natarajan & Oliver King

MSSRF, Namakkal, Tamil Nadu

11.1 Context

Kolli Hills is unsurprisingly another Indian community with strong cultural inheritance. The community traditionally cultivated a large diversity of millet species but approximately 30 years ago significant socio-economic changes resulted in the decline of millet conservation and use. The introduction of government distribution centres which offer food items at considerable discount, and the introduction of cash crops to the region were significant driving forces. MSSRF began working in the site in 1994 initially surveying the traditional knowledge, agricultural practices and natural resources management of the community. This survey later developed more of a focus on studying the biodiversity within sacred groves, which display a fascinating link between cultural practice and biodiversity conservation.

11.2 Institutional and project setting

The two latter described projects in the previous chapter (Chapter 10: Jeypore site), funded by the SDC and IFAD respectively, were also involved to some or more extent in Kolli Hills. The SDC funded project consolidated the work initiated in Kolli Hills on millets, with the purpose to achieve higher productivity as well as to bridge the gap between supply and market demand of millets by facilitating market linkages. The IFAD funded project was also, in addition to the Jeypore site, implemented in Kolli Hills with the same objectives and key activities as outlined in Chapter 10.

11.3 Key project activities

Please see comments above and refer to Chapter 10 under the same section heading.

11.4 Social and institutional organization

Most farmers have legal ownership of land but some are landless and rely heavily on the forest for resources. Although not formally registered, land in the forest is cleared for cultivation. Some farmers are attempting to develop agroforestry systems and form an organisation with the idea of establishing a nursery.

The creation of community organizations with institutionalised working modalities has been achieved through the formation of farmers' self-help groups (SHGs). One in particular has been very successful in the marketing of organically produced pineapples with the support of private organic certification agencies and export companies. There are a number of other SHGs which are also involved in value-addition activities; including, the 'Natural Food Shop', established and maintained by a local woman's group. Several SHGs manage a millet processing mill which is used predominantly for home consumption but does generate income for the organization. The Kolli Hills Agrobiodiversity Conservation Federation (KHABCOFED) was established in 2009 with the aim of scaling-up community collective actions and for consolidating community roles in planning and implementing CBM. The KHABCOFED encompasses all farmer SHGs, coordinated by two committees and a general assembly.

MSSRF has been successful in generating awareness on the benefits of *in-situ* conservation of landraces for food security and the value of production of minor crops for home consumption, which has led to participatory approaches in millet conservation and genetic characterisation. Furthermore, input-based trials and demonstration plots have been started in association with knowledgeable farmers. The community is actively promoting local landraces for traditional agricultural production, for home consumption and also in the preservation of cultural aspects. Community seed banks are well organized, autonomous and keep the community's register of germplasm documentation. The community is also concerned about the protection of natural resources; for example, the sacred groves. An ecotourism orientated group has been given the responsibility to manage a touristic site. There is a waterfall at the site and the group generates good income from visitors.

11.5 Plant genetic resources

Traditionally, communities cultivated a wide variety of millet species but many are being reintroduced now after a significant decline in the conservation of these over the past 30 years. Cash crops were introduced roughly 30 years ago, which resulted in the diminished orientation towards minor crops. Cassava, pineapple, coffee, black pepper, banana and clove were among those introduced commodities. More recent interests in agroforestry have brought about the increased cultivation of pineapple, pumpkin and jackfruit.

11.6 CBM practices

This list serves to enumerate all the different activities taking place in the Kolli Hills site which pertain to community-based conservation and sustainable utilization of agrobiodiversity.

1. Generating awareness and an understanding of local diversity:
 - MSSRF survey and documentation of community biodiversity, traditional knowledge, agricultural practices and natural resource management;
 - 4C's approach (conservation, cultivation, consumption and commercialization) to community awareness raising and resource management;
 - participatory characterization of millet germplasm.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - formation of community self-help groups and institutionalization of working modalities;
 - establishing KHABCOFED and electing committees to coordinate, monitor and consolidate collective community action.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - value-addition through processing, certification and branding;
 - input-based trials, diversity blocks and demonstration plots;
 - managing village seed banks and keeping a register of germplasm;
 - providing diversity kits to farmers for the multiplication and replication of millet landraces;
 - payment to farmers for participating in landrace multiplication and distribution;
 - introducing new crops through agroforestry schemes;
 - generating income from ecotourism for the community.

