

PHILIPPINES

Project Title: Ecological assessment, restoration and protection of the Northwest Panay Low-elevation Forest Ecosystem: Developing community-based agroforestry systems for natural resources management and biodiversity conservation

Study Leader: Dr. Samuel N. Koffa, Bioresource Conservation Trust for the Philippines, Inc.

Introduction

As forests in the Philippines and other countries in the Southeast Asian Region recede and/or degrade and human needs for forest products and services mount, there is also a heightening interest in the private and public sectors to protect the remaining forests in an honest attempt to conserve biodiversity and to sustain the variety of ecological processes, which forests normally maintain and support, in addition to the rich assortment of products they provide. Interactive participation in conservation efforts by direct forest-dependent folks (locals) within the proximity of protected forests and other nature reserves has been recognised in the Philippines and across the globe as a key ingredient for success in this endeavor.

Arguments for participation of locals in protected area management range from humanistic (ethical, human rights concerns) to those predicated upon pragmatism, resource use efficiency and conflict resolution. A critical element in the quest towards participation, as practical experience and recent research results on the subject indicate, is to integrate the needs of locals into conservation objectives. One of the most common, appropriate and potent means to effect participation is to adopt the framework of the integrated conservation and development (cash income and livelihood generation for and by locals) approach.

Developing and employing the principles and practices of agroforestry through a range of social assessment tools (quantitative surveys, key informants, semi-structured interviews, focused group discussions), the above project had meticulously planned and successfully executed research and development activities that would help abate the degree of human impact on the remaining fragments of the Northwest Panay Low-Elevation Forest (NPLF). It would also help address the survival and socio-economic needs of direct forest-dependent families of farmers, fisherfolks and hunters or immediate project clients. This document is an update on the project's accomplishments.

Propagation of more seedlings of a variety of client-preferred plant species in 17 community-based nurseries.

The 17 nurseries were established for and with 15 people's organisations in 15 village communities and one nursery each on the campuses of the Central High School in Pandan and a Vocational High School in Libertad. Pandan and Libertad are municipalities in the Province of Antique where significant fragments of the NPLF are located. In addition to the 27,719 seedlings (of 21 plant species) propagated during the first year of the project, some 24,246 more had been raised in the second year.

Development of 10 agroforestry systems and component technologies (in direct fulfillment of the requirements for livelihoods and indirectly for forest conservation purposes).

Establishment and development of agroforestry systems

Four (4) multi-strata agroforestry systems had been established, developed and are being managed on coconut-dominated lands in four village communities. These systems are "multi-strata" because of the various canopy layers created by the different species introduced in the huge spaces among coconut trees in a given coconut plantation (to diversify productivity and maximise the use of the land). The systems include coconut trees (in the first stratum), followed by timber and fruit trees (second stratum) and crops such as ginger, pineapple, forage grasses and beans on the last stratum (ground level).

Agroforestry technologies

Honeybee husbandry. Three honeybee colonies had been established and are being managed directly by a selected group of clients who had, during the training in honeybee husbandry, demonstrated outstanding ability to understand the subject matter and to train others.

Honeybees are very active and effective pollinators for many crop types; their integration into agroforestry can improve crop yield. Properly managed honeybee pollination can result in larger, well-formed fruits, berries, vegetables, nuts and seeds. Hence honeybee husbandry can improve agroforestry, forestry and agronomic crop production and productivity.

Tree-planting and management. More than 35 small-scale (0.25-2 ha) plantations of timber and fruit trees had been established by members of the 15 grassroots organisations whose members are the project's immediate clients/beneficiaries. These trees had been planted in degraded areas within watersheds, which the communities feel are very important for

sustaining their water supply; others in vacant backyards, and the rest on lands designated for the DENR's Integrated Social Forestry Programme. These plantations belong to those who planted them for various reasons (cash, construction material, food, forest conservation, watershed stabilization). Students in Pandan Central School will soon be planting over one thousand trees on their campus this month, mainly for shade and boundary delineation.