12 Site description for Sirsi, India

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12.1 Context

Sirsi is located in the central part of the Western Ghats, a range of hills that stretch 1500km along the western coast of India. This area is known for its high percentage of endemic flora and fauna and is one of the world's 34 hotspots for biodiversity. It also hosts a high number of ethnic groups, most of which are culturally tied to the forest for resource utilization and cultivation. Eighty per cent of the area is covered with forest and one-third of household income is contributed by non-timber forestry products, of which 60-70% is wild fruits.

12.2 Institutional and project setting

The lead organization in the coordination of the global CBM study at Sirsi site is the College of Forestry, Sirsi. In partnership with Life Trust Sirsi, the College of Forestry has conducted research relevant to CBM in the study site. The project; entitled, Documentation of community biodiversity management practices with respect to (primarily) *Garcinia spp.* resources in the Central Western Ghats, India, focuses on the objectives of documenting CBM practices for these tropical fruits at the site, understanding empowerment issues related to these resources, and developing a set of best practices for value addition and value chains for these resources.

12.3 Key project activities

Key activities in the above-mentioned project include both documenting and characterizing tropical fruit resource use patterns, further elaborating these descriptions and analysing CBM practices. Additionally, identifying opportunities for value addition, income generation, and livelihood improvements, whilst generating awareness and developing the capacities of stakeholders in these respective value chains are important activities too.

12.4 Social and institutional organization

In the early 1990s, the state government of Karnataka implemented the Joint Forest Planning and Management (JFPM) project with the intention of encouraging the communities' participation in the conservation and sustainable utilization of biological diversity in the Western Ghats. The principle of this participatory forest management is based on a relationship of 'co-management' and 'give and take' between the two major stakeholders; namely, village communities and the Forestry Department, in most cases mediated by a non-governmental organization. Karnataka Forestry Department and local communities share the responsibility of jointly planning and managing areas of forests with the incentive of mutually benefiting from the conservation of the forest.

Over 500 village forest committees (grassroots community-based organizations) were formed in Uttara Kannada district to facilitate the implementation of JFPM. In order to facilitate the JFPM activities, the general auctioning of NTFPs to the forest contractors was excluded from the VFC areas, so that the communities could harvest as well as sell these products. The VFCs have started planting prioritized plant species in degraded areas, in consultation with the KFD. Any benefits arising out of this activity will be shared between the KFD and VFC. Every VFC has a revolving fund, which is raised jointly by the government and the communities and which is utilized for different activities. Today, because of the JFPM, there is a relatively high level of social learning among the communities and a scaling-up of collective community action has taken place.

Awareness raising activities have been attempted. Two fairs were organized by outside organizations, including the Department of Agriculture, but no clear connections to CBM were expressed. Diversity kits have as yet not been introduced, but an on-going project on tropical fruit trees aims to establish nurseries and distribute grafts of mango landraces. Demonstrations on grafting techniques were observed, having been delivered by a member of a women's group.

The establishment of diversity blocks is a positive example of awareness creation and capacity building within the site among its community members. This practice was initiated owing to the interest of innovative farmers. On a diversity plot, spread over 6 ha, mango and *Garcinia* trees were planted separately to experiment with individual treatments. The desire to harvest better mango types over a longer season has driven these farmers to collect varieties that mature during different months of the year. This also ensures a longer period of income for farmers. A fairly high number of wild mangos that are more aromatic and which can be harvested whilst slightly unripe in order to make a pickled product are also collected and maintained by the farmers. These wild mangos carry a high price due to their acclaim in traditional culinary use. About 54 mango varieties are being maintained in the diversity plot, of which about 12 are pickling types. Importantly, about 22 varieties are endemic to the district. All of the mango trees in the diversity plot were grafted from the original parent in the wild. Several *Garcinia gummi-gutta* and *G. indica* have also been included in the diversity block. The farmer has identified three different varieties of *G. indica* (bright red, big red and pale yellow). For *Garcinia spp.*, the farmer tested two methods of propagation: seed origin and graft origin. Seed-origin individuals were preferred because grafted individuals turned out to be more bushy in architecture. Over the past 10 years the farmer has been training several others interested in these issues.

12.5 Plant genetic resources

During discussions between VFCs and the state, communities expressed their concern about the disappearance of valuable timber and NTFP species that were lost, allegedly because of the state's earlier policies. Before British rule, local communities managed the forests under a set of traditional rules and regulations, suggesting a higher level of understanding of local biodiversity. Today, important NTFPs that are extracted include: *Garcinia gummi-gutta*; *G. indica*; wild varieties of mango, nutmeg, cinnamon, rattan; *Terminalia sp.*; and *Phyllanthus emblica*. In contemporary times, the main cultivated crops are arcanut palm (betel nut), coconut palm, banana, black pepper, and irrigated rice. Cardamom, cocoa, and vanilla are also sparsely cultivated.

12.6 CBM practices

This list serves to enumerate all the different activities taking place in the Sirsi site which pertain to community-based conservation and sustainable utilization of agrobiodiversity.

1. Generating awareness and an understanding of local diversity:
 - awareness has been enhanced by village workshops and by biodiversity and food fairs;
 - different organizations working in the area have documented the biodiversity and the practices of extraction and use of forest genetic resources;
 - four cell analysis of common, unique and rare PGR;
 - biodiversity register for locating seed sources and documenting traditional knowledge;
 - identifying site-specific NTFP species crucial to livelihoods;
 - identifying biological, social and economic factors limiting the cash income of rural households and suggesting mitigation measures.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - capacity development including methods for swot analysis;
 - village-based training programmes;
 - enhancing NTFP management among forest user groups;
 - key institutions were identified for playing coordinating roles and roles and responsibilities, including institutional norms, were defined;
 - establishment of a CBM committee representing members of the farming community and the community based institutions;
 - development of a code of conduct for the management of genetic resources;
 - consolidating community roles in the planning and implementation, coordination and development of annual action plans;
 - facilitation of the above through village meetings;
 - defining specific guidelines for the season of collection, permissible amounts for collection, and methods for harvesting, storing and processing NTFPs.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - the custodian farmers act like gene banks, they have access to a high diversity of mango varieties and have the habit of exchanging scions and making grafts;
 - about 54 mango varieties are being maintained in the diversity plot;
 - group saving and credit programmes;
 - facilitating joint learning;
 - priority given to poor, female and disadvantaged members of the community in the implementation of the CBM plan;
 - community monitoring and evaluation;
 - identifying evaluation indicators and methodology;
 - review meetings;
 - travelling seminars are organized regularly to monitor and evaluate community actions;
 - identifying innovations and new practices that can be scaled up to other households and communities;
 - cultivation of *Garcinia* plants in home gardens;
 - redesigning agroforestry systems;
 - involvement of village forest committees and self-help groups in collecting fruits for handover to the Forest Department and contractors.

13 Site description for Bara, Nepal

Pitambar Shrestha & Rachana Devkota

LI-BIRD, Pokhara

13.1 Context

This site is characterized as having high production potential. About 97% of households in the Bara site regard agriculture as their main occupation and 27% of these are actively involved in CBM activities. The farmers are exposed to technologies and have ample access to agricultural inputs due to its proximity to the Indian border. However, owing to the nature of the soil and the scarcity of irrigation water, early maturing varieties of rice are preferred in the high lying areas. Farmers grow predominantly rice, wheat, potato, maize, lentil and pigeon pea. Other sources of income in Bara are wage labouring and small businesses.

13.2 Institutional and project setting

The lead organization for the study sites in Nepal is LI-BIRD. Other partners and collaborators are involved through two different projects in the region. These are outlined below.

The first project is the Promoting Innovative Mechanisms for Implementing Farmers' Rights through Fair Access to Genetic Resources and Benefit Sharing Regime in Nepal (ABS). Implementation of the project ended in 2010, having commenced in 2007. The main objectives are: assessing the appropriateness of policy and legal instruments to implement farmers' rights relevant to the access to genetic resources and benefit sharing, and to the conservation and utilization of genetic resources; strengthening multi-stakeholder arrangements for effective implementation; identifying and supporting institutional arrangements appropriate to farming communities' rights and sustainable management of their genetic resources; supporting innovative practices serving implementation of farmers' rights and other project mechanisms; and conserving biodiversity for livelihood security. The donor is the Canadian International Development Research Centre (IDRC) in partnership with South Asia Watch on Trade, Economics and Environments (SAWTEE). Collaborators include: Bioversity International; the Nepalese Ministries of Agriculture and Cooperatives, and Forest and Soil Conservation; Nepal Agricultural Research Council; and district development committees, farming communities and community institutions within the project sites.