Installation of biogas digesters. Clients who own livestock, especially pigs, raise them close to their houses, about two to five meters away. The odor of animal waste and from the animals themselves is clearly a health menace in itself because it attracts houseflies and other carriers (undetected, unidentified) of diseases, which take their toll on the lives of rural households. This health hazard is being lessened as animal wastes (in some cases, crop residues) are deposited into biogas digesters. Eight units had been installed in rural households in the five municipalities: Buruanga, Libertad, Malay, Nabas, Pandan. At the time of this update, four biogas digesters are in full operation. Thus, the clients have cut down their dependence on forests for fuel and have not been buying LPG, saving their money to buy other or future needs.

This good news about the biogas is spreading like fire, and requests for more units have been received by the office in the past few months. Moreover, the digested wastes in these biogas digesters are excellent sources of organic fertilizer, which are used to improve soil fertility and for the production of chemical free-vegetables and other crops. The fertilizers produced are also used to increase soil fertility for tree-growing purposes, as much of the areas slated for tree planting are highly degraded.

Seedling dispersal

There are several thousands of seedlings of over 20 plant species that are still in some nurseries. These have yet to be collected later by clients inasmuch as they are still small for outplanting. Some beneficiaries had collected and planted most of the healthy and plantable seedlings.

Completion of community mapping exercises to groundtruth 3-D maps and delineate forest boundaries

Community mapping exercises as well as the delineation of the protected forest have been completed. There is already a map of the area.

Characterisation of mycorrhizal species (which are associated with various plant spe-

cies in the protected forest)

The first draft of this work had been submitted by the team (in Los Banos) that carried out this study; it had been reviewed and is being finalised. The final copy is expected within the second week of (July 2003).

Publications of results

Faunistic and floristic inventories, mycorrhizal characterization, analysis of market and marketing constraints and opportunities, primers on the propagation methods and techniques of six tree species, stakeholder analysis and a detailed quantitative survey on trees that beneficiaries themselves have grown on farms through their own initiatives (for livelihood and other purposes) have been done. Almost all publications had been completed or are in the final stages of completion. Those under completion concern with the faunistic inventory, primers on propagation methods and the detailed quantitative survey. These papers shall be completed and submitted as scheduled.

Training courses, workshops and a field day

All training courses and workshops had been completed. There is a planned field day in which the project's overall accomplishments shall be shared with the public.

Preparation and submission of the Final Report

Collection of data on all activities is being finalised and is expected to be completed on or before 25 July 2003. As agreed, the Final Report shall be submitted on 31 August 2003.

Project Title: Resource assessment, economic valuation and identification of rehabilitation strategies and alternative livelihood options in areas within and surrounding the Batangas Bay, Ragay Gulf and Tayabas Bay, Philippines
Study Leader: Ms. Merlyn Rivera, Ecosystems Research and Development Bureau, College, Laguna, Philippines

This 30-month project was implemented in July 2001 to: conduct a resource inventory and assessment within the surrounding areas of Batangas Bay, Ragay Gulf and Tayabas Bay; describe ecosystems health vis-à-vis prevailing geophysical conditions of the area; identify marine and terrestrial resources of economic and ecological importance in the surrounding communities of the said sites; identify threats to biological resources and areas where rehabilitation strategies may be applied;

assess the economic importance of marine and terrestrial resources in terms of their market and non-market values; identify income-generating/livelihood activities which would lessen the pressure on biodiversity; and lastly, draw up management plans for the conservation of biological diversity in these areas.

The project covers three (3) sites – the Ragay Gulf, Tayabas Bay and Batangas Bay. The project adopted the landscape/watershed approach in studying resources, wherein all levels (upland, lowland and coast/marine) are represented. The study was conducted by a team of scientists with different disciplines.

Among the three sites, the Ragay Gulf's location is the farthest and the first studied site. It is approximately 300 km south of Manila. The Ragay River Watershed was the specific site studied. Identified as the largest watershed in the municipality, Ragay is under the political jurisdiction of Ragay, Camarines Sur with an area of 18,464 ha. The Watershed is composed of 28 barangays. Its main tributary is the Ragay River, which empties into the Ragay Bay and to the Ragay Gulf. It falls under Climatic Type IV under the Corona Classification, which is characterised by evenly distributed rainfall throughout the year. The average rainfall is 12,913 mm.