The second project that is currently underway, ending 2011, is Community Based Biodiversity Management (CBM) in Nepal, supported by The Development Fund, Norway, in partnership with: Department of Agriculture, Nepal; Bioversity International; the Nepalese Ministries of Agriculture and Cooperatives, and Forest and Soil Conservation; Nepal Agricultural Research Council; and district development committees, farming communities and community institutions within the project sites. Implementation began in 2008 with the main objective to enable farming communities to assess, conserve, utilize and secure access to and control over their genetic resources through local capacity building and by influencing favourable policy changes.

13.3 Key project activities

Key activities in the above-mentioned ABS and CBM in Nepal projects are, for the former, advocacy for policy and practice, assessment, capacity development, awareness raising and inspiring innovation practices aligned with *in-situ* conservation of plant genetic resources, value addition and participatory plant breeding and variety selection. Activities of the latter include capacity building, influencing policy changes, documenting genetic resources and associated traditional knowledge, empowering communities to develop and implement CBM plans, and exploring opportunities for conservation through the utilization of local genetic resources. Both projects involve similar approaches to conservation and empowering communities to conserve and sustainably manage genetic resources. These are enumerated in the *CBM practices* section below.

13.4 Social and institutional organization

The presence of active and functional community-based institutions is a prerequisite for the effective implementation of community based biodiversity management programmes. The establishment and work of the Agriculture Development and Conservation Society (ADCS) in this community, is an example of such local institutions. Farmers, who were more motivated and oriented towards conservation, formed the ADCS and established a community seed bank. The ADCS also mobilizes women's groups, manages the community seed bank, promotes participatory plant breeding products, mobilizes the CBM fund and conducts community-based seed production and marketing activities. The ADCS initiates different activities to enhance community awareness about biodiversity, especially agrobiodiversity. The CBM fund is used to support conservation and income-generating activities, and as a revolving fund scheme under which community members receive credit for conservation-oriented activities. The community holds a monthly meeting to plan and review progress and discuss problems and constraints. Day-to-day activities are planned by the ADCS during these monthly meetings. An annual general assembly is held where progress made during the year, and plans for the following year, are presented and agreed upon. Through these processes, individuals realized that it is easier to work as a group. The CBM fund brought the community together. An important conclusion made by the community during general assembly is that when it works in a collective way, members have more opportunities and better access to resources.

13.5 Plant genetic resources

The genetic erosion of traditional varieties has been taking place in Kachorwa due to technological interventions, the provision of easy access to inputs and frequent natural disasters, like floods and drought. The farmers are faced with the erosion of rice landraces at an alarming rate and have consequently internalised the importance of conservation.

As mentioned previously, owing to the nature of the soil and the scarce availability of irrigation water, early maturing varieties of rice are planted in the high lands. Thus far, farmers together with breeders have developed 13 improved rice varieties, which exhibit farmer-favoured traits of their earlier generation landraces.

A number of other major and minor food crops are cultivated in the site but these unfortunately have poor market orientation. For example, commodities such as sponge gourd, cucumber and finger millet are predominantly cultivated for home consumption with only a limited number of households selling to the market.

13.6 CBM practices

This list serves to enumerate all the different activities taking place in the study site which pertain to community-based conservation and sustainable utilization of agrobiodiversity.

1. Generating awareness and an understanding of local diversity:
 - generating awareness through village workshops, field visits, social and resource mapping, folk song competitions, diversity blocks;
 - establishing diversity blocks and distributing diversity kits;
 - identifying common, unique and rare plant genetic resources through participatory tools such as four-cell analysis (de Boef & Thijssen, 2007);
 - conducting a network analysis to identify nodal farmers and their potential to exchange genetic resources with others;
 - assessing the status of plant genetic resources through the community biodiversity register and diversity fairs.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - formation of the ADCS to enhance community awareness about agrobiodiversity;
 - formation of women's groups;
 - setting the agenda to meet and discuss day-to-day activities, review progress, identify constraints and plan for the future;
 - constructing conservation strategies for community plant genetic resources;
 - integrating a conservation theme into the school programme;
 - coordinating different needs-based trainings on value addition and nursery management and organizing farmer exchange visits to increase capacity;
 - contributing to organizational development and facilitating linkage and coordination between stakeholders;
 - internalizing CBM practices in the community action plan in the study site;
 - designing a Sustainable Agriculture Saving and Credit Cooperative in the district.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - conducting SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis on the different community organizations to identify capacity development priorities;
 - establishment and maintenance of the community seed bank;
 - mobilization of community contributions to the CBM fund;
 - crediting conservation-orientated farming activities;
 - promoting participatory approaches to plant breeding and variety selection;
 - facilitating community-based seed production and marketing activities.