In the case of Tayabas, the Binahaan River Watershed Forest Reserve is the specific site of study, located at Pagbilao, Quezon. It is about three to four kilometres from the Pagbilao-Atimonan National Road and about 156 km south of Manila. It has a land area of about 1,489.26 ha of forested areas and is drained by the main channel of the Binahaan River or Locohin River from the downstream to the coastal mouth of Pagbilao Bay. The area is categorised under Climatic Type II, which is characterised by a wet season from July to December, and relatively dry from January to June, with an average rainfall of about 5,039 mm.

To date, project management has been able to analyze data gathered on the inventory and assessment of resources from the two sites – Ragay Gulf and Tayabas Bay and rehabilitation measures have been identified as well; initial work has begun in Batangas Bay. The following are the discussions on the preliminary inventory on the resources, particularly flora and fauna, found in the first two sites.

Flora. In assessing plant resources, the project used the Quadrat Sampling Technique. Ragay has a total of 180 species inventoried belonging to 87 families under various forms, namely: tree, shrubs, vines and grass in Quadrats I & IV. The most dominant is the *Vitex parviflora* (molave), *Polyscias nodosa* (malapapaya), *Cordia dichotoma* (anonang), *Cocus nucifera* (cocoanut), and *Samanea saman* (rain tree). In Quadrats II and III, the most dominant species is the *C. nucifera*.

Binahaan, on the other hand, has a total of 199 species belonging to 163 genera and 65 families. The family Moraceae is the most diverse among plant species in the watershed area. Other families with the most number of representative species are Euphorbiaceae and Fabaceae (11), Arecaceae and Poaceae (10), Meliaceae (9) and Rubiaceae (8). Rhizophoraceae is the most prevalent mangrove species.

Fauna. The faunal species observed and found to be existing in the Ragay area include bulbuls, warblers, flycatchers, sunbirds, kingfisher, tree sparrows, wildpigs, monkeys, wild cats, rats, rodents, monitor lizards, and water monitor lizards. There are also mangrove heron, bhramingy kite, white-collared king fisher, Malaysian fantail, crow sunbirds, titmouse, serpent eagle, yellow-vented bulbul and wood swallow.

In Binahaan, a mangrove area was found to have 28 species of birds belonging to 18 families. Fifty (50) per cent of these is endemic to the area and the country, 25% is rather common and another 25% is classified as either migratory and/or introduced. There are also monitor lizards and species of bats found thereat, namely: *Rosettus amplexicaudatus*, *Pteropus vampyrus*, *Eonycteris spelaea* and *Macroglossus lagochilus*.

The uplands of Binahaan Watershed is mostly agroforestry/agricultural in nature. There are a total of 24 bird species under the 19 families sighted and identified. These species include *Passer montanus*, *Pycnonotus goiavier*, *Collocalia esculenta*, *Hypsipetes philippinus* and *Lonchura leucogaster*. Binahaan's forested areas have been found to have other bird species like the *Zosterops nigrorum* and *Pycnonotus goiavier*. There were other bird species caught by mist nets.

Large mammals that are still in existence are the Philippine deer, wildpigs and civet cats.

Eight (8) orders of arthropod species were also observed at the upper and lower streams: shrimps (Decapoda), mites (Acari), pill bugs (Isopoda), caddisflies (Trichoptera), mayflies (Ephemeroptera), bugs (Hemiptera), dragonflies (Odonata) and stoneflies (Plecoptera). The assessment revealed that the upstream portion had more insects than in the downstream area.

The following were also inventoried and assessed: microfungi, coastal and marine resources, hydrology (water and sediment charges, water quality, plankton population), soil and socio-economic component (socio demographic, economic and community profiles). The project has also started identifying alternative livelihood options in the two sites.

The terminal report is expected to be submitted in December 2003, which would incorporate the analyses on the various data gathered from the three project sites. ■