14 Site description for Bardiya, Nepal

Bharat Bhandari & Rachana Devkota

LI-BIRD, Pokhara

14.1 Context

The most common livelihoods in this area are agricultural, small business ownership and animal husbandry. Despite the majority of land being covered with tropical and sub-tropical forest, a large area is used for agricultural production including a broad diversity of crops, vegetables and fruits. The greatest proportion of agricultural land is classified as lowland dominated by rice production, which is preceded by wheat as the additional crop of the year. Maize is grown in the higher-lying areas and many households grow vegetables and fruit trees in their gardens.

14.2 Institutional and project setting

The lead organization for the study in Nepal is LI-BIRD. There is an on-going CBM orientated project in the site, to which this study relates, known as the WTLC project; landscape level biodiversity conservation in Nepal's Western Terai Landscape Complex (WTLC). Implementation of the project commenced in 2005 with plans to phase out in 2012. The main objectives of the WTLC project are to establish an effective management system and to build capacity for conservation and sustainable use of Nepal's Western Terai Landscape Complex. The project is funded by the UNDP and Global Environment Facility (GEF) in partnership with: the Nepalese Ministry of Forests and Soil Conservation; Netherlands Development Organization (SNV); WWF; Bioversity International, Rome; and the Nepal Agriculture Research Council (NARC). The project runs from August 2005 to July 2012.

14.3 Key project activities

Key activities in the above-mentioned WTLC project include:

- establishing benchmark information regarding agro-biodiversity uses, land-use practices and the socio-economic and cultural setting;
- raising awareness on biodiversity conservation and utilization;
- forming an association of farmers' groups and strengthening their organization's effectiveness in conservation and sustainability practices;
- initiating community-based biodiversity management activities; and
- mapping globally important agro-biodiversity.

More specific project and community practices are enumerated in the section entitled *CBM practices* below.

14.4 Social and institutional organization

During 2007, LI-BIRD facilitated the establishment of a farmers' group association called the Biodiversity Conservation and Development Committee (BCDC). The BCDC is tasked with initiating various CBM activities and generating community awareness on plant genetic resource conservation and sustainable use. An executive committee heads the BCDC which has been selected from representatives of the different farmers' groups and the Village Development Committee (VDC).

This executive committee meets at least once a month to decide on routine CBM activities and then every two years a general assembly elects a new committee. Further activities of the BCDC include documenting plant genetic resources in the community biodiversity register, organizing biodiversity fairs and other awareness raising activities, but also importantly, mobilizing member contributions to the CBM fund. Loans are provided to the BCDC members only, and priority is given to the poorest of individuals for running income-generating small business activities. Landholding is indicative of wealth and the vast majority of the community are poor, owning less than two-thirds of a hectare or even nothing at all. Wealthy households command greater than two hectares of land, but represent a mere 4% of the community.

Currently, most farmers within the community appreciate the importance of local landraces, especially as a source of genetic variability for crop improvement programmes. Such programmes operate with the participation of the community in plant breeding and variety selection. Furthermore, a biodiversity themed topic has been integrated into the school curriculum to further augment capacity development and awareness raising initiatives launched by the BCDC and VDC. The community realizes that organizing themselves into groups makes it easier to work on community development and conservation activities, to share ideas and also to improve their access to resources and their opportunities to utilize these.

14.5 Plant genetic resources

Ninety-two per cent of the agricultural land of Bardiya site is classified as lowland; dominated by rice production. One group within the BCDC has been tasked with carrying out trials for the selection of superior landraces of drought tolerant and higher productivity rice for a range of different moisture conditions. The group has designed this trial in the form of a diversity block for maintaining landraces and has incorporated 36 different varieties of rice. The upland areas cultivate mainly maize and some households grow vegetables and keep fruit trees in their gardens, but the predominant plant genetic resources of the region can be summarized by: cereals; pulses; vegetables; and some forest and household fruit trees.

A voluntary scholar initiative has resulted in the establishment of a small indigenous fruit tree nursery in the school garden. The community, assisted by LI-BIRD, is also conserving a number of fruit and vegetable species through the establishment of a local nursery. The land has been provided by a single farmer who provides training on how to manage fruits and vegetables, using techniques such as the grafting of mango trees, for example.

14.6 CBM practices

This list serves to enumerate all the different activities taking place in the study site which pertain to community-based conservation and sustainable utilization of agrobiodiversity.

1. Generating awareness and an understanding of local diversity:
 - documenting plant genetic resources in the community biodiversity register;
 - generating awareness through a biodiversity fair and village workshops;
 - displaying the value of goods and services provided by agrobiodiversity;
 - formation of the BCDC to enhance community awareness about agrobiodiversity.

2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - electing an executive committee to take decision on routine CBM practices, meeting at least once a month;
 - integrating biodiversity themed topics into the school curriculum;
 - focussing capacity development of community institutions within the activities of agricultural biodiversity conservation and management, participatory plant breeding, the diversity block and drought tolerant rice variety trials, local nurseries, the CPCP, rainwater harvesting, medicinal plant growing, home garden establishment, and all associated training activities such that of mango tree grafting, for example;
 - setting up institutional working modalities, mobilization of member contributions to the CBM fund, internal coordination and linkage between stakeholders;
 - internalizing CBM practices in the community action plan in the study site.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - establishment and maintenance of the community seed bank;
 - promoting participatory approaches to plant breeding and variety selection;
 - supporting the school indigenous fruit tree nursery and the Cyber Plant Conservation Programme (CPCP) which hosts an electronic database of information related to these nursery trees;
 - setting up a student website enabling the sharing of the CPCP information and that gathered by others;
 - crediting conservation-orientated farming activities with first priority for financial support being granted to the poorest among the community;
 - rewarding farmers who cultivate the highest number of indigenous landraces with a financial prize.

15 Site description for Begnas, Nepal

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15.1 Context

The village of Begnas is comprised of a mixture of different ethnic communities. There is also a considerably greater number of community cooperatives and institutions in place in the Begnas site, compared with the other two study sites in Nepal, namely Bara and Bardiya. This degree of social organization distinguishes Begnas from these other two sites. Also, mean annual precipitation is relatively high and temperature ranges allow for three crops per year. Agricultural land is classified according to the availability of irrigation, being either seasonal to all year round or not present at all. Land with access to irrigation grows predominantly rice, cultivated in the summer season. Maize, finger millet, taro, vegetables and fruits are planted in the non-irrigated fields. The majority of households are involved in farming activities ranging from cereal crop production and/or horticulture to livestock rearing.

15.2 Institutional and project setting

The lead organization for the study sites in Nepal is LI-BIRD. In Begnas site, the study focuses on two projects, which will both have been concluded by the end of 2011. A more detailed outline of each project is provided below.

The first is Promoting Innovative Mechanisms for Implementing Farmers' Rights through Fair Access to Genetic Resources and Benefit Sharing Regime In Nepal (ABS). Implementation of the project commenced in 2007. The main objectives are: assessing the appropriateness of policy and legal instruments to implement farmers' rights relevant to the access to genetic resources and benefit sharing, and to the conservation and utilization of genetic resources; strengthening multi-stakeholder arrangements for effective implementation; identifying and supporting institutional arrangements appropriate to farming communities' rights and sustainable management of their genetic resources; supporting innovative practices serving implementation of farmers' rights and other project mechanisms; and conserving biodiversity for livelihood security. The donor is the Canadian International Development Research Centre (IDRC) in partnership with South Asia Watch on Trade, Economics and Environments (SAWTEE). Collaborators include: Bioversity International; the Nepalese Ministries of Agriculture and Cooperatives, and Forest and Soil Conservation; Nepal Agricultural Research Council; and district development committees, farming communities and community institutions within the project sites.

The second project; Community Based Biodiversity Management (CBM) in Nepal, is supported by The Development Fund, Norway, in partnership with: Department of Agriculture, Nepal; Bioversity International; the Nepalese Ministries of Agriculture and Cooperatives, and Forest and Soil Conservation; Nepal Agricultural Research Council; and district development committees, farming communities and community institutions within the project sites. Implementation began in 2008 with the main objective to enable farming communities to assess, conserve, utilize and secure access to and control over their genetic resources through local capacity building and by influencing favourable policy changes.

15.3 Key project activities

Key activities in the above-mentioned ABS and CBM in Nepal projects are, for the former, advocacy for policy and practice, assessment, capacity development, awareness raising and inspiring innovation practices aligned with *in-situ* conservation of plant genetic resources, value addition and participatory plant breeding and variety selection. Activities of the latter include capacity building, influencing policy changes, documenting genetic resources and associated traditional knowledge, empowering communities to develop and implement CBM plans, and exploring opportunities for conservation through the utilization of local genetic resources. Both project approaches involve similar approaches to conservation and empowering communities to conserve and sustainably manage genetic resources. These are enumerated in the *CBM practices* section below.

15.4 Social and institutional organization

As mentioned previously, the Begnas site can be distinguished from the other two Nepalese study sites by its relatively developed social organization. Initially, farmers' groups were set up by CARE Nepal, an International NGO, but several years later, LI-BIRD is working within the community on agrobiodiversity management. A number of these initial farmers' groups that were formed by CARE went on to form the Biodiversity Conservation Movement (BCM), which acts as a leading community-based organization for the resource collection activities of the community. As a component of the BCM, the Pratigya Cooperative has been involved in the collection and selling of local agri-products, from 1998 to date. This cooperative mobilizes other farmers' groups to produce local food items. Cooperative members also work as mediators in the collection and selling of those products. Another cooperative is the Rupa Lake Rehabilitation and Fishery Cooperative, which manages wetland biodiversity around Rupa Lake and its watershed. The Jaivik Shrot Sanrachan Abhiyan (Biodiversity Conservation Movement) is another community-based organization, which mobilizes a CBM fund for income generation and conservation activities. The PPB farmers' group in Begnas is responsible for the establishment and management of mother trials, participatory varietal selection (PVS) and the segregation of materials of *in situ* PPB products. Biodiversity Conservation and Development Committees (BCDCs) were formed at the village level, which are also responsible for the conservation and management of genetic resources and the mobilization of community contributions to the CBM fund.

The initial farmers' cooperatives formed with the objective to document the available genetic resources in a community biodiversity register. Later, they and their successor organizations initiated several awareness-raising activities to sensitize the community towards vanishing local genetic resources. In this regard, the community developed a wide range of methods and tools to raise awareness. The formation of the PPB Group is one such method and one crucial for the conservation of indigenous landraces.

15.5 Plant genetic resources

Rice is the main food crop grown across the study site and it is cultivated in all categories of land: swampy, irrigated or partially irrigated, rainfed and high land. Finger millet is the second most important hill crop, after maize, and it is grown under marginal conditions. The local genetic resources base in the site includes 68 rice, 24 finger millet, 13 sponge gourd, 24 taro and 15 cucumber local varieties. The site is rich in fruits, vegetables, grain legumes, forests (including non-timber forest products), fodder species and wetland species diversity.

15.6 CBM practices

This list serves to enumerate all the different activities taking place in the Begnas site which pertain to community-based conservation and sustainable utilization of agrobiodiversity.

1. Generating awareness and an understanding of local diversity:
 - documenting genetic resources in the community biodiversity register;
 - identifying rare, endangered and valuable resources through four-cell analysis (de Boef & Thijssen, 2007);
 - raising awareness on diminishing local genetic resources through biodiversity fairs, food fairs, rural theatre, poetry, song, painting competitions, farmers' workshops, rural radio shows, and travelling seminars.
2. Establishing community institutions, developing their capacities and consolidating CBM in their working modalities:
 - NGO and community involvement in the formation of several cooperatives operating at different scales with different roles and responsibilities related to CBM;
 - coordination and linkage between community organizations regarding various CBM activities;
 - defining institutional norms and responsibilities of community cooperatives;
 - internalizing CBM in the community action plan;
 - building capacity through various needs-based trainings, diversity blocks, diversity kits, village workshops, subcommittee formation, and community group working platforms;
 - capacity development aimed at improving the efficiency, self-confidence and social mobilization of local institutions.
3. Developing conservation practices (including entrepreneurship and marketing of agrobiodiversity), monitoring and evaluating practices, promoting social learning and scaling-up:
 - reviewing and monitoring CBM progress in the forum of monthly meetings and annual general assembly's;
 - mobilizing community contributions to the CBM fund;
 - financing income-generating ventures, especially for those farmers who are resource-poor, using the CBM fund;
 - establishment and maintenance of the community seed bank;
 - encouraging social learning through this site's recognition as a CBM resource centre, hosting site visits from outside communities and institutions and participating in several governmental and non-governmental trainings programmes;
 - promoting participatory approaches to plant breeding and variety selection;
 - developing diversified options for conservation strategies.

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Appendix 1 – Overview of practices

Country	Site	Practices:														
		Diversity Fair	Diversity Block	Diversity Kit	Community biodiversity register	Community gene bank	Reintroduction of gene bank accessions	PPB	PVS	Home gardens	CBM fund	Value addition	Rural Drama and/or folk song competitions	Rural Poetry	Traveling seminars	Field days
Brazil	Guaraciaba	X		X				X	X			X				
	Imbituba	X			X						X	X				
	Irati				?	?						X				
	Porteirinha		X		X				X			X				
	Tavares	X				X	X									
Ethiopia	Chefe Donsa	X			X	X	X		X		X					X
	Ejere	X				X	X		X							X
	Harbu	X			X	X	X		X		X					
India	Jeypore	X	X		X	X	X	X	X			X	X			
	Kolli Hills		X	X	X		X				X	X				
	Sirsi	X	X		X	X				X	X				X	
Nepal	Bara	X	X	X	X	X		X	X		X	X	X			X
	Bardiya	X	X		X	X		X	X	X	X					
	Begnas	X	X	X	X	X		X	X		X		X	X	X	

Appendix 2 – Overview of CBM process components

Country	Site	Process components:							
		Enhancing community awareness	Understanding diversity, social networks and institutions	Capacity building of community institutions	Setting up of institutional working modalities	Consolidating community roles in planning and implementation	Establishing a CBM fund	Community monitoring and evaluation	Social learning and scaling up for collective action
Brazil	Guaraciaba	X	X	X	X				X
	Imbituba	X	X	X	X	X	X	X	X
	Irati	X	X	?	?	?			?
	Porteirinha	X	X	X	X				X
	Tavares	X	X	X	X				X
Ethiopia	Chefe Donsa	X	X	X	X				
	Ejere	X	X	X	X				X
	Harbu	X	X	X	X				X
India	Jeypore	X	X	X	X	X			
	Kolli Hills	X	X		X	X	X		X
	Sirsi	X	X	X	X	X	X	X	X
Nepal	Bara	X	X	X	X	X	X	X	X
	Bardiya	X	X	X	X	X	X		X
	Begnas	X	X	X	X	X	X	X	X

Appendix 3 – Overview of plant genetic resources addressed in sites

Country	Site	PGR groups:						
		Cereals	Pulses	Oil crops	Vegetables	Perennials	Spices and medicinal plants	Other
Brazil	Guaraciaba	X	X		X			
	Imbituba	X		X		X	X	
	Irati					X		
	Porteirinha	X	X		X			
	Tavares	X	X		X			
Ethiopia	Chefe Donsa	X	X					
	Ejere	X	X					
	Harbu	X	X		X	X		
India	Jeypore	X			X	X		X (Bamboo)
	Kolli Hills	X			X	X	X	
	Sirsi	X		X		X	X	
Nepal	Bara	X			X			
	Bardiya	X	X		X	X		
	Begnas	X	X		X	X		X (Fodder)

Appendix 4 – Overview of levels of agrobiodiversity addressed in sites

Country	Site	Levels (indicates at what scales of conservation initiatives are targeted, be it varieties, species and/or plant communities):		
		Landscape (plant communities and ecosystem)	Species	Genetic diversity (intra-specific/varieties)
Brazil	Guaraciaba	X (micro-watershed management)	X (establishing corridors for riparian forest)	X (diversity kits; PPB; PVS)
	Imbituba	X (addressing land rights to adjacent native vegetation)	X (Ethnobotany and use of medicinal plants; NTFP management)	X (variety exchange, crop production, processing and marketing)
	Irati	X (plant and landscape domestication)	X (NTFP management)	?
	Porteirinha Tavares		X (sustainable poly-crop production and use) X (poly-crop conservation and use)	X (diversity block; PVS) X (seed exchange and diversity fairs)
Ethiopia	Chefe Donsa			X (reintroducing local varieties; PVS; seed production and marketing)
	Ejere			X (PPB; PVS; reintroducing landraces; seed production and marketing)
	Harbu			X (reintroducing varieties; PVS; seed banking)
India	Jeypore Kolli Hills			X (reintroduction of landraces; variety trials) X (diversity kits)
	Sirsi Bara Bardiya Begnas	X (forest conservation)	X (conservation and management of NTFPs)	X (diversity plot)
Nepal	Bara			X (PPB; PVS; reintroducing landraces)
	Bardiya	X (land-use assessments)	X (conserving biodiversity)	X (PPB; PVS)
	Begnas			X (PPB; PVS; reintroducing landraces)

This document contains comprehensive descriptions of all the sites in which the Global CBM Study was conducted. For brevity, future publications sharing results, conclusions and experiences of the Global CBM Study will omit such detailed descriptions and instead will provide reference to this publication as a supplementary source for those data.

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